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THE INCIDENCE OF EPIDEMIC INFLUENZA, 1918-19*

A FURTHER ANALYSIS ACCORDING TO AGE, SEX, AND COLOR OF THE RECORDS OF MORBIDITY AND MORTALITY OBTAINED IN SURVEYS OF 12 LOCALITIES

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CONTENTS

Introduction

This report, one of a series of papers from this office on the epidemiology of influenza, is devoted to a discussion of the incidence of the disease in the different sex, age, and color groups of the population during the 1918–19 epidemic, as indicated by surveys made at that time by the United States Public Health Service in certain localities. Summaries of the results obtained in these surveys were published shortly after the surveys were finished;[1] but, as a further contribution to the epidemiological studies of the disease, it seems desirable to give a more detailed account of the results at this time.

The Public Health Service conducted special surveys in a number of widely scattered localities as soon as the 1918–19 epidemic in these

* From the Office of Statistical Investigations, in cooperation with the Office of Industrial Hygiene and Sanitation, United States Public Health Service.

[1] Influenza in Maryland: Preliminary Statistics of Certain Localities. By W. H. Frost and Edgar Sydenstricker. Pub. Health Rep., Mar. 14, 1919. Reprint No. 510.

Epidemiology of Influenza. By W. H. Frost and Edgar Sydenstricker. Pub. Health Rep., Aug. 15, 1919. Reprint No. 550. (Reprinted from J. A. M. A., vol. 73, No. 5, Aug. 2, 1919.)

Statistics of Influenza Morbidity, with Special Reference to Certain Factors in Case Incidence and Case Fatality. By W. H. Frost. Pub. Health Rep., Mar. 12, 1920. Reprint No. 586.

Variations in Case Fatality during the Influenza Epidemic of 1918. By Edgar Sydenstricker. Pub. Health Rep., Sept. 9, 1921. Reprint No. 692.

A list of epidemiological studies of influenza made by the Public Health Service will be found at the end of this article.

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places appeared to have reached its close. The purpose was to determine for a population of known sex, age, and color composition the approximate incidence of the disease in sample areas of a number of widely scattered localities, and also to determine the relations between cases of influenza, cases of pneumonia, and deaths from these causes in so far as the number of observations would permit.

It was necessary to limit the surveys for the most part to localities in which the Public Health Service was at the time maintaining previously established organizations prepared to collect the requisite data reliably and efficiently; but in so far as practicable, the communities were chosen to represent the different geographical sections of the United States. Reference to Table 1 will show that, with the exception of the far West, this object was accomplished in a reasonably satisfactory manner. San Francisco was the only city west of San Antonio, Tex., and Des Moines, Iowa.

The survey included (*a*) 10 cities, varying in population from 22,500 to 680,000; (*b*) certain small towns of Maryland; and (*c*) one rural county of Maryland. The minor towns surveyed in Maryland are usually treated as a single statistical group in this report. In the case of Charles County, the entire population, rather than a sample of it, was made the basis of the survey. This particular survey was made by employees of the U. S. Bureau of the Census, funds having been transferred to that bureau by the Public Health Service for the purpose. The data were tabulated and analyzed by the Public Health Service. Although the canvass included the whole county, one of 12 enumeration districts was later dropped from the records, owing to the presence of a proving ground (Indianhead) which made that district unrepresentative of a general population.

In the case of Louisville, the canvass was made before the wave of the epidemic had run its full course; but in all the other localities the canvass is believed to have comprised practically the whole of the epidemic period. In Baltimore and San Francisco second surveys were made in January and February, respectively, to obtain a record of recrudescences which had taken place in the interval. The cases occurring during these recrudescences are included in the data here reported.

In the case of Spartanburg, S. C., some time after the completion of the canvass in the city itself, an additional survey was made of adjacent mill villages. These villages had a disproportionately large population of one selected class—mill workers—and for this reason the Spartanburg data are not altogether comparable with those collected in other localities.

The canvasses were made as soon as possible after the subsidence of the autumn (1918) wave of the epidemic in each locality. The following table will show the dates on which the surveys were begun and ended:

TABLE 1.—*Localities in which 1918–19 surveys were made, with dates of surveys, estimated total populations, and number of persons canvassed*

Locality	Dates of canvass		Total population (estimated) [1]	Population canvassed	
	Begun	Completed		Number of persons	Per cent of total population
New London, Conn.	Dec. 2, 1918	Dec. 18, 1918	25,000	7,933	31.7
Baltimore, Md.	Nov. 20, 1918	Jan. 31, 1919 [2]	680,000	33,361	4.9
Minor Maryland towns: [3]					
Cumberland	Dec. 1, 1918	Dec. 6, 1918	27,300	5,194	19.0
Frederick	Nov. 27, 1918	Nov. 30, 1918	11,340	2,311	20.4
Lonaconing	Dec. 4, 1918	Dec. 11, 1918	2,000	1,730	86.5
Salisbury	Dec. 10, 1918	Dec. 12, 1918	9,000	1,727	19.2
Downsville [4]	Dec. 7, 1918	do	850	718	84.4
Linganore District (Frederick Co.) [4]	Nov. 29, 1918	do	1,000	688	68.8
Quantico [4]	Dec. 1, 1918	Dec. 10, 1918	2,000	114	5.7
Charles County, Md.	([5])	([5])	[6] 18,326	[7] 18,326	100.0
Spartanburg, S. C.	Dec. 5, 1918	Dec. 31, 1918	22,500	5,257	23.4
Augusta, Ga.	Feb. 1, 1919	Feb. 8, 1919	55,000	4,123	7.5
Macon, Ga.	Dec. 4, 1918	Dec. 14, 1918	50,000	7,905	15.8
Des Moines, Iowa	Jan. 31, 1919	Feb. 8, 1919	115,000	5,857	5.1
Louisville, Ky.	Dec. 6, 1918	Dec. 27, 1918	245,000	12,002	4.9
Little Rock, Ark.	Dec. 2, 1918	Jan. 13, 1919	65,000	9,920	15.3
San Antonio, Tex.	Dec. 5, 1918	Dec. 22, 1918	150,000	12,534	8.4
San Francisco, Calif.	do	Feb. 21, 1919 [8]	475,000	18,682	3.9

[1] Estimated as of July 1, 1918; revised on the basis of other data.
[2] The population included in survey made in November and December was recanvassed in January in order to record cases occurring during a recrudescence of the epidemic.
[3] Total number of persons canvassed in minor Maryland towns was 12,482.
[4] Rural area.
[5] Census as of Mar. 12, 1919.
[6] Actual count in February–March, 1919.
[7] One enumeration district was later excluded from the study (see p. 304), leaving data for 16,147 canvassed persons.
[8] The population included in survey made in November and December was recanvassed in February in order to record cases occurring during a recrudescence of the epidemic.

The population estimates contained in the third column of Table 1 require some comment. Since the epidemic occurred while this country was at war, a number of factors (principally the withdrawal of males for military service) tend to make population estimates more than usually unreliable in the present instance.[2] By the time of the 1920 census the unusual distribution had given way to a more normal one. An estimate based on the 1910 and the 1920 censuses will thus not afford a reliable indication of the population of individual localities in the fall of 1918. Indeed, a satisfactory estimate is impossible, however it be derived. But since the data here presented deal almost entirely with actually enumerated populations in sample areas, estimates of the total population are employed in only a few instances. The estimates adopted for use in the table are based on a number of factors, including an intercensal estimate of the population (calculated arithmetically), allowance having been made for the withdrawal of males for military service; population estimates based on the normal death rates from all causes, exclusive of respiratory infections; infor-

[2] This question has been given detailed consideration in the article, "Difficulties in Computing Civil Death Rates for 1918", by Edgar Sydenstricker and Mary L. King. Public Health Reports, Feb. 13, 1920. Reprint No. 583.

mation secured by Public Health Service officers located in the individual localities; and other available information.

Data were collected by intelligent inspectors working under specific instructions and careful supervision. In each locality these inspectors made a house-to-house canvass in 10 or more enumeration districts so situated geographically as to give, presumably, a fair sample of the general population of the city. Each district contained approximately the same number of families. Homes at which information was not available when the inspector called (owing to the absence of the adults, or for other reasons) were not counted. The effort was made to canvass in each city not less than 5,000 persons, in order to give a group sufficient for simple statistical analyses, and in cities of more than 100,000 population to increase this number so as to give not less than 5 per cent of the total population. These conditions were generally fulfilled.

Regarding each individual in the canvassed populations, the inspectors recorded the name, color, sex, and age at last birthday; whether or not sick since September 1, 1918, with "influenza," "pneumonia," or illness suspected to be influenza (classed as "doubtful"); date of onset, duration, and severity of such illnesses (whether "severe," "moderate," or "light"); and date of death, if death resulted. Regarding each household, the inspectors recorded the number of rooms occupied, and their impressions of the economic status of the family (whether "well-to-do," "moderate," "poor," or "very poor"). This point was recorded by the inspectors without instructions as to the possible definitions of each class.[3]

In making inquiry as to the type or nature of illness, the enumerators were instructed to ask which members of a family had "influenza," "flu," "grippe," "pneumonia," or "colds" since September 1, 1918. Persons who were said to have been only "feeling badly," or as having a "cold" were recorded as "doubtful" cases. If, however, the illness lasted not less than three days and was of such severity as to confine the patient to bed for the whole of one day, the case was classed as "influenza," unless otherwise diagnosed by the attending physician. Cases of illness, if definitely stated to be due to some cause other than "influenza," "pneumonia," or "colds," were not recorded. In view of the difficulties of diagnosis of influenza and the large number of mild cases indistinguishable from common colds, it was believed that the total morbidity from influenza during the epidemic period could be best represented by a figure which would include cases classified during the canvass as "influenza," "grippe," "pneumonia," and "doubtful." The widespread nature of the epidemic minimized the effect of minor

[3] A special study of the data secured in relation to economic conditions has recently been issued: The Incidence of Influenza Among Persons of Different Economic Status during the Epidemic of 1918. By Edgar Sydenstricker. Pub. Health Rep., Jan. 23, 1931, vol. 46, No. 4, (Reprint No. 1444.)

respiratory illnesses unassociated with influenza. The inclusion of "pneumonia" in the figures was, of course, logical, since during the epidemic only a comparatively few pneumonia cases occurred which were not sequelae of influenza.[4]

The sources of error involved in the method of survey outlined are fully appreciated. Although the canvasses were made as soon as possible after current morbidity and mortality reports indicated that the wave of the epidemic had subsided, certain important points had been forgotten by the informants. Especially was this true in regard to the dates involved.

Another source of error arose from the fact that the families' statements were accepted as to diagnosis for a disease the diagnosis of which is especially difficult and uncertain. No other course was open; and it is confidently believed that, owing to the peculiar and widespread nature of the epidemic, the data obtained were sufficiently reliable when used in the mass.

A third source of error lay in the employment of enumerators not specially trained for this work. However, they were carefully selected and the inquiries were purposely made sufficiently simple to permit even untrained persons to obtain the data with such detailed written instructions as were furnished, if under careful supervision.

When due allowance is made for the inevitable errors incident to the method employed, it is still believed that the surveys gave data which represented with reasonable accuracy the influenza morbidity in the localities surveyed. This view is corroborated by a comparison of the chronological incidence of influenza cases in the surveyed populations and the chronological reported mortality for the population as a whole. In the following table this comparison is made for those surveyed localities for which death rates for the total populations were available by weeks.

[4] That the inclusion of "doubtful" cases was justifiable for the epidemic period, for the purposes to which the data were to be put, is clearly indicated in the following table, from which it will be seen that, in Baltimore (the largest sample canvassed), cases classified as "influenza," "pneumonia," and "doubtful" show almost identical chronology. It is to be observed that the "doubtful" cases represent only 11 per cent of the total epidemic morbidity in Baltimore; for the surveys as a whole such cases were 7 per cent of the total—3,216 out of 42,920:

Week ended—	Cases reported by informant as—		Cases classified as "doubtful"	Week ended—	Cases reported by informant as—		Cases classified as "doubtful"
	"Influenza," "grippe"	"Pneumonia"			"Influenza," "grippe"	"Pneumonia"	
Sept. 7	28	6	7	Nov. 9	86	12	18
Sept. 14	52	2	8	Nov. 16	47	7	15
Sept. 21	126	10	14	Nov. 23	29	6	16
Sept. 28	271	32	41	Nov. 30	24	3	15
Oct. 5	1,363	135	165				
Oct. 12	1,605	137	170	Total	5,636	490	736
Oct. 19	1,206	73	156	Percentage of all cases	82.1	7.1	10.7
Oct. 26	524	44	60				
Nov. 2	275	23	51				

TABLE 2.—*Weekly death rates per 100,000 from influenza-pneumonia in total population and weekly influenza case rates per 1,000 in canvassed populations of six localities, by weeks during epidemic of 1918–19* [1]

Week ended—	Baltimore		Cumberland		Augusta		Louisville		Little Rock		San Francisco	
	Death rate in total population	Case rate in canvassed population	Death rate in total population	Case rate in canvassed population	Death rate in total population	Case rate in canvassed population	Death rate in total population	Case rate in canvassed population	Death rate in total population	Case rate in canvassed population	Death rate in total population	Case rate in canvassed population
1918												
Sept. 7	0	1.2	0	2.1	0	1.5	0	1.7	1.5	1.0	1.3	1.5
Sept. 14	1.0	1.9	0	3.1	0	.7	1.2	1.1	0	1.8	1.3	2.5
Sept. 21	.7	4.5	0	7.7	0	1.7	3.7	1.5	0	4.9	2.7	3.5
Sept. 28	2.8	10.3	3.7	33.5	1.8	2.9	1.6	1.4	0	8.6	3.2	3.3
Oct. 5	17.2	49.8	33.0	96.6	3.6	11.2	5.7	22.9	18.5	87.3	2.9	7.2
Oct. 12	82.8	57.3	307.7	123.2	16.4	14.6	37.6	8.6	133.8	95.8	6.3	13.2
Oct. 19	199.6	43.0	402.9	71.4	30.9	14.1	73.5	13.9	146.2	52.1	27.4	27.5
Oct. 26	157.8	18.8	172.2	25.8	61.8	7.3	73.9	5.8	93.8	27.9	116.2	28.8
Nov. 2	58.4	10.5	76.9	12.7	54.5	17.0	28.2	10.5	24.6	20.3	155.4	16.2
Nov. 9	21.6	3.5	40.3	6.7	32.7	11.6	23.7	5.3	9.2	8.9	87.2	9.5
Nov. 16	7.5	2.1	22.0	4.8	34.5	21.6	15.9	9.6	7.7	9.8	41.7	9.4
Nov. 23	5.3	1.5	14.6	4.0	43.6	15.0	14.3	7.0	4.6	7.5	18.9	5.1
Nov. 30	5.9	1.3	7.3	2.1	34.5	13.1	25.3	14.3	13.8	7.9	11.8	4.3
Dec. 7	8.5	1.1	3.7	1.2	23.6	11.4	22.4	18.8	12.3	8.1	10.5	9.0
Dec. 14	10.0	1.0	7.3	-------	16.4	8.2	37.1	6.6	12.3	3.9	14.9	8.2
Dec. 21	10.9	1.4	7.3	-------	12.7	16.5	22.4	1.5	9.2	3.1	28.8	6.8
Dec. 28	8.4	2.5	7.3	-------	10.9	20.1	15.1	-------	10.8	2.4	37.5	12.4
1919												
Jan. 4	7.1	2.5	3.7	-------	29.1	26.7	9.0	-------	10.8	-------	40.8	9.6
Jan. 11	11.0	4.0	-------	-------	63.6	44.9	8.2	-------	13.8	-------	61.1	7.1
Jan. 18	12.2	3.3	-------	-------	70.9	33.2	8.6	-------	36.9	-------	65.3	6.2
Jan. 25	22.1	1.3	-------	-------	65.5	16.0	12.2	-------	21.5	-------	31.4	1.8
Feb. 1	20.3	.2	-------	-------	25.5	5.1	8.2	-------	20.0	-------	12.4	-------

[1] Deaths classified according to date of death; cases classified according to date of onset.

The mortality rates are seen to follow the case incidence rates with considerable exactness, when one takes into account the necessary lag due to the difference between date of onset of the disease and death from it. So far as these few examples justify any conclusion it would appear that, for comparison between communities, with respect to chronology, mortality statistics give results quite similar to those derived from morbidity statistics. In the section on case fatality, however, it will be shown that entirely misleading results as to actual incidence of the disease would be obtained from judging by mortality alone.

Total Epidemic Morbidity (Influenza Incidence)

GENERAL ASPECTS

The observations made during the surveys relate to 146,203 persons, 42,920 cases, and 730 deaths. In view of the fact that the record of the morbidity from influenza practically disappears between epidemics and is extremely incomplete during epidemics, special significance must attach to the results of such a canvass. Although the data can not in themselves give an accurate picture of the incidence of the disease or of its case fatality in diverse parts of the country, they do indicate the incidence and fatality for the samples surveyed

and thus—in view of the correlation chronologically with the more general records noted in the introduction—for the particular cities in which the surveys were made. Accordingly, they serve as a check upon the precision of other morbidity data, and indicate in a general way certain highly important relations between morbidity and mortality.

The general incidence of influenza ("total epidemic morbidity") in the areas canvassed will be the first point to be taken up. In a later section of the report it will be shown that this incidence was not greatly different in the white and colored population. Because of this fact, and because of the small proportion of colored in most of the localities, no considerable error will be introduced into the following discussion by combining the white and colored rates.

TABLE 3.—*Incidence of influenza in canvassed populations of each surveyed locality during the epidemic of 1918–19*

Locality	Rate per 1,000	Number of cases	Number of persons	Locality	Rate per 1,000	Number of cases	Number of persons
All localities	294	42,920	146,203	Baltimore, Md	246	8,199	33,361
				Des Moines, Iowa	231	1,353	5,857
San Antonio, Tex	535	6,701	12,534	San Francisco, Calif	215	4,021	18,682
Minor Maryland towns	405	5,060	12,482	Spartanburg, S. C	214	1,126	5,257
Charles County, Md	405	6,546	16,147	Macon, Ga	213	1,681	7,905
Little Rock, Ark	359	3,565	9,920	New London, Conn	185	1,466	7,933
Augusta, Ga	341	1,405	4,123	Louisville, Ky.[1]	150	1,797	12,002

[1] Survey made before epidemic had ended.

The rate for all localities is 294 per thousand persons. In other words, one out of every three or four persons in the canvassed populations reported that they had influenza during the autumn wave of the epidemic and the recurrence. Other studies made by the same method in various parts of the country give substantially the same results, and a tabulation of these studies by Jordan is of interest at this point.

TABLE 4.—*Incidence of influenza (autumn wave, 1918) in canvassed populations of various United States communities* [1]

Locality	Rate per 1,000	Number of cases	Number of persons canvassed	Locality	Rate per 1,000	Number of cases	Number of persons canvassed
Oswego, N. Y.[2]	470	6,094	12,952	Watertown, N. Y.[2]	282	5,765	20,473
Millville, N. J.[3]	406	4,749	11,686	Gloucester, N. J.[3]	245	2,930	11,969
Bridgeton, N. J.[3]	289	3,845	13,319	New Britain, Conn.[4]	234	645	2,757

[1] From Epidemic Influenza, by E. O. Jordan, p. 190.
[2] Some Statistics of Influenza in Oswego and Watertown in 1918. Official Bull. N. Y. State Department of Health, 4:53.
[3] Report of Bureau of Local Health Administration. State Department of Health of New Jersey, 42:28.
[4] Statistics of the 1918 epidemic of influenza in Connecticut. Winslow, C.-E. A., and Rogers, J. F. Journ. Infect. Dis., 26:185.

It is of interest to contrast these results with those for the Army, remembering that in the latter case the population is concentrated at

those ages when the incidence was particularly high. The rates for four months of 1918 (September–December), corresponding approximately to the period covered by the Public Health Service surveys, are given in Table 5. The rates are for hospital admissions for influenza, bronchitis, broncho-pneumonia, and lobar pneumonia combined, and are exclusive of sickness occurring among the troops in Europe.

TABLE 5.—*Incidence of total respiratory diseases* [1] *in Army in the United States, (admissions) September to December, inclusive, 1918* [2]

Rate per 1,000	310.4
Cases	424,074
Mean strength	1,366,016

[1] Influenza, bronchitis, broncho-pneumonia, and lobar pneumonia.
[2] Compiled from data given in the Medical Department of the United States Army in the World War. Vol. IX. Communicable and Other Diseases. Prepared by Lieut. Col. Joseph F. Siler. Chapter 2: Inflammatory Diseases of the Respiratory Tract, by Maj. Milton W. Hall.

With this picture before us, we are able to establish in a broad way what the incidence of influenza was during the 1918 epidemic, and the results secured in the surveys by the Public Health Service seem to give a rather representative mean.

Detailed house-to-house surveys in England, comparable to the canvass by the Public Health Service, were made in a number of towns for the summer and autumn waves of 1918, giving considerably lower rates than those indicated for this country. Table 6 summarizes these results (also from Jordan).

TABLE 6.—*Comparison of influenza incidence rates per 1,000 in English towns 1918* [1]

Locality	Summer	Autumn	Total	Persons
Manchester [2]	149	103	252	4,666
Leicester [3]	63	146	209	4,619
Cambridge [4]	36	165	201	
Warrington [5]	75	82	157	1,626
Newcastle-upon-Tyne [6]	62	47	109	4,461

[1] From Epidemic Influenza, by E. O. Jordan, p. 194.
[2] Analysis of the results of a block census undertaken in Manchester in December, 1918. 1920. Ministry of Health. Report on the Pandemic of Influenza, 1918-19. London. P. 456. By T. Carnwath.
[3] Report on an inquiry into the recent epidemic of influenza in the county borough of Leicester. 1920. Ministry of Health. Report on the Pandemic of Influenza, 1918-19. London. P. 445. By M. B. Arnold.
[4] Report on incidence of influenza in the University and Borough of Cambridge, and in the Friends School, Saffron Walden. 1920. Ministry of Health. Report on the Pandemic of Influenza, 1918-19. London. P. 388. By S. M. Copeman.
[5] Report on an investigation of the incidence and effects of influenza among the population of Warrington (Lancs.). 1920. Ministry of Health. Report on the Pandemic of Influenza, 1918-19. London. P. 539. By G. W. N. Joseph.
[6] Analysis of an influenza census at Newcastle-upon-Tyne. 1920. Ministry of Health. Report on the Pandemic of Influenza, 1918-19. London. P. 556. By S. J. Clegg.

Returning again to the canvass made by the Public Health Service, it will be noted that the highest rate was in San Antonio, where one out of every two persons reported having the disease. The range of variation in the rates is considerable, the rate in San Antonio being nearly three times that in New London. The canvassed populations are so large that only a relatively small part of this fluctuation can be

explained as being due to chance.[5] However, in several widely separated localities the incidence rate varied only within narrow limits.

A cursory examination of the rates in the different localities will show that no consistent relation is manifested between the rates and the geographic position of the localities. If the New England and Maryland localities are grouped together and contrasted with the central and southern localities, the rates in the two groups will be found to be practically identical, namely, 304 and 306, respectively.

AGE

A marked selective effect on the incidence of influenza was exerted by age during the epidemic of 1918–19. This observation, which is common to nearly all reports on the epidemic, is corroborated by the data secured in the surveys. What they show most clearly is a very heavy incidence in the younger ages and a definite contrast with the curve of mortality.

The influenza morbidity rates for each 5-year age group for all surveyed localities are given in Table 7.

TABLE 7.—*Incidence of influenza among canvassed persons in each age group in all surveyed localities during the epidemic of 1918–19*

Age group	Rate per 1,000	Number of cases	Number of persons
All ages	294	[1] 42,920	[2] 146,203
Under 1	207	586	2,838
1–4	337	4,016	11,933
Under 5	312	4,602	14,771
5–9	391	5,755	14,725
10–14	381	5,404	14,182
15–19	345	4,448	12,897
20–24	323	3,967	12,287
25–29	337	4,127	12,234
30–34	326	3,805	11,668
35–39	296	3,276	11,074
40–44	236	2,219	9,415
45–49	207	1,688	8,157
50–54	175	1,102	6,628
55–59	162	698	4,323
60–64	143	537	3,756
65–69	135	332	2,456
70–74	111	189	1,703
75 and over	88	145	1,650

[1] Includes 566 of unknown age. [2] Includes 4,277 of unknown age.

It will be noted that the incidence was highest in the age group 5 to 9, fell off progressively in the age groups from 10 to 24, rose to

[5] Even in the case of New London, which has one of the smallest surveyed populations, the probable error of the rate is less than 7 per 1,000 persons. This calculation is based on the formula

$$0.6745\sqrt{\frac{pq}{n}} \text{ or } \sqrt{\frac{(\text{rate})\ (1000-\text{rate})}{n}}$$

where p is the chance that an individual will have a case, q the chance that he will not, and n the size of the canvassed population. The probable error is applicable because there were relatively few instances where one person reported having more than one case.

a minor second mode in the age group 25 to 29, and then declined progressively in successive age groups. Among old people the incidence appeared to be not more than one-third of that among the young.

Through the courtesy of the health officers of the States of Kansas and Maryland, reports of cases of influenza in these States were available for statistical analysis. Without going into the results of these studies in any detail, a comparison by age is of interest for corroborative purposes. There was, of course, no expectation that any great proportion of the cases occurring would be reported to the health departments of the States, but it was felt that the relative incidence by age might not be greatly affected by this limitation. In order to permit a comparison between the surveyed data and the data for the two States, the rates have been reduced to an index basis by dividing by the rate for all ages. Thus the three curves are put on a relative basis, and the actual height becomes of no significance.

TABLE 8.—*Relative incidence of influenza by age in surveyed localities, in Kansas, and in Maryland during epidemic of 1918–19 (rate for each age group divided by rate for all ages)*

Age group	Surveyed localities	Kansas	Maryland	Age group	Surveyed localities	Kansas	Maryland
Under 5	1.04	0.73	0.73	45–49	0.69	0.59	0.58
5–9	1.30	1.28	1.29	50–54	.58	.34	.40
10–14	1.27	1.34	1.36	55–59	.54		.31
15–19	1.15	1.34	1.47	60–64	.48		.24
20–24	1.08	1.30	1.40	65–69	.45	.19	.20
25–29	1.12	1.36	1.29	70–74	.37		
30–34	1.09	1.34	1.22	75 and over	.29		
35–39	.99	1.09	.96	All ages	1.00	1.00	1.00
40–44	.79	.88	.71				

The results are represented graphically in Figure 1. In general, the curves for Kansas and Maryland correspond to the curve for the survey, although the former show a tendency to fall off more rapidly with age. This may be due to a greater tendency not to report sickness among old people to the health authorities. At all events, it is the similarity of the three curves, rather than any differences, which is most striking.

The age curves in each of the surveyed localities may next be considered. These curves are given, in 5-year age groups, in Figure 2 and Table 9. For the graph, as in the preceding case, the ratios of the rate in each age group to that for all ages are used so that the age incidence in the different localities may be readily compared.

TABLE 9.—*Incidence of influenza by age in each locality during epidemic of 1918–19*

[Rate per 1,000]

Age group	New London	Baltimore	Minor Maryland towns	Charles County, Md.	Spartanburg	Augusta	Macon	Des Moines	Louisville	Little Rock	San Antonio	San Francisco
Under 5	180	283	414	380	252	388	247	274	238	366	488	209
5–9	230	366	493	448	253	480	318	350	268	463	609	281
10–14	224	317	512	486	238	416	264	233	211	460	625	290
15–19	177	289	493	508	232	325	219	220	142	384	598	235
20–24	207	275	476	493	250	326	207	240	169	335	590	236
25–29	236	314	485	465	221	412	225	261	143	392	598	262
30–34	210	295	488	441	217	388	202	249	188	378	590	258
35–39	221	229	421	407	214	398	238	235	135	386	527	225
40–44	173	185	321	349	168	242	196	219	113	262	464	185
45–49	169	158	300	277	158	298	142	162	93	278	410	157
50–54	121	135	266	255	152	284	132	138	84	213	379	121
55–59	72	131	211	229	124	208	160	161	64	199	330	97
60–64	108	124	183	211	130	247	89	140	66	222	234	80
65–69	103	112	201	181	75	283	63	125	83	136	294	72
70–74	74	79	145	147	132	214	67	138	51	211	247	78
75 and over	20	56	109	119	150	275	45	36	49	236	230	33

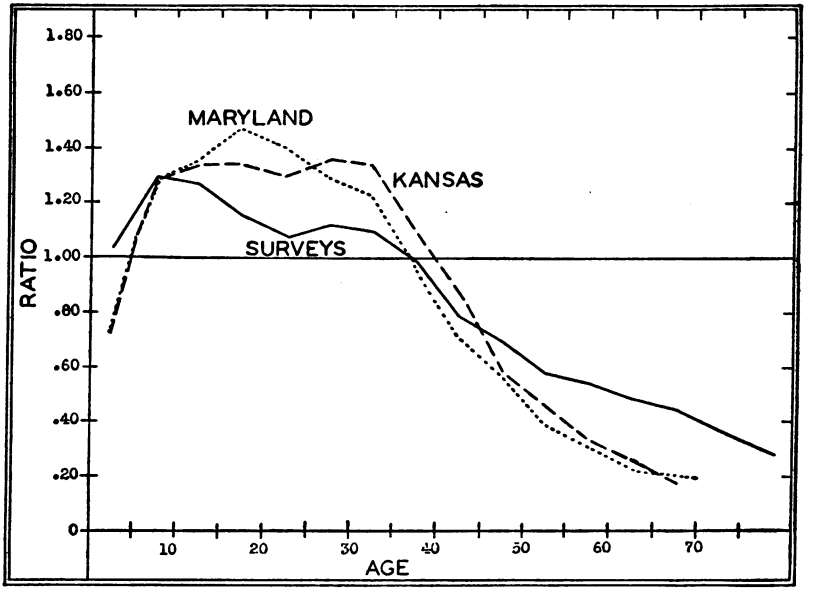

FIGURE 1.—Relative incidence of influenza by age in surveyed localities, in Kansas, and in Maryland, during 1918–19 epidemic (ratio of rate in each age group to that in all ages)

Although minor differences are noted in the incidence in various age groups, the essential similarity in the different localities—if we neglect the actual level of the rates already considered—is much more striking than these slight differences, indicating quite conclusively that the selective incidence in relation to age was a marked characteristic of this epidemic in each locality. The peak in the

younger ages, with a gradual decline in the rates after age 30 or 35, is found in every locality.

Perhaps of greatest interest is the suggestion that the double peak indicated in the data for all surveyed localities and in the reported morbidity for Kansas is really significant. The only curve which

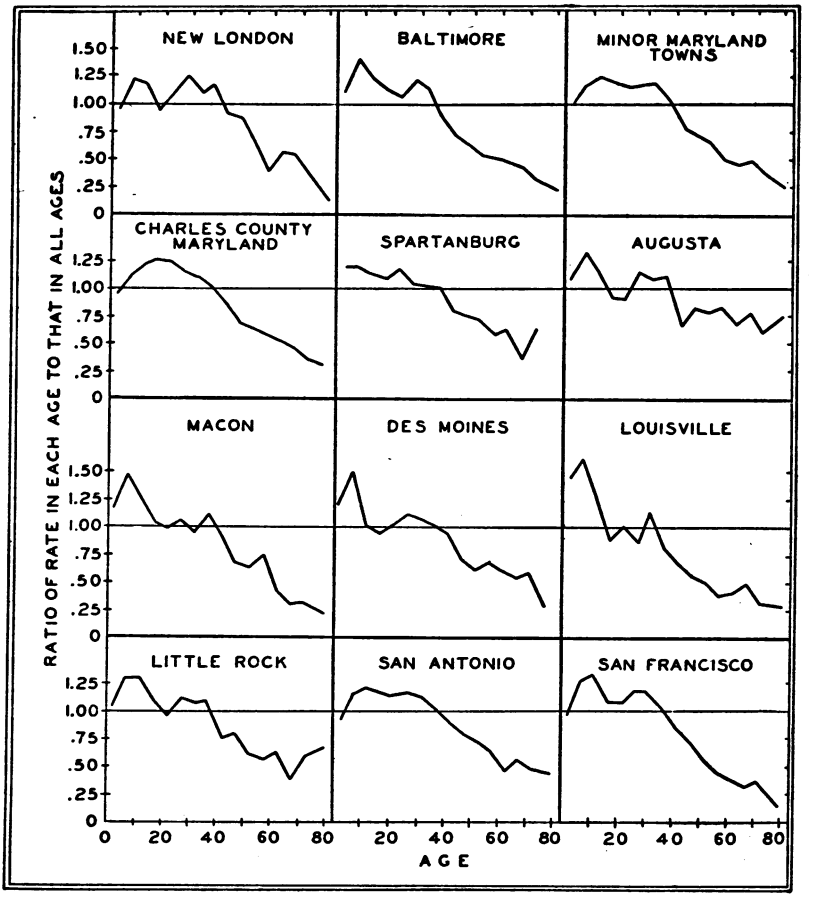

FIGURE 2.—Ratio of influenza case incidence in each age group to that in all ages in a canvassed population of each surveyed locality

does not give a suggestion of the two peaks is that for a rural area (Charles County). The first peak usually occurs in the age group 5 to 9 and the second peak in the age group 25 to 29. This bimodal tendency is analyzed in Table 10, giving the age group in which the two modes occur in each locality.

TABLE 10.—*Age groups when first and second modes occur in each surveyed locality during epidemic of 1918–19*

Locality	Age group when—	
	First mode occurs	Second mode occurs
Spartanburg	[1] 0–9	20–24
Baltimore	5–9	25–29
New London	5–9	25–29
Augusta	5–9	25–29
Des Moines	5–9	25–29
Little Rock	5–9	25–29
Louisville	5–9	30–34
Macon	5–9	35–39
San Antonio	10–14	25–29
San Francisco	10–14	25–29
Minor Maryland towns	10–14	30–34

[1] Same rate for 0–4 and for 5–9.

In practically every case the second mode is quite definite, but it should be pointed out that in only one locality (New London) is the second mode higher than the first.

Reference may be made to the fact that W. T. Vaughan, in a house-to-house survey of 10,000 persons in Boston, also found two peaks of age incidence.

Question arose as to the advisability of adjustment of the rates for influenza in the various surveyed localities to a standard age or age and sex distribution of the population. Such adjustments were worked out, but found to be too slight in their effect to warrant their use in this paper, except for certain comparisons between the sexes.[6]

INCIDENCE OF INFLUENZA IN THE TWO SEXES

The morbidity rate of influenza as obtained in these canvasses was slightly higher for women than for men, the rate for all localities being 307 and 294, respectively, after adjustment to a standard age

[6] To bring out the rather slight effect of adjustment for age and sex, the following table is reproduced. The rates for the different localities differ somewhat from those used previously, because in this case it was necessary to base the rate on persons of known ages.

Locality	Actual rate per 1,000 known ages	Rate per 1,000 adjusted to standard population (all surveyed localities)			
		By age		By age and sex	
		Rate	Ratio to actual	Rate	Ratio to actual
All localities	298	301	1.01	300	1.01
San Antonio, Tex	536	525	.98	522	.97
Minor Maryland towns	408	418	1.02	417	1.02
Charles County, Md	406	405	1.00	405	1.00
Little Rock, Ark	360	356	.99	354	.98
Augusta, Ga	359	362	1.01	359	1.00
Baltimore, Md	253	260	1.03	258	1.02
Des Moines, Iowa	232	235	1.01	233	1.00
Spartanburg, S. C	217	214	.99	212	.98
San Francisco, Calif	216	219	1.01	218	1.01
Macon, Ga	213	216	1.01	212	1.00
New London, Conn	187	189	1.01	188	1.01
Louisville, Ky	158	165	1.04	165	1.04

distribution. The rates for women were higher in nearly every locality. The differences are brought out in Table 11. Adjustment seemed advisable, because of the possible effect of the withdrawal of males for military duty. As a matter of fact, this adjustment made little difference in the ratio between the two sexes, the unadjusted rates being 304 and 292 for women and for men for all known ages and 299 and 288 for all ages.

TABLE 11.—*Incidence of influenza by sex in each surveyed locality (adjusted to standard age distribution) during epidemic of 1918–19*

Locality	Rate per 1,000		Ratio of female rate to male	Locality	Rate per 1,000		Ratio of female rate to male
	Male	Female			Male	Female	
All localities	294	307	1.04	San Francisco	213	222	1.04
				San Antonio	514	530	1.03
Macon	194	229	1.18	Augusta	357	364	1.02
Minor Maryland towns	406	459	1.13	Charles County, Md	403	406	1.01
Spartanburg	200	220	1.10	Des Moines	229	231	1.01
Baltimore	248	270	1.09	Louisville	166	164	.99
New London	185	192	1.04	Little Rock	352	345	.98

When it is realized that in a large proportion of families the information was secured from the wife, it seems possible that this slight excess for women might be due to the fact that they were able to remember their own cases somewhat better than the cases of other members of the family. A tendency of this character has been noted in other studies where the information was secured in this manner.[7] Thus the only conclusion which is really justified is that there was no *marked* difference in the rates of the two sexes.

In Table 12 and Figure 3 comparison is made by sex for the different ages.

TABLE 12.—*Incidence of influenza among canvassed males and females in each age group, in all surveyed localities during epidemic of 1918–19*

Age group	Rate per 1,000		Number of cases		Number of persons	
	Male	Female	Male	Female	Male	Female
All ages	288	299	19,742	23,169	68,684	77,495
Under 1	214	199	301	284	1,407	1,427
1–4	348	325	2,081	1,933	5,984	5,945
Under 5	322	301	2,382	2,217	7,391	7,372
5–9	388	394	2,845	2,910	7,342	7,382
10–14	379	383	2,649	2,755	6,994	7,187
15–19	332	356	1,985	2,461	5,986	6,909
20–24	288	343	1,267	2,699	4,405	7,881
25–29	328	344	1,624	2,503	4,953	7,281
30–34	320	331	1,723	2,082	5,385	6,283
35–39	295	296	1,638	1,638	5,546	5,527
40–44	242	230	1,112	1,107	4,592	4,823
45–49	200	215	850	838	4,250	3,907
50–54	167	184	555	607	3,319	3,308
55–59	157	166	334	363	2,130	2,192
60–64	128	157	237	300	1,848	1,908
65–69	132	138	154	178	1,170	1,286
70–74	114	108	85	104	744	959
75 and over	83	92	58	87	702	948

[7] The Illness Rate Among Males and Females. By E. Sydenstricker. Pub. Health Rep., vol. 42, No. 30, July 29, 1927. (Reprint 1172.)

Except for the youngest ages, there is a tendency for the female rates to be higher, but, as just pointed out, the difference is slight. The ratios of female rates to male rates for broad age groups are as follows: Under 15 years, 0.99; 15 to 44, 1.07; 45 to 59, 1.07; and 60 and over, 1.09. The age curves are practically identical in the two sexes, the only difference between the two being the greater depression in the male curve between the two modes. In fact, the female curve shows only a bare suggestion of the second mode.

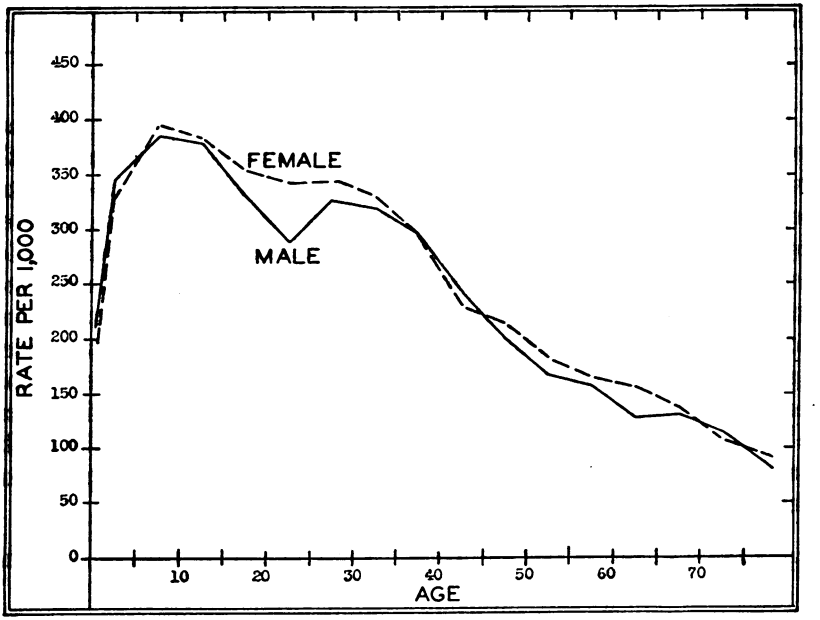

FIGURE 3.—Incidence of influenza among canvassed males and females in each age group (all surveyed localities)

INCIDENCE IN COLORED POPULATION

Since a number of the cities had a considerable colored population, it is of interest to determine whether a larger percentage of white or colored were attacked. We are faced immediately with the difficulty of getting as complete information from the colored as from the white in a canvass of this character; thus any results must be discounted. No rates have been used for all the surveyed localities, because of the varying proportion of colored persons in the different localities. The rates in the eight places where there was a sufficient number of colored to give somewhat reliable results are given in Table 13, adjustment having been made to a standard age and sex distribution.

TABLE 13.—*Incidence of influenza in white and colored canvassed populations during the epidemic of 1918–19 (adjusted to a standard age and sex distribution)*

Locality	Rate per 1,000		Ratio of colored to white	Number of cases		Number of persons	
	White	Colored		White	Colored	White	Colored
Louisville	179	49	0.27	1,739	58	10,534	1,465
Baltimore	278	116	.42	7,690	481	29,085	4,195
Augusta	456	212	.47	1,044	361	2,434	1,689
Macon	220	137	.62	1,337	341	5,971	1,930
Spartanburg	224	173	.77	1,033	84	4,652	581
Minor Maryland towns	419	385	.92	4,794	249	11,782	643
Little Rock	360	338	.94	2,657	908	7,262	2,654
Charles County, Md	[1] 379	[1] 431	1.14	3,028	3,518	7,992	8,155

[1] Rates for Charles County unadjusted; adjustment made only a slight difference in the ratios.

With the exception of Charles County, Md. (see p. 304 for information as to method of survey in this locality), the rates are consistently lower for the colored populations. In Louisville, Baltimore, and Augusta the rate is at least twice as great in the white as in the colored population. The fact that the colored population live generally under conditions presumably more favorable to the spread of contact infections would lead one to expect a higher rate of influenza among them. How much of the difference is to be ascribed to more complete reporting among the white populations is quite impossible to determine. Some confirmation of this difference between the incidence of influenza in white and colored is given by the rates for the Army while in the United States. The period covered in the table is September–December, 1918.

TABLE 14.—*Incidence of total respiratory[1] disease by color in Army in the United States, September–December, inclusive, 1918*[2]

	White	Colored
Rate per 1,000	316	269
Number of cases	383,498	40,576
"Strength"	1,215,447	150,569

[1] Influenza, bronchitis, broncho-pneumonia, lobar pneumonia.
[2] Compiled from data given in the Medical Department of the United States Army in the World War. Vol. IX. Communicable and Other Diseases. Prepared by Lieut. Col. Joseph F. Siler. Chap. 2: Inflammatory Diseases of the Respiratory Tract, by Maj. Milton W. Hall.

One further table is presented giving the incidence of influenza by color in the two sexes. The tendency for higher rates in the white population is evidently present in both sexes.

TABLE 15.—*Incidence of influenza by sex and color in certain canvassed localities during epidemic of 1918–19*

Locality	Rate per 1,000			
	Male		Female	
	White	Colored	White	Colored
Louisville	169	43	162	37
Baltimore	255	98	272	129
Augusta	427	197	430	225
Spartanburg	207	135	235	152
Macon	198	171	246	180
Little Rock	377	308	355	371
Minor Maryland towns	397	330	415	432
Charles County, Md	383	419	374	445

The Frequency of Pneumonia as a Complication

GENERAL ASPECTS

The 1918–19 epidemic of influenza was notably different from the 1889–90 epidemic in a much higher frequency of pneumonia and consequently a much higher mortality, especially among young adults. The record of pneumonia cases in the areas canvassed by the Public Health Service is therefore of interest, particularly in view of the inadequacy of pneumonia morbidity reports during either epidemic or normal periods. As noted in the introduction, cases were classified in these surveys as "pneumonia" when so reported by the householder. No attempt could be made to diagnose the cases or to inquire of the physician in charge as to the diagnosis made by him. Deaths from influenza were classed as pneumonia cases even when not so specified on the census report.

The results obtained in Charles County are evidently not comparable to those obtained in the other localities, since in this county there were only 102 pneumonia cases recorded, whereas there were 147 deaths from influenza-pneumonia. The deaths in this instance were presumably complete, as the results of the survey were checked up with the death certificates in the State registrar's office; but since it may be assumed that epidemic deaths were due almost always to complicating pneumonia, and since by no means all of the pneumonia cases resulted in death,[8] clearly the pneumonia cases were not complete. Because of these obvious inconsistencies, the records from Charles County have been omitted from all discussions of pneumonia morbidity.

The following table gives the pneumonia incidence for all localities (except Charles County) and for each locality.

[8] If we were to assume completeness of recording nonfatal cases of pneumonia, we would have a fatality rate in Charles County of 82 per cent, whereas in the other localities the average is about 25 per cent.

TABLE 16.—*Incidence of pneumonia in canvassed population of each surveyed locality during epidemic of 1918–19*

Locality	Rate per 1,000	Number of cases	Number of persons	Locality	Rate per 1,000	Number of cases	Number of persons
All localities [1]	17.6	2,290	130,056	New London	17.1	136	7,933
Minor Maryland towns	25.8	322	12,482	Little Rock	16.0	159	9,920
San Antonio	24.2	303	12,534	Augusta	15.3	63	4,123
Des Moines	23.6	138	5,857	Macon	13.0	103	7,905
Baltimore	18.0	599	33,361	Louisville	9.2	111	12,002
San Francisco	17.2	321	18,682	Spartanburg	6.7	35	5,257

[1] Exclusive of Charles County, Md.

The pneumonia case rate for all localities (except Charles County) was 17.6 per 1,000 persons, as compared with 280, the influenza rate, for the same localities. In other words, the percentage of influenza cases complicated by pneumonia, as determined in these surveys, was 6.3. A more detailed comparison with influenza morbidity will be taken up later. At this point it is desirable to summarize the pneumonia data themselves.

The most striking feature of the pneumonia rates is their wide range. The minor Maryland towns have a rate four times as great as that of Spartanburg (surveyed population, 5,257) and nearly three times as high as Louisville (surveyed population, 12,002).

Another point of interest is that the cities with the lowest rates are invariably in the south central part of the country, where, it is believed, the epidemic was somewhat less severe. The combined pneumonia rate for Augusta, Macon, Louisville, and Spartanburg was 10.7, whereas it was 19.6 in the other localities combined.

AGE

The toll of the epidemic in young adult life is depicted clearly by the rates for cases of pneumonia recorded in these surveys. The pneumonia incidence in each age group for all localities is presented in Table 17. The numbers are evidently sufficient for quite reliable results.

TABLE 17.—*Incidence of pneumonia by age in all localities, exclusive of Charles County, Md., during epidemic of 1918–19*

Age group	Rate per 1,000	Number of cases
All ages	17.6	2,290
Under 1	24.9	60
1–4	26.0	264
Under 5	25.8	324
5–9	14.8	186
10–14	11.5	137
15–19	15.5	173
20–24	23.1	256
25–29	31.1	352
30–34	25.7	279
35–39	21.0	213
40–44	13.0	112
45–49	9.8	73
50–59	8.3	82
60–69	9.3	51
70 and over	6.5	19

There are two marked peaks. The incidence is high in children under 5 years of age, although not any higher in the first year of life than in the years immediately following. The second mode occurs in young adult life, the highest point being found in the age group 25 to 29, where the rate is three times that in the age group 10 to 14. As age advances, the rate falls off rapidly. By 50 years of age it is already one-half of the rate for the age group 25 to 29. A direct comparison with the incidence of influenza as a whole is postponed until later, but it may be pointed out that the bimodal effect noted in the case of influenza is much more marked in the case of pneumonia alone. In both the incidence falls off steadily with age after the second peak.

So striking is this bimodal tendency for pneumonia curves according to age during the epidemic that it seems well to present the rates by age for the individual localities. The numbers are limited, and it has been necessary to combine certain age groups. The data are given in Table 18 and Figure 4.

TABLE 18.—*Incidence of pneumonia in each canvassed locality, by age, during epidemic of 1918–19* [1]

Age group	Rate per 1,000 persons canvassed										
	New London	Baltimore	Minor Maryland towns	Spartanburg	Augusta	Macon	Des Moines	Louisville	Little Rock	San Antonio	San Francisco
Under 5	11.1	27.3	38.2	10.4	29.6	17.5	37.4	22.2	16.3	20.4	20.2
5–9	9.0	13.4	21.6	3.2	23.1	11.7	50.0	8.5	7.8	14.7	8.7
10–14	7.8	11.3	15.2	3.8	7.4	7.3	14.2	9.2	10.9	11.2	10.6
15–19	12.4	18.5	19.3	4.3	13.2	10.4	18.0	6.1	11.7	20.1	15.2
20–24	25.4	21.1	37.0	6.0	18.0	11.2	25.7	9.4	24.1	39.8	14.7
25–29	44.4	29.4	39.7	9.1	26.9	14.8	38.7	11.0	22.1	42.2	30.7
30–34	28.7	21.8	46.2	8.8	26.7	14.6	24.7	11.7	24.7	34.4	22.8
35–39	19.0	18.4	38.8	4.9	7.4	15.7	16.3	10.6	18.3	31.9	17.7
40–44	10.4	10.7	14.9	6.1		16.5	10.4	4.7	9.8	13.7	17.7
45–59	6.9	7.2	9.3	1.2	9.2	8.3	5.8	3.6	9.5	17.4	10.6
60 and over	5.4	9.4	3.9		4.5	2.1	8.9		6.9	8.7	9.0

[1] Inclusion of deaths from influenza as pneumonia cases was not possible in this table, except where the case was originally recorded as pneumonia. The rates, however, are not more than about 7 per cent too low.

The marked bimodal effect is noted in each locality without any exception. In all but one city the first peak comes in the under 5-year age group. Usually the second peak is in the age group 25 to 29, but in three instances it is in the age group 30 to 34, and in one in the age group 35 to 39. It is evident that the location of these modes is subject to a certain chance variation.

This strikingly high incidence of pneumonia in the young adult population, reaching a peak of nearly 5 per cent in some of the localities in the modal age group, is obviously at great variance with the normal age distribution of pneumonia. An idea of this difference may be obtained from a comparison of the age curve secured in this canvass with that for Hagerstown, Md., during a period (December 1, 1921, to April 1, 1924) without major epidemic waves, the data

having been secured in house-to-house canvasses during this period by the Public Health Service.[9] No comparison of the actual level of the morbidity rates seems feasible or of consequence in this connection, in view of the varying periods for which the sickness data

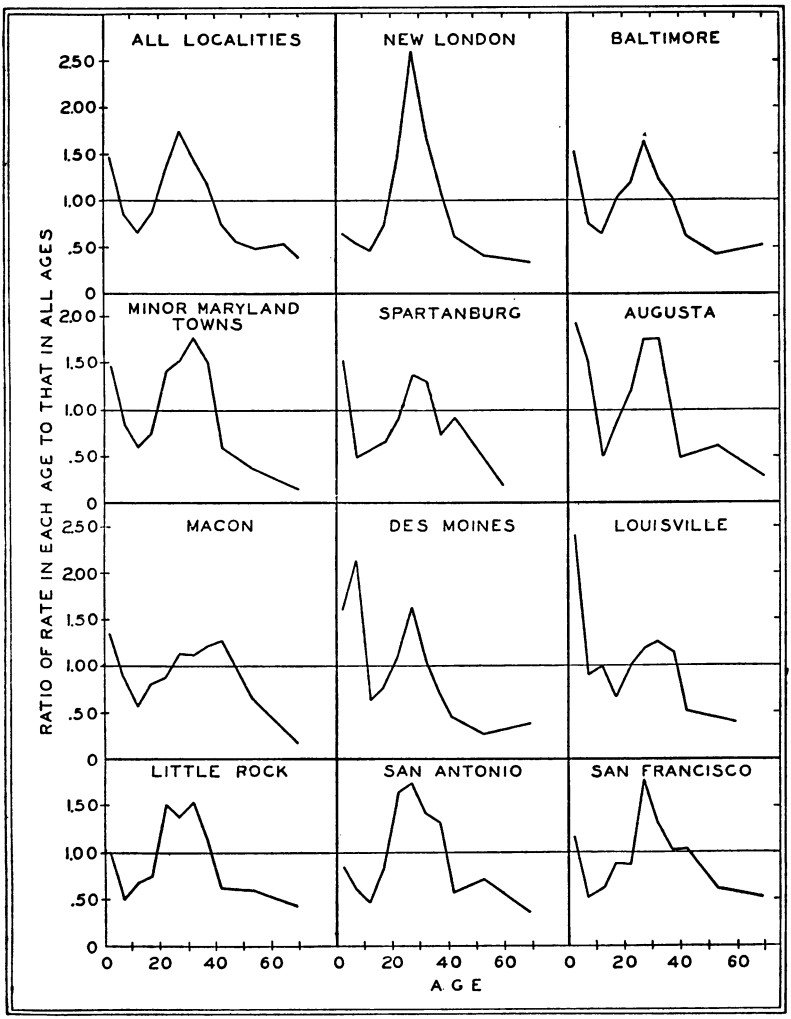

FIGURE 4.—Ratio of pneumonia case incidence in each age group to that in all ages in a canvassed population of each surveyed locality

in the various localities were secured. Comparison may be made most easily by reducing each series of rates to an index basis by dividing by the rate for all ages. These indices are given in Figure 5 and Table 19.

[9] The Incidence of Various Diseases according to Age. Hagerstown Morbidity Studies No. VIII. By Edgar Sydenstricker. Public Health Reports, May 11, 1923. (Reprint No. 1227.)

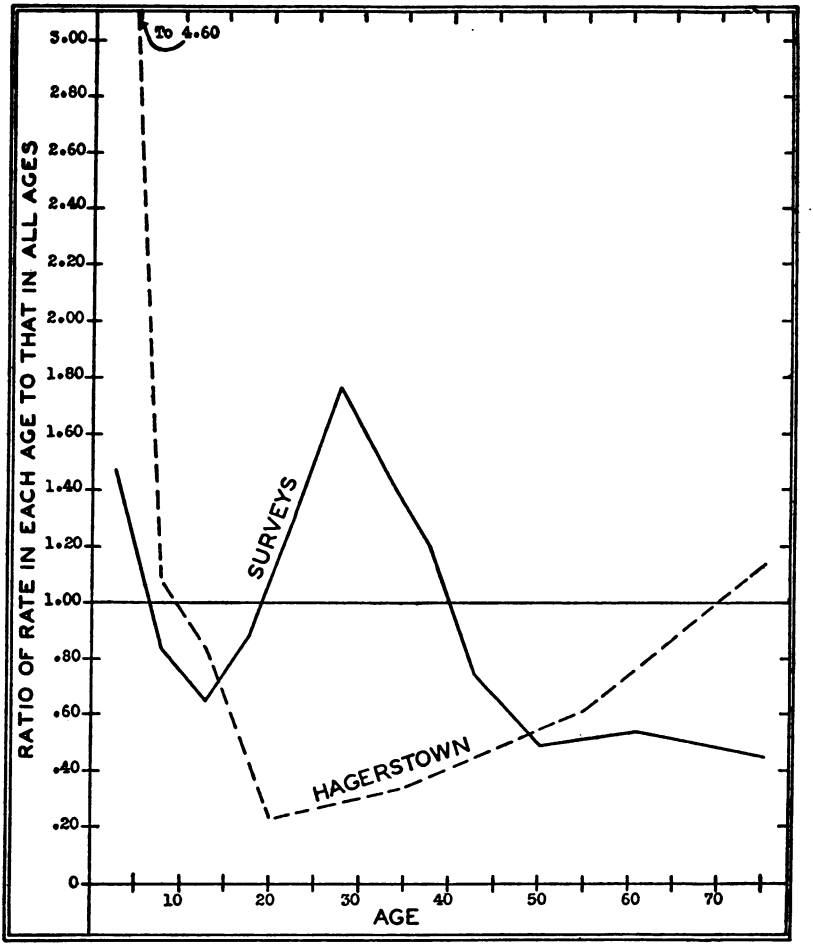

FIGURE 5.—Relative incidence of pneumonia by age in surveyed localities and in Hagerstown, Md. (data for Hagerstown from a previous sickness survey)

TABLE 19.—*Relative incidence of pneumonia by age in surveyed localities during 1918–19 epidemic and in Hagerstown sickness study (rate for all ages=1.00)*

Age group	Rates per 1,000		Indices	
	Surveyed localities	Hagerstown [1]	Surveyed localities	Hagerstown
Under 5	25.8	40.0	1.47	4.60
5–9	14.8	9.5	.84	1.09
10–14	11.5	7.0	.65	.84
15–19	15.5	2.0	.88	.23
20–24	23.1		1.31	
25–29	31.1		1.77	
30–34	25.7	3.0	1.46	.34
35–39	21.0		1.19	
40–44	13.0		.74	
45–54	8.7	5.4	.49	.62
55–64	9.5		.54	
65 and over	7.9	9.9	.45	1.14
All ages	17.6	8.7	1.00	1.00

[1] Annual rates.

In a nonepidemic period, pneumonia has its highest frequency at the beginning and end of life. In the pandemic of 1918 pneumonia showed its highest frequency in the age group 25 to 29, a subordinate peak in the age group under 5 years, and a relatively low incidence after 40 years of age. It should be observed that the contrast is really somewhat greater than that shown in the figure, since the curve for the epidemic contains a proportion of deaths from pneumonia not associated with the epidemic and therefore tending to follow the age curve as typified by the Hagerstown data.

SEX

In contradistinction to the material presented for the total morbidity during the epidemic, the pneumonia rates are slightly higher in the males, as shown in Table 20. Spartanburg is omitted, because only 35 cases were recorded in all, but is included in the total for all localities. The rates have been adjusted to a standard age distribution.

TABLE 20.—*Incidence of pneumonia by sex in each surveyed locality during epidemic of 1918–19* [1] *(adjusted to standard age distribution)*

Locality	Rate per 1,000		Ratio of female rate to male	Cases	
	Male	Female		Male	Female
Augusta	16.5	17.9	1.08	26	35
Baltimore	18.7	19.1	1.02	267	327
New London	16.7	16.9	1.01	64	72
Macon	12.9	12.5	.97	44	56
Louisville	11.2	9.6	.86	52	58
Minor Maryland towns	30.6	25.1	.82	159	163
Little Rock	17.0	13.7	.81	81	77
San Antonio	27.0	21.7	.80	139	161
San Francisco	20.8	14.8	.71	177	144
Des Moines	29.4	19.5	.66	79	59

[1] Spartanburg omitted because of small numbers.

In only one locality is the rate for females definitely higher. The fact that we do not find higher rates among females for these serious cases suggests that possibly the difference in the incidence of influenza as a whole was due to the tendency of the women to report a higher incidence for themselves than for other members of the family. That would hardly be expected in the case of illnesses severe enough to be classed as pneumonia, as they would probably be recalled whatever member of the family had the case.

A graph is added for pneumonia incidence by sex and age. (Fig. 6.) There is a suggestion that the excess among males occurs entirely during the ages where the epidemic exerted its greatest effect. The rates are presented in Table 21.

TABLE 21.—*Incidence of pneumonia by sex and age in all surveyed localities during epidemic of 1918–19* [1] *(rate per 1,000)*

Age group	Male	Female
All ages	18.4	17.0
Under 1	28.8	21.3
1–4	27.5	24.5
Under 5	27.7	23.8
5–9	14.1	15.5
10–14	12.1	11.0
15–19	17.2	14.2
20–24	24.1	22.5
25–29	37.4	26.9
30–34	29.0	22.9
35–39	24.1	17.9
40–44	13.2	12.8
45–49	11.0	8.6
50–59	6.2	10.3
60–69	6.1	12.2
70 and over	4.2	8.2

[1] Exclusive of Charles County.

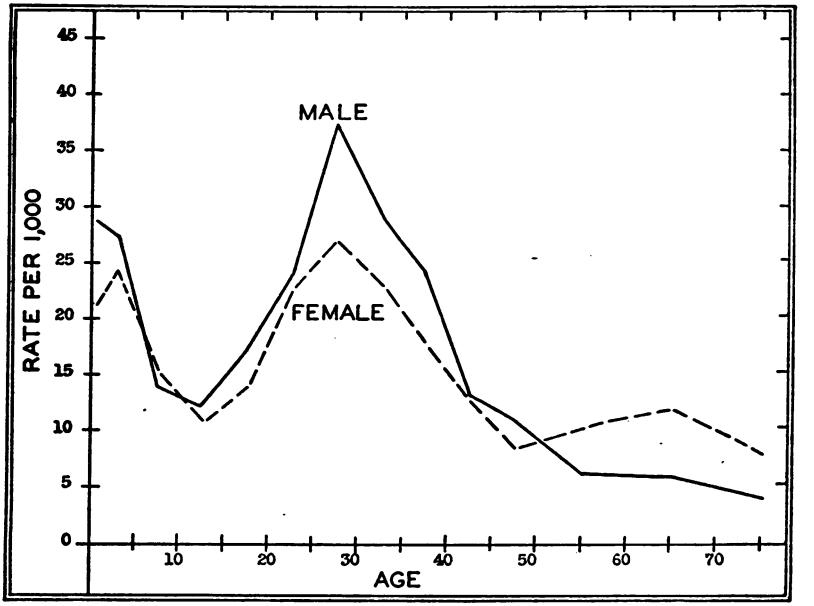

FIGURE 6.—Incidence of pneumonia by age and sex in all surveyed localities (except Charles County, Md.)

In view of these differences, it is of interest to compare the rates by sex and age in each locality. To do so, however, a broad grouping of ages is necessary to secure any degree of regularity. These broad groups have been chosen to bring out, as well as possible, the characteristics of the age curve (under 5 years, 5–19, 20–29, 30–39, 40 and over). The rates are given in Table 22. At the bottom of the table will be found ratios of the female rates to those of the males.

TABLE 22.—*Incidence of pneumonia by sex and broad age groups in each surveyed locality during epidemic of 1918–19* [1]

	Under 5 years	5–19	20–29	30–39	40 and over
	RATES PER 1,000				
All localities:					
Male	23.3	12.2	26.3	23.8	7.6
Female	20.5	11.8	22.3	18.2	9.3
New London:					
Male	11.3	12.6	34.7	20.9	4.9
Female	11.0	7.2	34.1	27.3	9.5
Baltimore:					
Male	30.5	13.2	27.9	19.4	6.2
Female	24.0	15.4	23.3	20.6	10.8
Minor Maryland towns:					
Male	36.2	20.7	48.4	54.5	5.9
Female	40.1	16.9	31.5	32.7	12.5
Spartanburg:					
Male	3.5	1.4	6.6	7.3	----------
Female	17.3	5.8	11.3	7.0	4.7
Augusta:					
Male	18.4	13.4	25.4	15.9	10.8
Female	40.2	15.8	20.8	14.3	5.8
Macon:					
Male	20.6	7.1	13.0	22.5	7.0
Female	14.8	11.9	13.0	8.2	10.3
Des Moines:					
Male	49.1	37.5	32.4	21.9	8.6
Female	25.4	17.7	32.1	19.2	6.9
Louisville:					
Male	19.2	9.0	11.5	15.4	3.6
Female	25.6	6.6	9.6	7.8	4.1
Little Rock:					
Male	22.9	10.4	25.0	26.1	7.6
Female	10.0	9.9	21.9	16.5	9.3
San Antonio:					
Male	26.7	15.3	44.6	40.8	14.9
Female	13.8	15.5	40.6	26.7	12.5
San Francisco:					
Male	20.8	12.8	31.1	24.0	19.6
Female	19.7	10.6	17.6	16.7	10.9
	RATIO OF FEMALE RATE TO MALE				
All localities	88	97	85	76	122
New London	97	57	98	131	194
Baltimore	79	117	84	106	174
Minor Maryland towns	111	82	65	60	212
Spartanburg	----------	----------	----------	----------	----------
Augusta	218	118	82	90	54
Macon	72	168	100	36	147
Des Moines	52	47	99	88	80
Louisville	133	73	84	51	114
Little Rock	44	95	88	63	122
San Antonio	52	101	91	65	84
San Francisco	95	83	57	70	56

[1] Inclusion of deaths from influenza as pneumonia cases was not possible in this table, except where the case was originally recorded as pneumonia.

The tendency is toward an excess in the male rate at the ages 20 to 39 and is evidently present in a great proportion of the localities.

COLOR

The recorded pneumonia incidence was generally greater among the white than among the colored population. The following table gives the cases and rates by color for each locality in which there was a considerable number of colored (except Charles County).

TABLE 23.—*Incidence of pneumonia in canvassed white and colored populations of certain surveyed localities during epidemic of 1918–19*

Locality	Pneumonia rate per 1,000		Ratio of colored rate to white	Number of cases		Number of persons	
	White	Colored		White	Colored	White	Colored
Louisville, Ky	10.1	2.7	0.27	107	4	10,534	1,465
Augusta, Ga	19.7	8.8	.45	48	15	2,434	1,689
Baltimore, Md	19.1	9.3	.48	556	39	29,085	4,195
Macon, Ga	13.7	10.9	.80	82	21	5,971	1,930
Minor Maryland towns	26.2	18.7	.71	309	12	11,782	643
Little Rock, Ark	16.9	13.6	.80	123	36	7,262	2,654
Spartanburg, S. C	6.9	5.2	.75	32	3	4,652	581

In some localities the colored population seemed almost to escape the disease, while the white population was severely affected. In Baltimore the white and colored rates were, respectively, 19.1 and 9.3, and in Louisville 10.1 and 2.7. This relation is consistent with the fact that, in the canvassed populations, the mortality was slightly higher in the white than in the colored.

Mortality and Case Fatality

Rates of mortality in the general population of this country during the pandemic of 1918 have been thoroughly analyzed. There is no occasion to refer to them in the present paper, or to utilize the record of deaths obtained in the canvass to corroborate such findings. The value of these records lies rather in the fact that by means of them we may have a fairly precise conception of the case fatality of the 1918 epidemic in the communities surveyed. The section will deal with the case fatality of the epidemic as a whole (the percentage which the influenza-pneumonia deaths are of the influenza cases) and the case fatality of pneumonia (the percentage which these deaths are of the pneumonia cases), together with some reference to the mortality rates themselves.

It has been previously pointed out that it is impossible to distinguish between deaths reported as due to influenza and those reported as due to pneumonia—in practically all cases both of these diseases contributed to the deaths. Therefore only a slight error will be introduced in taking the relation between the influenza-pneumonia deaths and the total epidemic or pneumonia cases. Obviously these deaths also include a small number of normal or nonepidemic deaths. In view of the small size of the samples and the lack of information as to the normal rate of pneumonia in these sample areas, it has been impossible to limit the study to epidemic deaths alone.

In the six communities in which a comparison was possible, it was found that the influenza-pneumonia death rate in the canvassed population was only about 70 per cent of that in the city as a whole during the same period. The discrepancy was found consistently in each

community, varying from 57 per cent in Louisville to 84 per cent in Baltimore. The data are recorded in Table 24, which gives also the mortality rates in the surveyed areas of the localities for which mortality rates for the whole city were not determined.

TABLE 24.—*Mortality from influenza-pneumonia during epidemic period in total populations of certain surveyed localities and in canvassed populations of same localities*

Locality	Middle date of survey	Estimated population	Death rates per 1,000 based on reported deaths in total population	Deaths reported from September 1 to middle date of survey	Death rates per 1,000 canvassed persons	Ratio of rate for canvassed population to that for total population
Baltimore	Jan. 15[1]	680,000	6.2	4,239	5.2	0.84
Cumberland	Dec. 3	27,300	10.8	295	7.1	.66
Augusta	Feb. 4	55,000	6.3	348	4.4	.70
Louisville	Dec. 16	245,000	3.7	908	2.1	.57
Little Rock	Jan. 3	65,000	5.1	330	3.9	.77
San Francisco	Feb. 15[1]	475,000	7.8	3,700	4.8	.62
New London	Dec. 10	25,000			5.8	
Minor Maryland towns [2]	Dec. 5	26,190			6.4	
Charles County, Md	Mar. 12	18,326			9.1	
Spartanburg	Dec. 18	22,500			1.9	
Macon	Dec. 9	50,000			3.2	
Des Moines	Feb. 4	115,000			3.8	
San Antonio	Dec. 14	150,000			4.2	

[1] Middle date of recanvass.

[2] Exclusive of Cumberland (given above).

There are a number of factors which may tend to explain the lower mortality rates in the canvassed populations: (*a*) Deaths of nonresidents in hospitals in the city have a tendency to raise the city mortality rates, but would not appear in the canvassed population; (*b*) there might be a tendency for persons visited to fail to mention deaths occurring in the family some time previously; (*c*) canvassed populations naturally do not include certain groups of the population in which mortality rates are likely to be excessive, such as boarding houses. Whatever the cause of this discrepancy, it is manifest that the case fatality rates to be discussed are affected by it in some degree.

The case fatality for all localities (percentage of total cases which were fatal) was 1.70. If we consider the pneumonia cases alone, it was 25.5 (omitting Charles County). The data by locality are given in Table 25.

TABLE 25.—*Influenza and pneumonia case fatality in canvassed populations of each surveyed locality during epidemic of 1918–19*

Locality	Fatality rate per 100 cases		Per cent of influenza complicated by pneumonia	Number of cases		Number of deaths
	Influenza	Pneumonia		Influenza	Pneumonia	
All localities	1.70	[1] 25.5	[1] 6.8	42,920	[1] 2,290	730
New London	3.14	33.8	9.3	1,466	136	46
Charles County, Md	2.25	----------	----------	6,546	----------	147
San Francisco	2.24	28.0	8.0	4,021	321	90
Baltimore	2.10	28.7	7.3	8,199	599	172
Minor Maryland towns	1.66	26.1	6.4	5,060	322	84
Des Moines	1.63	15.9	10.2	1,353	138	22
Macon	1.49	24.3	6.1	1,681	103	25
Louisville	1.39	22.5	6.2	1,797	111	25
Augusta	1.28	28.6	4.5	1,405	63	18
Little Rock	1.09	24.5	4.5	3,565	159	39
Spartanburg	.89	28.6	3.1	1,126	35	10
San Antonio	.78	17.2	4.5	6,701	303	52

[1] Exclusive of Charles County, Md.

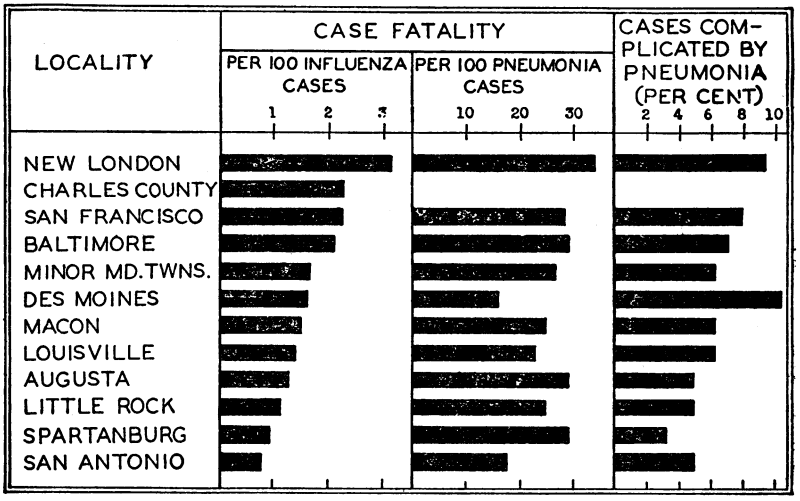

FIGURE 7.—Case fatality of influenza and of pneumonia, with percentage of cases complicated by pneumonia, in specified localities

A great variation in the fatality rates is observable, which is no doubt partly due to the small number of deaths. For total influenza, the fatality varies from 3.14 per cent in New London to 0.78 per cent in San Antonio. The coefficient of variability is 37.[10] The pneumonia fatality showed much less variation, the coefficient being 23. The highest rate was in New London (33.8) and the lowest in Des Moines (15.9). These fatality rates are presented by graph in Figure 7, together with the percentage of cases complicated by pneumonia.

[10] In making this calculation the minor Maryland towns were subdivided. See p. 305. Coefficient of variability is the standard deviation times 100 divided by the mean.

Examination of the graph shows that the influenza case fatality seemed somewhat lower in the south central part of the country. A map has been included (fig. 8) to bring this out more clearly. The fatality rate is indicated by symbols of varying degrees of density.

A comparison of the influenza case fatality with that obtained in certain other house-to-house canvasses is next given (Table 26). Since the available data are for the northeast section of the country, the only rates from the Public Health Service surveys which have been included in the table are for New London, Baltimore, and the minor Maryland towns.

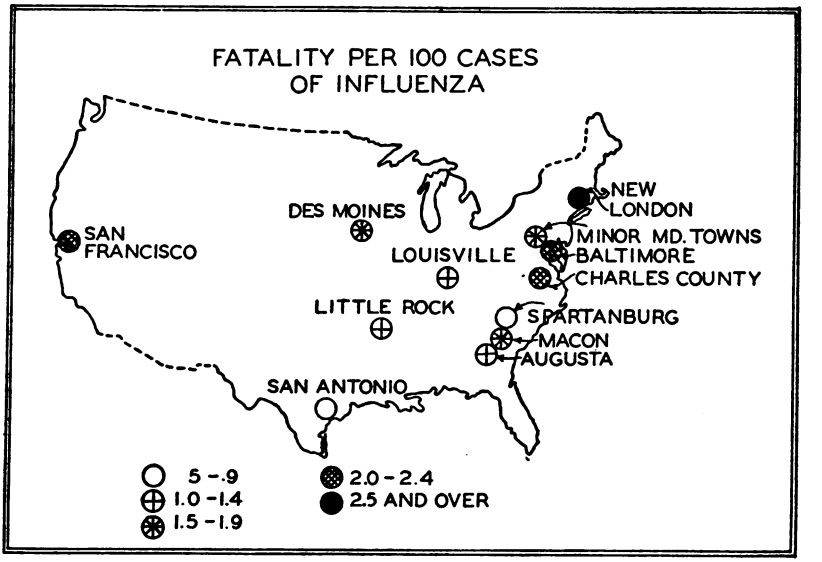

FIGURE 8.—Case fatality in different cities

TABLE 26.—*Influenza case fatality rates during pandemic of 1918 in certain house-to-house canvasses*

Locality	Case fatality (percentage)	Number of persons surveyed	Locality	Case fatality (percentage)	Number of persons surveyed
U. S. Public Health Surveys:			New Britain, Conn. [1]	3.9	2,757
New London	3.1	7,933	Watertown, N. Y. [2]	3.1	28,473
Baltimore	2.1	33,361	Boston [3]	2.5	10,050
Minor Maryland towns	1.7	12,482	Oswego, N. Y. [2]	2.4	12,952

[1] Statistics of the 1918 Epidemic of Influenza in Connecticut. 1920. Journ. Infec. Dis., 26:185. Winslow, C.-E. A., and Rogers, J. F.
[2] Some Statistics of Influenza in Oswego and Watertown in 1918-19. Off. Bull. N. Y. State Dept. of Health, 4:53. Baker, G. W.
[3] Influenza: An Epidemiological Study. Am. Journ. Hyg., Monograph No. 1, 260 pp. 1921. Vaughan, W. T.

A question arises as to whether the incidence of influenza or the incidence of pneumonia determined the mortality rates in the sur-

veyed communities. This question can be considered from several angles. For instance, the fact that the case fatality of pneumonia was less variable than that of the epidemic as a whole (as previously noted) suggests that it was the presence of the secondary invaders which primarily determined the mortality. Another point of view is to consider the correlation of the rates of influenza, pneumonia, and deaths. The highest correlation is between the incidence of pneumonia and the mortality rates, but there is a definite correlation in the

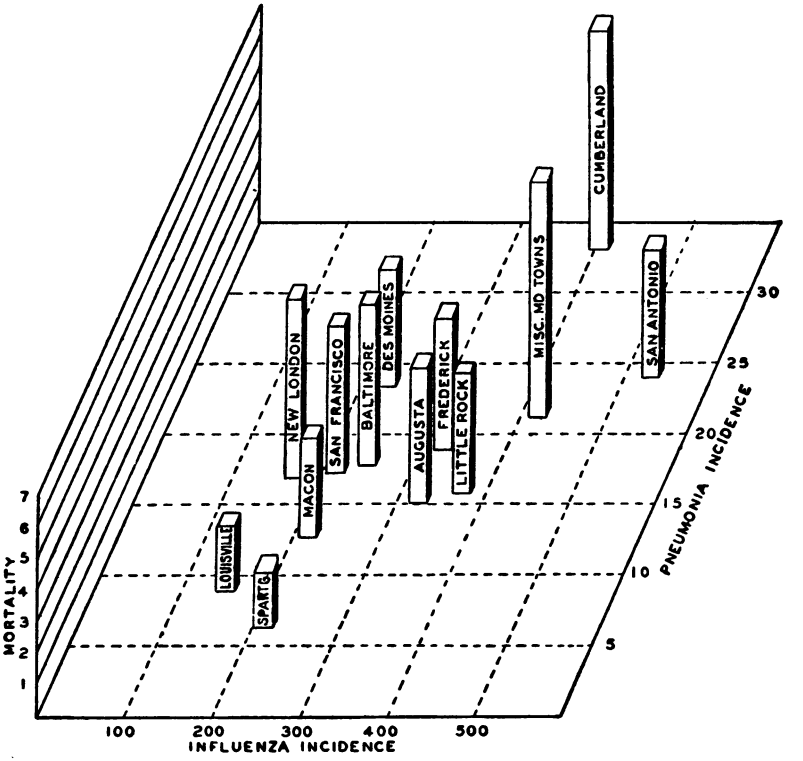

FIGURE 9.—Composite picture of incidence and mortality in the various localities

other two instances. The coefficients are as follows: Influenza incidence-pneumonia incidence, +.63; influenza incidence-mortality, +.66; pneumonia incidence-mortality, +.77. A composite picture of the interrelations by locality is shown in Figure 9, where the height of the vertical bars represents the mortality rates.

AGE

The age curve of mortality from the epidemic is given for all localities in Table 27, first for both sexes combined and then for males and females separately.

TABLE 27.—*Mortality per 1,000 persons from influenza-pneumonia by sex and age in all surveyed localities during epidemic of 1918–19*

Age group	Both sexes	Male	Female	Age group	Both sexes	Male	Female
All ages	5.0	5.3	4.7	20–24	6.2	6.8	5.8
				25–29	9.9	13.3	7.6
Under 1	15.2	17.1	13.3	30–34	7.9	9.1	6.8
1–4	6.2	5.4	7.1	35–39	6.3	7.9	4.7
				40–44	4.0	4.1	3.9
Under 5	7.9	7.6	8.3	45–49	2.9	3.5	2.3
5–9	2.2	1.9	2.4	50–59	2.6	2.8	2.4
10–14	2.1	1.4	2.8	60–69	4.3	3.3	5.6
15–19	3.4	4.0	2.9	70 and over	5.1	4.2	5.8

The most obvious point to be brought out is the extraordinary age curve of mortality during the epidemic. There is no necessity of emphasizing this fact here, since it has been thoroughly recognized in all accounts of the 1918–19 epidemic and the contrast with the usual experience has been apparent to everyone.

Discussion of the differences between the two sexes will be postponed until later. (See p. 334.)

The fatality of the epidemic according to age is of extraordinary interest, because it brings out so clearly the severe toll among young adults. The rates are presented in Table 28, for both the case fatality of influenza and that of pneumonia alone.

TABLE 28.—*Fatality of influenza and of pneumonia by age, in all surveyed localities during epidemic of 1918–19 (percentage of cases which died)*

Age group	Influenza	Pneumonia [1]	Age group	Influenza	Pneumonia [1]
All ages	1.7	25.5	20–24	1.9	25.0
			25–29	2.9	30.1
Under 1	7.4	43.3	30–34	2.4	28.0
1–4	1.8	18.6	35–39	2.1	28.6
			40–44	1.7	28.6
Under 5	2.5	23.1	45–49	1.4	27.4
5–9	0.6	11.8	50–59	1.5	28.0
10–14	0.6	16.1	60–69	3.1	45.1
15–19	1.0	19.1	70 and over	5.1	57.9

[1] Exclusive of Charles County, Md.

The very high incidence of pneumonia in young adult ages (previously discussed) is evidently the most important factor in the determination of the curves shown herewith. The fatality of influenza rises to nearly 3 per cent in the age group 25 to 29 and then falls to less than 1.5 per cent. In old age it rises again, reaching 5 per cent or more. Pneumonia cases themselves do not show this striking change in fatality in young adult life. As a matter of fact, the pneumonia fatality curve, except for an expected high value at the beginning of life, rises rather consistently from 12 per cent in the age group 5 to 9 to nearly 60 per cent in old age. It must again be stressed that the picture of pneumonia fatality includes the cases and deaths

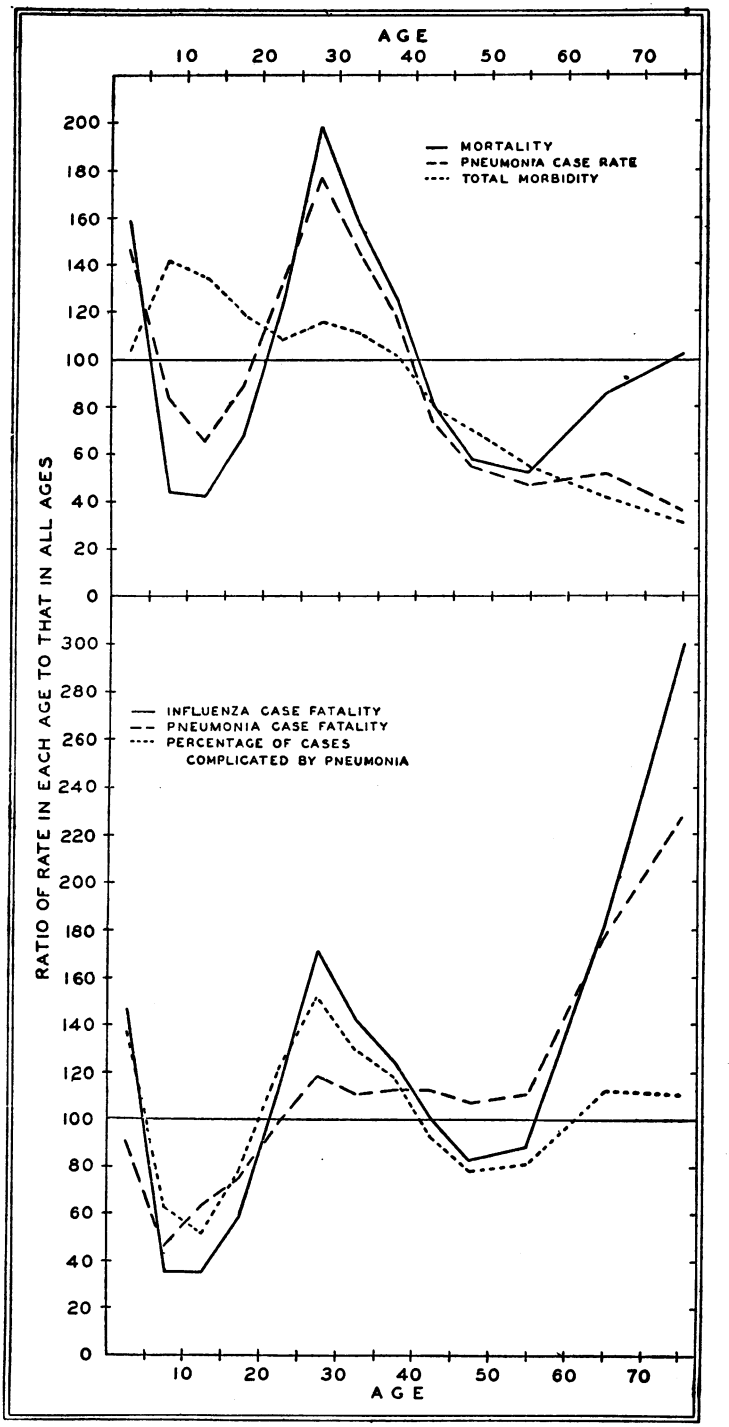

FIGURE 10.—Epidemic relations, by age, on relative basis (all ages=1.00). (Charles County omitted in rates involving pneumonia incidence)

which would have occurred at this time of year quite apart from the epidemic.

Perhaps it would be convenient to summarize in a single graph all the relations which have been brought out with respect to age, because the striking manner in which the epidemic affected young adults is so clearly depicted. Figure 10, accordingly, gives the age curves for influenza incidence, pneumonia incidence, mortality, percentage which the pneumonia cases were of the influenza cases, case fatality of the epidemic as a whole and case fatality of pneumonia. The indices (ratio of the rate in each age group to that for all ages) are given in Table 29.

TABLE 29.—*Ratio of rates in each age group to those in all ages in all canvassed localities during epidemic of 1918–19*

Age group	Influenza incidence	Pneumonia incidence[1]	Per cent complicated by pneumonia [1]	Mortality	Influenza case fatality	Pneumonia case fatality [1]
All ages	1.00	1.00	1.00	1.00	1.00	1.00
Under 5	1.04	1.47	1.37	1.59	1.47	.91
5–9	1.42	.84	.62	.44	.35	.46
10–14	1.34	.65	.51	.42	.35	.63
15–19	1.18	.88	.78	.68	.59	.75
20–24	1.08	1.31	1.21	1.24	1.12	.98
25–29	1.16	1.77	1.51	1.98	1.71	1.18
30–34	1.11	1.46	1.29	1.58	1.41	1.10
35–39	1.02	1.19	1.17	1.26	1.24	1.12
40–44	.80	.74	.92	.80	1.00	1.12
45–49	.70	.55	.78	.58	.82	1.07
50–59	.55	.47	.81	.52	.88	1.10
60–69	.42	.52	1.11	.86	1.82	1.77
70 and over	.31	.37	1.10	1.02	3.00	2.27

[1] Exclusive of Charles County, Md.

As in the case of comparisons by locality, these relations indicate that the mortality is determined primarily by the incidence of pneumonia. The cause of the high mortality in young adult life evidently lies in the complicating pneumonia. All of the relations shown in this figure bear this out: The peak in the pneumonia case incidence in young adult life, coinciding almost completely with that of the mortality from the epidemic; the absence of a corresponding peak in the total epidemic morbidity (except a minor secondary mode) and (by corollary) a peak in young adult life for influenza case fatality and the percentage of cases complicated by pneumonia, but not for pneumonia case fatality itself.

SEX

Mortality and case fatility rates for influenza and for pneumonia were higher among men than among women, the differences being about 10 per cent on the average. In the case of influenza fatality, this may have been due to the fact that the reports were usually obtained from the female members of the household, giving

a relatively higher rate of influenza among them. But a similar explanation is hardly possible in the case of pneumonia fatality. Table 30 gives the relations between the two sexes for all the measures which have been employed in this report. All ratios based on pneumonia incidence are exclusive of Charles County, Md., as indicated. For the other cases, all 12 localities are used. Since it was found that adjustment for age made little difference in the ratio between the two sexes (see p. 324), these rates are given without adjustment.

TABLE 30.—*Epidemic relations by sex in all surveyed localities during epidemic of 1918–19*

	Male	Female	Ratio female to male
Influenza incidence (per 1,000)	288	299	104
Pneumonia incidence [1] (per 1,000)	18.4	17.0	92
Percentage of influenza cases which were complicated by pneumonia [1]	6.8	5.9	87
Mortality (per 1,000)	5.3	4.7	89
Case fatality—influenza (per cent)	1.8	1.6	89
Case fatality—pneumonia alone [1] (per cent)	26.5	24.5	92

[1] Exclusive of Charles County, Md.

The mortality rates by age and sex have already been given. (Table 27.) The excess among men would seem to occur at the ages when the epidemic took its severest toll (20 to 40). This is equally borne out in the fatality rates, which are given in Figure 11, especially in the case of influenza case fatality. The two sexes evidently present a quite different picture, which may be regarded as of importance in connection with the epidemiological problems raised by the disease. The data are given in Table 31. Table 32 gives corresponding figures for the percentage of cases complicated by pneumonia.

TABLE 31.—*Fatality of influenza and of pneumonia by age and sex in all surveyed localities during epidemic of 1918–19*

Age group	Fatality per 100 cases of influenza		Fatality per 100 cases of pneumonia [1]		Age group	Fatality per 100 cases of influenza		Fatality per 100 cases of pneumonia [1]	
	Males	Females	Males	Females		Males	Females	Males	Females
All ages	1.8	1.6	26.5	24.5	20 to 24	2.4	1.7	27.5	23.6
					25 to 29	4.1	2.2	36.3	24.5
Under 1	8.0	6.7	44.1	42.3	30 to 34	2.8	2.1	29.9	25.9
1 to 4	1.5	2.2	12.9	25.0	35 to 39	2.7	1.6	31.1	25.3
					40 to 44	1.7	1.7	29.1	28.1
Under 5	2.4	2.8	19.0	28.0	45 to 49	1.8	1.1	28.6	25.8
5 to 9	.5	.6	11.4	12.2	50 to 59	1.7	1.3	40.0	21.2
10 to 14	.4	.7	11.4	20.9	60 to 69	2.3	3.8	43.8	45.7
15 to 19	1.2	.8	22.1	16.1	70 and over	4.2	5.7	60.0	57.1

[1] Exclusive of Charles County.

TABLE 32.—*Percentage of influenza cases which were complicated by pneumonia, by age and sex in all localities, during epidemic of 1918–19* [1]

Age group	Both sexes	Male	Female	Age group	Both sexes	Male	Female
All ages	6.3	6.8	5.9	20 to 24	7.6	9.4	6.8
				25 to 29	9.5	12.1	7.9
Under 1	12.2	13.6	11.0	30 to 34	8.1	9.4	7.0
1 to 4	8.1	8.2	7.9	35 to 39	7.4	8.5	6.2
				40 to 44	5.8	5.7	5.8
Under 5	8.6	8.9	8.3	45 to 49	4.9	5.7	4.1
5 to 9	3.9	3.7	4.1	50 to 59	5.1	4.1	6.0
10 to 14	3.2	3.4	3.0	60 to 69	7.0	5.0	8.5
15 to 19	4.9	5.8	4.2	70 and over	6.9	4.5	8.5

[1] Exclusive of Charles County.

COLOR

Outside of Charles County, Md., the fatality rate per 100 cases of influenza was about the same in the white and colored populations,[11] 1.7 and 1.9, respectively. The pneumonia case fatality (excluding Charles County) in the white and colored was 28.8 and 39.8, respectively. Thus we are probably warranted in concluding that the case fatality was really higher in the colored populations of the surveyed communities.

Summary

The purpose of this report has been to make a permanent record, for future reference, of the statistics obtained by the surveys, not to offer any extended discussion of their meaning. Hence there is no necessity for any detailed summary of the findings. Certain major points, however, are of considerable interest.

Special surveys were undertaken at the close of the 1918–19 epidemic of influenza to determine for a population of known sex, age, and color composition the approximate incidence of the disease, and also to ascertain the relations between the epidemic morbidity, the incidence of pneumonia, and the mortality. Preliminary reports on the surveys were published at the completion of the work.

The incidence of influenza (including pneumonia and "doubtful" cases) was 294 per 1,000 for all localities, varying from 535 to 150. These rates correspond closely with what was found in other surveys of the same general character. There seemed to be no clear indication of a geographical difference in incidence.

The incidence was highest among very young persons (age group 5 to 9 years), with a secondary peak at about 30 years. The rate of attack fell off rapidly in older life. Among old people the incidence appeared to be not more than one-third of that among the young.

Slightly higher influenza rates were found among females (except in two localities), but it seemed possible that this was due to the fact that most of the reports as to illness came from the women, who

[11] New London, San Antonio, Des Moines, and San Francisco excluded. In the case of these calculations by color, it was not possible to add to the pneumonia cases deaths reported as due to influenza.

might remember their own illnesses better than those of other members of the family. The colored had lower rates of influenza incidence, but it is possible that the reporting among them was less complete.

A special effort was made to determine the incidence of pneumonia as complicating the original case of influenza. For all localities the

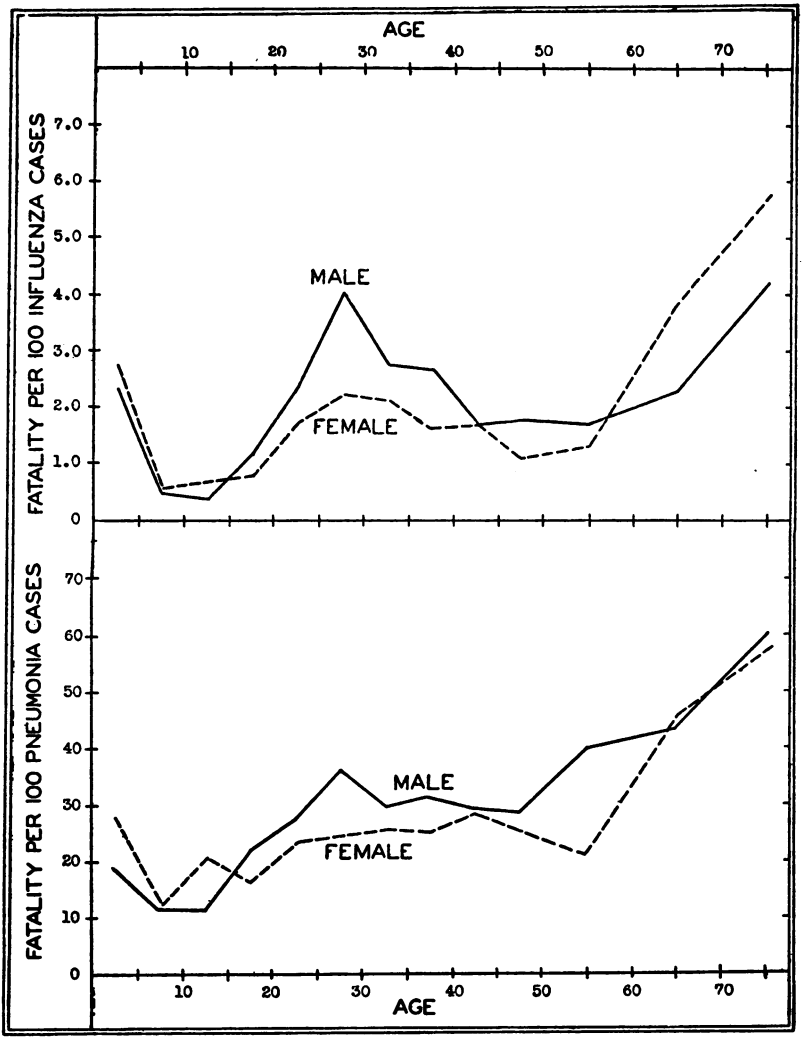

FIGURE 11.—Influenza and pneumonia fatality, by age and sex, in all surveyed localities during the 1918–19 epidemic. (Pneumonia fatality is exclusive of Charles County)

pneumonia rate was 17.6 per 1,000 persons, varying from 25.8 to 6.7. In other words, about 6 per cent of the influenza cases were complicated by pneumonia.

The peak in young adult life suggested in the epidemic morbidity as a whole comes out with remarkable clarity in the pneumonia

incidence. For all localities the rate is about 25 per 1,000 at the beginning of life, falls to about 11 in the age group 10 to 14, and then rises to a secondary mode of about 31 in the age group 25 to 29. After that the rate falls rather steadily to the end of life. This age distribution is, of course, fundamentally different from the normal course of pneumonia incidence, which is high among the very young and among the very old. The striking mode in young adult life is found in each locality without exception.

The pneumonia incidence rates were slightly higher among males, the difference being especially marked in young adult life. The recorded pneumonia incidence was higher among the white than among the colored.

The deaths from influenza-pneumonia during the epidemic period were obtained primarily to determine the relations as to case fatality. The fatality per 100 cases of influenza (total epidemic morbidity) was 1.70 for all localities, and that per 100 cases of pneumonia alone was 25.5. The fatality for the surveyed localities (total epidemic morbidity) seemed about the same as that recorded in other studies.

The fatality seemed lower in the southern and central localities, which is in line with other reports on this epidemic. It appeared that the incidence of pneumonia, rather than that of influenza as a whole, determined the mortality in the various localities.

The fatality of influenza (total epidemic morbidity) was very high among young adults, as would be expected in view of the high peak of pneumonia at these ages. The fatality of pneumonia did not show this peak, showing that the tendency to a severe toll at these ages was characteristic of the pneumonia itself, rather than of death from it.

The fatality rates, both for influenza and for pneumonia, were higher among men than among women. In the case of influenza, this may reflect the tendency of the women to report more adequately; but that would hardly explain the difference in the case of pneumonia fatality. The excess was most marked in young adult life.

The pneumonia case fatality was much higher among the colored than among the white.

Acknowledgments

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The surveys themselves were made under the direction of Senior Surg. W. H. Frost and Principal Statistician Edgar Sydenstricker, and the first papers reporting the results were prepared by them. Doctor Frost and Mr. Sydenstricker also supervised the more extended analysis on which this paper is based.

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DEATHS DURING WEEK ENDED JANUARY 16, 1932

Summary of information received by telegraph from industrial insurance companies, for the week ended January 16, 1932, and corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Jan. 16, 1932	Corresponding week, 1931
Policies in force	74, 179, 429	75, 092, 689
Number of death claims	15, 052	17, 116
Death claims per 1,000 policies in force, annual rate	10. 6	11. 9
Death claims per 1,000 policies, first 2 weeks of year, annual rate	9.9	11. 2

Deaths [1] from all causes in certain large cities of the United States during the week ended January 16, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates furnished in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Jan. 16, 1932				Corresponding week, 1931		Death rate [2] for the first 2 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1932	1931
Total (83 cities)	8, 402	12. 1	633	[4] 53	14. 0	803	12. 5	14. 0
Akron	45	8. 9	3	37	7. 9	4	9. 6	8. 7
Albany [5]	37	14. 8	0	0	14. 9	2	16. 6	16. 0
Atlanta [6]	77	14. 2	9	88	15. 4	9	17. 2	16. 0
White	37	10. 3	3	44	11. 9	5	12. 5	13. 6
Colored	40	21. 9	6	172	22. 4	4	26. 5	20. 7
Baltimore [5] [6]	230	14. 7	18	64	14. 2	19	14. 8	14. 9
White	177	13. 8	10	45	12. 8	11	14. 0	13. 8
Colored	53	18. 4	8	129	20. 6	8	18. 4	19. 9
Birmingham [6]	61	11. 5	5	52	13. 6	10	13. 4	14. 6
White	27	8. 2	4	66	10. 3	2	10. 7	9. 5
Colored	34	16. 9	1	27	18. 8	8	17. 9	22. 9
Boston	242	16. 0	25	76	16. 6	20	15. 9	15. 6
Bridgeport	38	13. 5	4	71	12. 1	4	13. 7	14. 4
Buffalo	146	13. 0	9	43	15. 0	13	13. 6	14. 2
Cambridge	36	16. 4	7	145	11. 4	5	16. 4	12. 6
Camden	39	17. 1	3	53	14. 5	2	14. 9	16. 0
Canton	25	12. 1	5	124	13. 2	5	11. 1	11. 2
Chicago [5]	683	10. 1	51	50	10. 8	72	11. 3	11. 1
Cincinnati	131	14. 8	5	32	19. 2	14	15. 6	20. 5
Cleveland	192	10. 9	16	52	11. 7	13	11. 5	11. 5
Columbus	82	14. 3	4	40	13. 6	4	16. 7	14. 3
Dallas [6]	59	10. 9	10	-------	13. 2	6	11. 6	13. 8
White	45	10. 1	7	-------	12. 7	4	9. 8	13. 1
Colored	14	15. 0	3	-------	15. 4	2	19. 9	17. 6
Dayton	54	11. 9	5	72	12. 8	8	11. 4	13. 6
Denver	107	19. 0	4	39	17. 7	5	21. 8	17. 1
Des Moines	33	11. 8	0	0	14. 1	1	11. 3	13. 4
Detroit	270	8. 2	37	66	8. 8	43	8. 7	8. 7
Duluth	15	7. 7	2	58	13. 8	2	9. 0	13. 6
El Paso	27	13. 2	3	-------	17. 4	5	15. 4	21. 9
Erie	38	14. 5	3	64	12. 4	1	11. 6	11. 3
Fall River [5] [7]	32	14. 5	2	53	15. 8	5	12. 7	13. 8
Flint	18	5. 5	1	15	8. 6	5	7. 4	7. 8
Fort Worth [6]	34	10. 4	1	-------	12. 5	2	10. 6	13. 7
White	25	9. 1	1	-------	13. 0	2	9. 4	12. 5
Colored	9	17. 6	0	-------	9. 6	0	16. 6	20. 1
Grand Rapids	30	9. 0	1	17	10. 3	2	8. 0	9. 0
Houston [6]	76	12. 2	4	-------	13. 1	4	11. 8	12. 9
White	46	10. 1	2	-------	14. 2	4	10. 0	13. 2
Colored	30	18. 3	2	-------	10. 1	0	16. 8	11. 9
Indianapolis [6]	92	12. 8	7	57	15. 4	9	13. 6	14. 9
White	79	12. 6	7	64	14. 6	9	12. 8	14. 4
Colored	13	14. 7	0	0	20. 8	0	19. 3	19. 0

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended January 16, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931—Continued.

City	Week ended Jan. 16, 1932				Corresponding week, 1931		Death rate [2] for the first 2 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1932	1931
Jersey City	66	10.8	5	41	11.8	9	11.7	12.3
Kansas City, Kans. [6]	27	11.4	0	0	15.7	5	14.1	15.9
White	16	8.4	0	0	14.2	3	13.3	14.4
Colored	11	24.3	0	0	22.2	2	17.6	22.2
Kansas City, Mo	91	11.4	7	79	15.4	8	10.2	15.0
Knoxville [6]	31	14.5	6	152	15.3	6	11.7	15.5
White	24	13.4	6	167	14.3	5	10.6	13.7
Colored	7	20.0	0	0	20.5	1	17.1	24.9
Long Beach	30	9.7	0	0	11.3	1	11.2	10.6
Los Angeles	326	12.3	16	47	13.5	22	12.8	14.1
Louisville [6]	103	17.4	2	18	16.4	7	15.5	20.9
White	80	16.0	2	21	14.4	6	14.2	19.2
Colored	23	25.2	0	0	27.3	1	22.4	30.1
Lowell [7]	29	15.1	2	52	12.0	4	14.1	13.3
Lynn	22	11.2	0	0	15.2	1	12.4	14.7
Memphis [6]	101	20.0	13	142	15.9	2	17.8	16.8
White	40	12.8	3	51	12.1	0	12.5	14.7
Colored	61	31.7	10	301	22.1	2	26.2	20.3
Miami [6]	31	14.2	1	28	14.4	3	14.5	12.3
White	24	14.2	1	39	16.1	2	13.9	13.5
Colored	7	14.5	0	0	8.2	1	16.5	8.2
Milwaukee	101	8.8	6	29	10.0	9	9.8	10.3
Minneapolis	83	9.0	6	39	11.6	14	9.6	12.8
Nashville [6]	34	11.3	3	45	18.1	2	13.7	17.3
White	26	11.9	3	59	16.2	1	13.3	14.8
Colored	8	9.8	0	0	23.1	1	14.6	23.8
New Bedford [7]	23	10.7	1	29	12.5	2	12.3	13.9
New Haven	47	15.1	1	20	10.3	1	14.1	12.2
New Orleans [6]	137	15.1	9	51	21.0	12	16.2	21.4
White	85	13.2	4	35	18.5	4	13.8	18.6
Colored	52	19.8	5	82	27.1	8	22.1	28.3
New York	1,499	10.9	126	56	15.7	165	11.5	14.9
Bronx Borough	220	8.3	10	29	11.4	19	8.9	10.3
Brooklyn Borough	525	10.2	49	54	14.8	60	10.3	14.1
Manhattan Borough	558	16.4	53	76	23.9	64	17.5	22.6
Queens Borough	152	6.6	10	42	10.0	18	7.6	9.8
Richmond Borough	44	13.7	4	79	13.1	4	15.6	14.4
Newark, N. J	96	11.2	9	49	13.5	8	11.2	13.1
Oakland	70	12.2	4	50	13.0	2	12.3	14.4
Oklahoma City	40	10.2	4	55	11.9	6	11.0	12.2
Omaha	58	13.9	1	11	15.6	6	14.1	14.7
Paterson	40	15.0	2	36	17.3	4	15.4	15.2
Peoria	21	9.9	1	28	18.8	5	11.5	16.8
Philadelphia	451	11.9	25	39	16.5	43	13.1	16.1
Pittsburgh	157	12.1	15	69	16.7	24	14.1	16.6
Portland, Oreg	85	14.3	2	26	13.8	4	14.3	14.7
Providence	89	18.1	8	77	13.9	11	18.3	15.3
Richmond [6]	57	16.1	8	121	16.1	7	17.2	16.4
White	31	12.2	4	90	11.5	2	14.4	13.9
Colored	26	25.7	4	183	27.6	5	24.3	22.7
Rochester	85	13.3	9	86	11.5	9	12.4	13.1
St. Louis	288	18.1	23	82	16.3	23	15.8	16.5
St. Paul	52	9.7	5	53	11.0	4	9.5	11.4
Salt Lake City [6]	29	10.4	0	0	14.2	4	11.9	14.0
San Antonio	83	17.6	12	-------	16.9	16	15.0	16.1
San Diego	52	16.6	3	65	14.7	5	15.7	17.0
San Francisco	163	12.9	4	28	16.6	5	15.0	14.6
Schenectady	15	8.1	1	29	8.1	1	9.8	8.4
Seattle	86	11.9	4	40	16.4	5	12.1	14.5
Somerville	22	10.8	1	40	8.9	0	12.1	11.6
South Bend	19	8.9	2	58	5.8	1	8.5	5.8
Spokane	29	13.0	1	27	17.5	5	14.5	14.1
Springfield, Mass	38	12.9	5	84	9.6	0	13.4	10.6
Syracuse	54	13.1	4	52	12.2	5	12.0	13.0
Tacoma	22	10.6	2	55	14.5	2	10.1	13.8
Tampa [6]	26	12.6	3	86	14.4	4	11.4	17.1
White	18	11.0	2	70	12.0	2	10.7	15.1
Colored	8	18.3	1	158	23.5	2	13.8	24.7
Toledo	68	11.8	4	43	11.2	3	11.6	11.8

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended January 16, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931—Continued

City	Week ended Jan. 16, 1932				Corresponding week, 1931		Death rate [2] for the first 2 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1932	1931
Trenton	33	13.9	0	0	12.6	1	16.4	19.6
Utica	33	16.8	1	28	20.4	3	14.2	17.6
Washington, D. C.[4]	167	17.7	10	56	17.7	8	15.9	18.6
White	111	16.2	4	33	15.2	5	14.2	16.3
Colored	56	21.4	6	107	24.3	3	20.3	24.7
Waterbury	15	7.7	0	0	6.7	1	8.2	7.8
Wilmington, Del.[7]	32	15.7	2	45	10.3	6	15.9	14.7
Worcester	49	12.9	3	42	16.9	1	13.7	14.9
Yonkers	23	8.5	2	52	11.6	4	8.6	11.1
Youngstown	30	8.9	5	81	9.3	0	9.2	12.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1932 and 1931 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 78 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Tampa, 21; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; and Washington, D. C., 27.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for Weeks Ended January 23, 1932, and January 24, 1931

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 23, 1932, and January 24, 1931

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931
New England States:								
Maine	2	5	181	17	633	20	0	0
New Hampshire	2	3			44	25	0	0
Vermont		2			334	8	0	0
Massachusetts	55	61	29	114	349	643	1	4
Rhode Island	4	8		1	1,056		0	1
Connecticut	9	15	7	140	121	286	1	4
Middle Atlantic States:								
New York	168	126	[1] 29	[1] 1,140	884	329	6	20
New Jersey	30	58	11	744	104	388	5	4
Pennsylvania	112	127			1,030	1,022	9	8
East North Central States:								
Ohio	86	39	15	7	141	140	1	5
Indiana	69	64	29	33	213	251	6	12
Illinois	170	162	33	263	68	905	8	6
Michigan	46	48	1	2	217	143	6	6
Wisconsin	19	24	28	82	89	172	3	1
West North Central States:								
Minnesota	17	8	1	1	68	28	1	1
Iowa	26	8			3	3	0	2
Missouri	57	39	7	71	28	1,109	0	5
North Dakota		5			86	3	0	0
South Dakota	6	26		1	56	12	0	0
Nebraska	11	8		37	14	30	0	1
Kansas	44	28	4	12	79	53	0	2
South Atlantic States:								
Delaware	3	4	1	1	2	3	0	0
Maryland [2] [3]	35	25	41	1,226	11	229	3	0
District of Columbia	19	11	1	28	3	25	0	1
Virginia							3	3
West Virginia	42	13	64	150	336	30	0	0
North Carolina	38	33	23	177	137	163	3	3
South Carolina	12	16	389	1,968	20	27	0	0
Georgia [3]	24	33	126	267	9	108	1	2
Florida	10	11	7	42	11	63	0	1

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, week ended Jan. 23, 1932, 6 cases: 1 case in Maryland, 1 case in Georgia, and 4 cases in Alabama.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 23, 1932, and January 24, 1931—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931
East South Central States:								
Kentucky	76	16	-------	14	94	76	0	7
Tennessee	31	15	43	187	16	110	4	2
Alabama [3]	65	60	95	87	17	458	4	5
Mississippi	22	14	-------	-------	-------	-------	1	1
West South Central States:								
Arkansas	24	14	18	209	2	9	0	3
Louisiana	35	21	4	91	4	2	1	1
Oklahoma [4]	50	26	73	155	84	74	0	0
Texas	80	32	63	102	10	141	1	2
Mountain States:								
Montana	6	4	11	-------	103	2	0	0
Idaho	-------	-------	-------	-------	2	-------	1	1
Wyoming	-------	1	-------	-------	1	2	0	3
Colorado	9	9	-------	-------	6	29	0	0
New Mexico	17	4	250	1	8	21	0	0
Arizona	2	14	42	22	-------	125	0	9
Utah [2]	1	3	-------	1	2	2	0	1
Pacific States:								
Washington	9	25	-------	-------	443	62	0	2
Oregon	5	5	70	56	40	115	0	0
California	79	62	235	93	252	546	5	6

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931
New England States:								
Maine	0	4	25	36	0	0	1	2
New Hampshire	1	0	14	5	1	0	0	0
Vermont	0	0	7	2	26	0	1	1
Massachusetts	2	3	549	325	20	6	3	0
Rhode Island	0	1	36	65	0	0	0	1
Connecticut	1	0	87	74	4	0	1	1
Middle Atlantic States:								
New York	1	0	909	739	4	1	15	6
New Jersey	1	0	209	252	0	0	3	1
Pennsylvania	3	2	589	580	0	2	26	1
East North Central States:								
Ohio	0	1	323	363	34	73	10	8
Indiana	0	1	100	391	31	108	0	0
Illinois	5	4	398	521	29	51	14	7
Michigan	1	1	319	381	16	88	2	4
Wisconsin	3	0	111	145	5	4	2	0
West North Central States:								
Minnesota	1	2	87	4	0	12	0	3
Iowa	1	1	64	89	67	46	0	2
Missouri	0	2	89	178	23	24	1	5
North Dakota	3	2	15	27	1	10	2	0
South Dakota	1	1	7	6	17	38	4	2
Nebraska	1	3	15	51	5	28	0	5
Kansas	0	0	74	68	1	87	4	1
South Atlantic States:								
Delaware	0	0	8	33	0	0	0	0
Maryland [2 3]	1	1	92	82	0	0	12	3
District of Columbia	0	0	21	32	0	0	3	1
Virginia	1	2	-------	-------	-------	-------	-------	-------
West Virginia	0	0	46	57	4	19	7	12
North Carolina	2	1	57	58	1	0	5	1
South Carolina	0	1	11	17	2	0	11	4
Georgia [3]	1	0	32	68	0	0	5	7
Florida	1	0	1	7	0	0	11	2

[2] Week ended Friday.
[3] Typhus fever, week ended Jan. 23, 1932, 6 cases: 1 case in Maryland, 1 case in Georgia, and 4 cases in Alabama.
[4] Figures for 1932 are exclusive of Oklahoma City and Tulsa, and for 1931 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 23, 1932, and January 24, 1931—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931	Week ended Jan. 23, 1932	Week ended Jan. 24, 1931
East South Central States:								
Kentucky	1	0	124	114	8	16	19	9
Tennessee	0	0	62	42	16	5	21	3
Alabama [3]	2	3	30	62	16	6	24	14
Mississippi	1	0	23	25	58	12	6	2
West South Central States:								
Arkansas	0	1	14	35	20	42	6	8
Louisiana	1	1	15	28	4	10	9	2
Oklahoma [4]	0	0	26	34	36	97	2	10
Texas	1	0	98	65	72	31	8	7
Mountain States:								
Montana	0	0	45	59	2	2	3	2
Idaho	0	1	12	20	2	2	0	0
Wyoming	0	1	18	50	0	2	0	0
Colorado	0	0	46	45	4	19	2	1
New Mexico	0	0	9	7	1	2	1	0
Arizona	0	0	5	4	0	14	0	1
Utah [2]	0	0	18	6	0	1	0	1
Pacific States:								
Washington	0	1	39	50	32	36	3	2
Oregon	1	1	27	14	20	19	3	0
California	2	7	149	142	21	82	5	6

[2] Week ended Friday.
[3] Typhus fever, week ended Jan. 23, 1932, 6 cases: 1 case in Maryland, 1 case in Georgia, and 4 cases in Alabama.
[4] Figures for 1932 are exclusive of Oklahoma City and Tulsa, and for 1931 are exclusive of Tulsa only.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November, 1931										
Colorado	4	22	-------	-------	-------	-------	1	129	-------	26
Kansas	1	311	1	1	102	-------	1	282	31	12
December, 1931										
Alabama	6	263	83	87	73	54	11	207	2	72
Arkansas	2	132	49	39	49	13	0	103	40	41
Idaho	1	7	14	-------	5	-------	0	63	23	4
Illinois	25	603	104	23	168	2	42	1,378	88	82
Indiana	39	325	71	4	121	-------	3	406	36	29
Maryland	5	288	94	-------	38	-------	2	420	0	44
Minnesota	7	121	6	-------	71	-------	26	260	35	15
Missouri	16	411	25	10	37	1	3	381	38	24
New Jersey	7	153	51	-------	126	-------	9	591	-------	13
North Carolina	9	360	88	-------	187	114	5	394	2	25
Pennsylvania	24	544	-------	1	2,791	1	22	1,914	1	92
Porto Rico	-------	68	80	9,859	126	3	2	-------	0	15
Rhode Island	-------	27	18	-------	2,249	-------	-------	142	0	0
West Virginia	5	188	46	-------	1,085	-------	3	179	10	72

November, 1931	Cases
Colorado:	
Paratyphoid fever	1
Kansas:	
Chicken pox	352
German measles	3
Impetigo contagiosa	6
Mumps	98
Paratyphoid fever	2
Scabies	4
Septic sore throat	2
Tetanus	2
Trench mouth	1
Tularaemia	7
Undulant fever	7
Vincent's angina	9
Whooping cough	113

December, 1931	Cases
Chicken pox:	
Alabama	133
Arkansas	52
Idaho	130
Illinois	1,474
Indiana	598
Maryland	274
Minnesota	470
Missouri	382
New Jersey	759
North Carolina	506
Pensylvania	3,527
Porto Rico	8
Rhode Island	78
West Virginia	255
Diarrhea:	
Maryland	10
Dysentery:	
Illinois	5
Illinois (amoebic)	4
Maryland	8
Minnesota	3
Minnesota (amoebic)	2
Missouri	1
New Jersey	1
Pennsylvania	1
Porto Rico	67
Filariasis:	
Porto Rico	23
German measles:	
Illinois	21
Maryland	1
New Jersey	31
North Carolina	13
Pennsylvania	159
Rhode Island	11
Impetigo contagiosa:	
Maryland	30
Lead poisoning:	
Illinois	5
New Jersey	2
Lethargic encephalitis:	
Alabama	3
Illinois	7
Maryland	1
Pennsylvania	4
Mumps:	
Alabama	28
Arkansas	27
Idaho	35
Illinois	133
Indiana	176
Maryland	186
Missouri	22
New Jersey	166
Pennsylvania	1,484
Porto Rico	10
Rhode Island	128
Ophthalmia neonatorum:	
Alabama	1
Illinois	7
Maryland	4
Minnesota	1
Missouri	2
Pennsylvania	18
Porto Rico	20
Rhode Island	1
Paratyphoid fever:	
Idaho	1
Illinois	2
New Jersey	1
North Carolina	1
Porto Rico	5
Rhode Island	1
Puerperal septicemia:	
Illinois	20
Pennsylvania	19
Porto Rico	4
Rabies in animals:	
Illinois	3
Maryland	3
Missouri	2
Rhode Island	1
Rabies in man:	
Illinois	2
Scabies:	
Maryland	10
Septic sore throat:	
Illinois	32
Maryland	4
Missouri	22
North Carolina	12
Rhode Island	3
Tetanus:	
Illinois	14
Maryland	1
New Jersey	1
Pennsylvania	1
Porto Rico	2
Tetanus, infantile:	
Porto Rico	4
Trachoma:	
Arkansas	1
Illinois	10
Indiana	1
Missouri	29
New Jersey	4
Pennsylvania	4
Porto Rico	11
Trichinosis:	
New Jersey	1

Tularaemia:	Cases
Alabama	1
Arkansas	1
Illinois	54
Indiana	11
Maryland	9
Minnesota	3
Missouri	13
New Jersey	1
Pennsylvania	3
Typhus fever:	
Alabama	11
North Carolina	1
Undulant fever:	
Alabama	4
Illinois	3
Indiana	1
Maryland	3
Minnesota	2
Missouri	6
New Jersey	2
Pennsylvania	6

Vincent's angina:	Cases
Illinois	27
Maryland	12
Whooping cough:	
Alabama	19
Arkansas	22
Illinois	1,250
Indiana	208
Maryland	637
Minnesota	96
Missouri	446
New Jersey	738
North Carolina	552
Pennsylvania	1,684
Porto Rico	206
Rhode Island	28
West Virginia	111
Yaws:	
Porto Rico	9

Cases of certain communicable diseases reported for the month of November, 1931 by State health officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Small pox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	193	17	782	10	139	0	40	16	80
New Hampshire		21			23	0		1	
Vermont	253	30	141	53	58	75	15	0	277
Massachusetts	488	243	390	627	906	0	437	15	474
Rhode Island	70	34	571	38	71	0	53	0	19
Connecticut	206	17	99	118	167	0	89	18	148
New York	1,439	419	904	398	1,787	70	1,471	100	1,109
New Jersey	524	134	122	87	499	1	384	21	641
Pennsylvania	2,504	508	1,352	1,108	1,603	0	607	242	1,743
Ohio	1,836	568	234	547	2,005	55	334	136	1,321
Indiana	408	361	138	63	415	31	222	27	137
Illinois	1,077	586	210	133	1,176	71	620	87	1,158
Michigan	763	210	326	310	787	64	257	48	694
Wisconsin	1,172	95	101	518	294	29	111	16	667
Minnesota	353	114	72		197	10	180	12	38
Iowa	363	83	13	14	201	258	33	16	111
Missouri	246	412	80	19	465	9	217	66	440
North Dakota	126	16	7	33	79	73	8	20	22
South Dakota	120	39	216	33	61	44	11	11	33
Nebraska	165	93	42	43	108	29	19	5	52
Kansas	352	311	102	98	282	31	68	14	113
Delaware	13	144	2	5	36	0	23	3	28
Maryland	250	289	21	123	432	0	147	94	599
District of Columbia	22	60	9		92	0	84	14	67
Virginia	419	1,335	211		729	6	126	130	738
West Virginia	283	228	730		249	2	65	152	213
North Carolina	389	691	184		714	4		64	536
South Carolina	84	340	38	58	62	1	113	43	72
Georgia	61	179	25	20	149		105	80	35
Florida	12	89	35	13	24	2	37	12	5
Kentucky [1]									
Tennessee	73	524	26	29	345	20	156	117	277
Alabama	67	397	26	22	247	2	295	89	61
Mississippi	238	391	27	45	154	44	75	40	302

[1] Reports received weekly.

Cases of certain communicable diseases reported for the month of November, 1931, by State health officers—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Arkansas	34	234	35	7	137	11	[3] 10	50	55
Louisiana	12	243	28	3	148	14	[2] 177	97	19
Oklahoma [3]	46	431	8	30	192	23	38	107	25
Texas	-------	364	-------	-------	183	-------	-------	48	-------
Montana	174	18	571	4	127	6	53	11	60
Idaho	87	20	-------	72	46	3	[2] 8	3	-------
Wyoming	31	-------	6	20	31	2	-------	1	18
Colorado	-------	22	-------	-------	129	-------	-------	27	-------
New Mexico	118	78	9	17	51	1	38	37	2
Arizona	99	73	5	10	26	2	88	9	14
Utah [1]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nevada	2	-------	-------	-------	5	0	[3] 1	0	11
Washington	442	50	135	97	235	58	179	22	62
Oregon	253	8	26	56	71	36	43	13	27
California	1,031	456	574	409	579	28	707	58	351

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

Case rates per 100,000 population (annual basis) for the month of November, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	293	26	1,188	15	211	0	61	24	122
New Hampshire	-------	55	-------	-------	60	0	-------	3	-------
Vermont	854	101	476	179	196	253	51	-------	935
Massachusetts	138	69	110	177	256	0	124	4	134
Rhode Island	122	59	996	66	124	0	92	-------	33
Connecticut	153	13	74	88	124	0	66	13	110
New York	136	40	86	38	169	7	139	9	105
New Jersey	154	39	36	26	146	0	113	6	188
Pennsylvania	313	63	169	138	200	0	76	30	218
Ohio	331	102	42	99	361	10	60	24	238
Indiana	152	134	51	23	154	12	82	10	51
Illinois	169	92	33	21	184	11	97	14	181
Michigan	186	51	80	76	192	16	63	12	169
Wisconsin	479	39	41	212	120	12	45	7	273
Minnesota	166	54	34	-------	93	5	85	6	18
Iowa	178	41	6	7	99	127	16	8	54
Missouri	82	137	27	6	155	3	72	22	146
North Dakota	224	28	12	59	140	130	14	36	39
South Dakota	209	68	376	57	106	77	19	19	57
Nebraska	145	82	37	38	95	25	17	4	46
Kansas	226	200	66	63	181	20	44	9	73
Delaware	66	729	10	25	182	0	116	15	142
Maryland	184	213	15	90	318	0	108	69	441
District of Columbia	54	148	22	-------	227	0	207	35	165
Virginia	209	667	105	-------	364	3	63	65	369
West Virginia	195	157	504	-------	172	1	45	105	147
North Carolina	146	259	69	-------	268	1	-------	24	201
South Carolina	59	237	26	40	43	1	79	30	50
Georgia	26	75	10	8	62	0	44	33	15
Florida	10	71	28	10	19	2	29	10	4
Kentucky [1]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tennessee	34	241	12	13	158	9	72	54	127
Alabama	30	180	12	10	112	1	134	40	28
Mississippi	142	234	16	27	92	26	45	24	180

[1] Reports received weekly.

Case rates per 100,000 population (annual basis) for the month of November, 1931—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Arkansas	22	152	23	5	89	7	[2] 7	33	36
Louisiana	7	138	16	2	84	8	[2] 101	55	11
Oklahoma [3]	27	250	5	17	112	13	22	62	15
Texas	------	74	------	------	37	------	------	10	------
Montana	394	41	1,292	9	287	14	120	25	136
Idaho	237	54	------	196	125	8	[2] 22	8	------
Wyoming	164	------	32	106	164	11	------	5	95
Colorado	------	26	------	------	150	------	------	31	------
New Mexico	333	220	25	48	144	3	107	104	6
Arizona	269	198	14	27	71	5	239	24	38
Utah [1]	------	------	------	------	------	------	------	------	------
Nevada	26	------	------	------	66	0	[2] 13	------	144
Washington	339	38	103	74	180	44	137	17	47
Oregon	316	10	32	70	89	45	54	16	34
California	211	93	117	84	118	6	145	12	72

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

PATIENTS IN INSTITUTIONS FOR THE CARE OF EPILEPTICS, JANUARY TO MARCH, 1930

Reports for the first quarter of the year 1930 were received by the Public Health Service from 13 institutions for the care and treatment of epileptics, located in 13 States. The total number of patients, including those on parole or otherwise absent, but still on the books, on March 31, 1930, was 8,677.

The first admissions were as follows:

Month	Male	Female	Total
January, 1930	62	35	97
February, 1930	76	41	117
March, 1930	65	44	109
Total	203	120	323

Of the new admissions during the three months, 62.8 per cent were males and 37.2 per cent were females, giving a ratio of 169 males per 100 females.

During the quarter 120 patients were discharged—71 males and 49 females. Seventy-four male patients and 76 female patients died. The annual death rates, based on the total number of patients of the institutions on March 31, 1930, were: Males, 65.1 per 1,000; females, 75.8 per 1,000; persons, 70.1 per 1,000.

At the end of March there were 4,613 males and 4,064 females on the rolls of the institutions, giving a ratio of 114 males per 100 females

The following table shows for the 13 institutions the numbers of patients in the hospitals and on parole on January 1, 1930, and at the end of each month of the first quarter of the year:

	Jan. 1, 1930	Jan. 31, 1930	Feb. 28, 1930	Mar. 31, 1930
Patients in hospitals:				
Male	4,196	4,321	4,361	4,375
Female	3,827	3,867	3,897	3,909
Total	8,023	8,188	8,258	8,284
Patients on parole:				
Male	325	227	220	238
Female	215	169	151	155
Total	540	396	371	393
Total patients on books:				
Male	4,521	4,548	4,581	4,613
Female	4,042	4,036	4,048	4,064
Total	8,563	8,584	8,629	8,677
Per cent of total patients on parole:				
Male	7.2	5.0	4.8	5.2
Female	5.3	4.2	3.7	3.8
Total	6.3	4.6	4.3	4.5

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 92 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,460,000. The estimated population of the 85 cities reporting deaths is more than 31,903,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended January 16, 1932, and January 17, 1931

	1932	1931	Estimated expectancy
CASES REPORTED			
Diphtheria:			
46 States	1,740	1,331	----------
92 cities	561	465	889
Measles:			
45 States	5,739	5,959	----------
92 cities	1,786	2,050	----------
Meningococcus meningitis:			
46 States	70	144	----------
92 cities	31	68	----------
Poliomyelitis:			
46 States	38	69	----------
Scarlet fever:			
46 States	5,243	5,265	----------
92 cities	2,031	1,968	1,411
Smallpox:			
46 States	550	1,375	----------
92 cities	22	100	43
Typhoid fever:			
46 States	237	150	----------
92 cities	29	21	28
DEATHS REPORTED			
Influenza and pneumonia:			
85 cities	851	1,530	----------
Smallpox:			
85 cities	0	1	----------
Omaha, Nebr	0	1	----------

City reports for week ended January 16, 1932

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

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1923 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths, reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	11	0	2	1	0	134	0	7
New Hampshire:								
Concord	0	0	0	----	0	0	0	1
Manchester	0	0	0	----	0	0	0	3
Nashua	0	0	0	----	0	0	0	0
Vermont:								
Barre	----	0	----	----	----	----	----	----
Burlington	0	0	0	----	0	44	0	0
Massachusetts:								
Boston	84	35	17	8	5	8	19	12
Fall River	7	4	2	2	1	1	0	2
Springfield	12	5	0	----	0	5	22	3
Worcester	9	5	3	----	0	3	81	6
Rhode Island:								
Pawtucket	0	2	0	----	0	0	0	0
Providence	10	7	9	----	0	642	0	3
Connecticut:								
Bridgeport	1	6	0	1	1	1	0	3
Hartford	4	6	3	1	0	1	42	3
New Haven	24	1	0	----	0	0	27	3
MIDDLE ATLANTIC								
New York:								
Buffalo	38	12	1	1	2	13	0	28
New York	210	199	157	28	14	33	72	176
Rochester	8	6	1	----	0	57	24	3
Syracuse	25	2	0	----	0	9	11	7
New Jersey:								
Camden	8	8	7	1	1	1	1	3
Newark	59	17	4	5	0	1	37	13
Trenton	3	2	2	----	0	1	7	5
Pennsylvania:								
Philadelphia	128	64	5	9	5	7	20	46
Pittsburgh	53	19	9	1	4	139	43	12
Reading	23	1	0	----	0	2	0	8
Scranton	5	----	0	----	0	1	1	----
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	10	9	5	1	2	0	0	9
Cleveland	154	30	13	26	0	176	110	20
Columbus	22	4	6	----	0	2	0	3
Toledo	53	7	0	2	2	2	1	4
Indiana:								
Fort Wayne	----	4	----	----	----	----	----	----
Indianapolis	36	7	1	----	0	1	63	11
South Bend	5	1	0	----	0	0	0	0
Terre Haute	1	1	0	----	0	0	0	3
Illinois:								
Chicago	112	104	48	62	2	46	3	45
Peoria	7	----	1	----	0	0	0	5
Springfield	4	0	2	----	0	0	4	1

City reports for week ended January 16, 1932—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Michigan:								
Detroit	68	53	33	1	3	9	17	29
Flint	19	3	1		1	7	74	3
Grand Rapids	10	1	0		1	42	4	0
Wisconsin:								
Kenosha	9	0	0		0	0	1	0
Milwaukee	101	16	4		0	17	62	12
Racine	32	3	0		0	1	54	0
Superior	3	0	0		0	0	13	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	19	0	0		0	0	0	1
Minneapolis	41	16	5		1	3	47	7
St. Paul	13	5	0		0	1	2	6
Iowa:								
Davenport	2	1	2			0	1	
Des Moines	0	2	1			0	0	
Sioux City	4	1	4			0	0	
Waterloo	4	0	0			1	0	
Missouri:								
Kansas City	35	6	14		0	2	1	1
St. Joseph	6	1	1		0	0	0	4
St. Louis	15	41	12		0	1	2	11
North Dakota:								
Fargo	4	0	0		0	26	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	7	0	0			16	0	
Nebraska:								
Omaha	11	4	4		0	0	2	7
Kansas:								
Topeka	6	2	6		0	1	2	0
Wichita	39	2	10		0	6	0	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	2	2	0		0	0	1	3
Maryland:								
Baltimore	65	22	13	6	2	4	56	33
Cumberland	0	0	0		0	0	0	1
Frederick	1	0	2		0	1	0	0
District of Columbia:								
Washington	12	17	13		0	1	0	24
Virginia:								
Lynchburg	1	1	0		0	2	0	3
Norfolk	3	2	1		0	0	3	2
Richmond	0	6	6		1	0	0	4
Roanoke	3	2	4		1	1	0	1
West Virginia:								
Charleston	7	1	1		0	6	0	1
Huntington	0		2			1	0	
Wheeling	2	1	0		0	1	0	6
North Carolina:								
Raleigh		1						
Wilmington	1	1	1		0	0	0	1
Winston-Salem	44	1	2		0	0	1	1
South Carolina:								
Charleston	1	1	1	16	0	0	0	3
Columbia	0	1	0		0	0	0	0
Greenville	3	0	0			0	0	
Georgia:								
Atlanta	5	4	3	28	0	0	0	17
Brunswick	0	0	0		0	0	0	0
Savannah		2						
Florida:								
Miami	0	2	3	1	0	0	0	1
Tampa	0	1	0		0	1	0	3

City reports for week ended January 16, 1932—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington		1						
Lexington	2		1	1	0	1	12	1
Tennessee:								
Memphis		4						
Nashville	2	1	3		1	0	0	3
Alabama:								
Birmingham	4	5	5	3	1	0	5	7
Mobile	0	1	1	1	1	0	0	5
Montgomery	1	1	0	2		1	14	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	1			0	0	
Little Rock	0	1	1		1	2	0	6
Louisiana:								
New Orleans	0	13	17	6	4	0	0	9
Shreveport	3	1	3		0	18	1	4
Oklahoma:								
Muskogee	4		3			0	1	
Tulsa	3	2	4			1	1	
Texas:								
Dallas	5	9	12		0	1	0	7
Fort Worth	5	7	9		0	2	0	4
Galveston	0	1	6		1	0	0	1
Houston	0	8	16		1	0	1	3
San Antonio	1	3	3		2	1	0	14
MOUNTAIN								
Montana:								
Billings	0	0	0		0	3	0	0
Great Falls	5	0	0		0	1	0	2
Helena	0	0	0		0	52	0	0
Missoula	0	0	0		0	0	0	1
Idaho:								
Boise	0	0	0		0	0	1	0
Colorado:								
Denver	14	8	5		9	4	10	15
Pueblo	15	1	0		1	0	0	0
New Mexico:								
Albuquerque	3	0	2		0	0	0	1
Arizona:								
Phoenix	0		1		0	0	0	3
Utah:								
Salt Lake City	37	3	0		2	0	1	1
Nevada:								
Reno	0	0	0		0	0	0	2
PACIFIC								
Washington:								
Seattle	63	4	0			161	17	
Spokane	17	1	0			2	0	
Tacoma	5	3	1		0	1	3	5
Oregon:								
Portland	26	8	1	1	0	1	6	6
Salem	5	0	0	3	0	0	3	2
California:								
Los Angeles	86	36	45	108	5	0	6	43
Sacramento	13	3	1	1	1	89	0	13
San Francisco	49	14	4	14	5	33	1	7

City reports for week ended January 16, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	3	1	0	0	0	0	1	0	0	6	32
New Hampshire:											
Concord	0	4	0	0	0	0	0	0	0	0	5
Manchester	2	2	0	0	0	0	0	0	0	0	16
Nashua	0	1	0	0	0	0	0	0	0	1	
Vermont:											
Barre	0		0				0				
Burlington	1	2		2	0	1	0	0	0	0	11
Massachusetts:											
Boston	92	152	0	1	0	22	0	0	0	32	242
Fall River	4	2	0	0	0	0	1	0	0	0	32
Springfield	9	5	0	0	0	0	0	0	0	8	30
Worcester	14	36	0	0	0	2	0	0	0	15	49
Rhode Island:											
Pawtucket	2	0	0	0	0	0	0	0	0	0	17
Providence	16	23	0	0	0	3	1	0	0	21	89
Connecticut:											
Bridgeport	10	4	0	0	0	3	0	0	0	5	38
Hartford	8	8	0	0	0	0	0	0	0	31	42
New Haven	6	8	0	0	0	2	0	0	1	3	47
MIDDLE ATLANTIC											
New York:											
Buffalo	27	76	0	0	0	8	0	0	0	35	142
New York	227	404	0	0	0	101	7	6	0	151	1,499
Rochester	10	56	0	0	0	2	0	2	0	5	84
Syracuse	13	26	0	0	0	1	0	0	0	102	54
New Jersey:											
Camden	6	50	0	0	0	1	1	0	0	6	39
Newark	25	19	0	0	0	15	0	1	0	58	101
Trenton	5	8	0	0	0	1	0	0	0	1	33
Pennsylvania:											
Philadelphia	97	150	0	0	0	24	2	1	0	276	451
Pittsburgh	36	65	0	0	0	7	0	0	0	43	157
Reading	4	4	0	0	0	0	0	0	0	14	37
Scranton		15		0				0		9	
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	22	50	0	0	0	11	0	0	0	8	131
Cleveland	44	61	0	0	0	20	1	2	0	172	192
Columbus	12	13	1	0	0	3	0	0	0	23	82
Toledo	14	7	2	0	0	8	0	0	0	62	68
Indiana:											
Fort Wayne	5		0				0				
Indianapolis	12	4	5	1	0	2	0	0	0	13	
South Bend	3	6	1	0	0	3	0	0	0	5	19
Terre Haute	2	0	0	0	0	0	0	0	0	1	25
Illinois:											
Chicago	137	191	1	1	0	37	1	0	0	156	663
Peoria		6		0	0	0		0	0	10	21
Springfield	3	10	0	0	0	0	0	0	0	5	24
Michigan:											
Detroit	108	151	2	0	0	22	0	1	0	113	270
Flint	13	15	1	0	0	0	0	0	0	13	13
Grand Rapids	13	10	0	0	0	1	0	0	0	2	30
Wisconsin:											
Kenosha	2	4	1	0	0	0	0	0	0	5	7
Milwaukee	35	35	0	0	0	6	1	0	0	133	101
Racine	5	3	0	0	0	1	0	0	0	2	7
Superior	3	1	0	0	0	0	0	0	0	0	6

City reports for week ended January 16, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL											
Minnesota:											
Duluth	11	4	0	0	0	1	0	0	0	3	15
Minneapolis	47	34	1	0	0	1	1	0	0	7	83
St. Paul	29	14	1	0	0	3	0	0	0	7	54
Iowa:											
Davenport	3	11	1	0			0	0		0	
Des Moines	8	6	2	1			0	0		0	33
Sioux City	3	0	0	6			0	0		3	
Waterloo	2	1	1	0			0	0		8	
Missouri:											
Kansas City	18	25	0	0	0	4	0	0	0	44	91
St. Joseph	3	0	1	0	0	0	0	0	0	0	27
St. Louis	44	25	1	1	0	13	1	0	0	69	288
North Dakota:											
Fargo	3	5	0	0	0	1	0	1	0	0	4
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen	1	1	0	0			0	0		3	
Nebraska:											
Omaha	7	7	2	2	0	1	0	0	0	6	58
Kansas:											
Topeka	3	0	0	0	0	0	0	0	0	12	15
Wichita	5	1	1	0	0	0	0	0	0	5	35
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	5	0	0	0	1	0	0	0	2	32
Maryland:											
Baltimore	34	45	0	0	0	14	2	1	0	144	230
Cumberland	1	4	0	0	0	0	0	0	0	3	8
Frederick	0	2	0	0	0	0	0	0	0	3	4
District of Col.:											
Washington	26	23	0	0	0	9	0	2	0	15	167
Virginia:											
Lynchburg	1	2	0	0	0	0	0	0	0	3	12
Norfolk	3	6	0	0	0	1	0	0	0	0	
Richmond	7	23	0	0	0	3	0	0	0	4	51
Roanoke	4	1	0	0	0	0	1	0	0	0	17
West Virginia:											
Charleston	1	1	0	0	0	1	0	0	0	4	19
Huntington		0		0				0		0	0
Wheeling	3	1	0	0	0	0	1	0	0	6	26
North Carolina:											
Raleigh	1		1				0				
Wilmington	1	0	0	0	0	0	0	0	0	17	9
Winston-Salem	2	7	1	0	0	1	0	0	0	13	16
South Carolina:											
Charleston	1	0	0	0	0	0	0	1	1	1	14
Columbia	0	1	0	0	0	0	0	0	0	0	
Greenville		0	1	2				0		1	
Georgia:											
Atlanta	6	5	1	0	0	2	0	1	1	2	77
Brunswick	0	0	0	0	0	0	0	0	0	0	2
Savannah	1		0				0				
Florida:											
Miami	3	0	0	0	0	5	0	0	0	0	31
Tampa	1	0	0	0	0	2	0	2	0	0	27
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2		0				0				
Lexington		0		0	0	1		0	0	6	11
Tennessee:											
Memphis	8		1				1				
Nashville	3	0	0	0	0	0	0	0	1	10	34
Alabama:											
Birmingham	5	8	1	0	0	2	0	4	0	2	61
Mobile	1	1	0	0	0	0	0	0	0	0	21
Montgomery	1	3	0	0			0	0		4	

City reports for week ended January 16, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0	----	----	0	0	----	8	----
Little Rock	1	2	0	0	0	1	0	0	0	1	----
Louisiana:											
New Orleans	7	9	0	3	0	13	3	2	1	2	127
Shreveport	1	1	1	0	0	2	0	0	1	4	28
Oklahoma:											
Muskogee	----	0	----	0	----	----	----	0	----	4	----
Tulsa	2	5	----	1	----	----	0	0	----	2	----
Texas:											
Dallas	7	11	1	0	0	0	1	1	1	1	59
Fort Worth	3	11	2	2	0	1	0	1	0	0	39
Galveston	1	0	0	0	0	4	0	0	0	0	16
Houston	2	7	3	2	0	7	0	0	1	0	76
San Antonio	2	0	0	0	0	4	0	0	1	0	83
MOUNTAIN											
Montana:											
Billings	2	0	0	0	0	0	0	0	0	0	5
Great Falls	5	0	0	0	0	0	0	0	0	0	10
Helena	1	0	0	0	0	0	0	0	0	0	5
Missoula	1	4	0	0	0	0	0	0	0	0	9
Idaho:											
Boise	1	1	1	0	0	0	0	0	0	0	9
Colorado:											
Denver	13	23	1	0	0	7	0	0	0	2	89
Pueblo	1	0	0	1	0	1	0	1	0	1	12
New Mexico:											
Albuquerque	1	1	0	0	0	4	0	2	0	0	15
Arizona:											
Phoenix	0	1	1	0	0	1	0	0	0	1	----
Utah:											
Salt Lake City	5	2	0	0	0	0	0	0	0	1	41
Nevada:											
Reno	1	0	0	0	0	0	0	0	0	0	8
PACIFIC											
Washington:											
Seattle	10	5	2	0	----	----	0	0	----	7	----
Spokane	8	1	3	0	----	----	0	0	----	0	----
Tacoma	3	6	2	0	0	0	0	0	0	0	22
Oregon:											
Portland	6	4	7	12	0	4	0	0	0	3	85
Salem	0	0	----	0	0	1	----	0	0	1	12
California:											
Los Angeles	40	48	3	3	0	16	1	0	0	10	326
Sacramento	2	0	1	0	0	2	0	0	0	0	43
San Francisco	19	8	2	1	0	12	1	0	0	0	163

City reports for week ended January 16, 1932—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated, expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	0	0	0	0	0	0	1	1	0
Worcester	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	2	0	0	0	0	0	0	0	0
New York [1]	5	2	2	2	0	0	1	1	0
Pennsylvania:									
Philadelphia	1	0	1	1	0	0	0	0	0
Pittsburgh	2	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Indiana:									
Indianapolis	7	2	0	0	0	0	0	0	0
South Bend	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago	2	1	0	0	0	0	1	1	0
Michigan:									
Detroit	4	1	0	1	0	0	0	0	0
Flint	2	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	1	0	0	0	0	0	0
South Carolina:									
Charleston [2]	0	0	0	0	2	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Nashville	2	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	1	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	2	0	0	0	0	0	0	0
Texas: [2]									
Dallas	0	1	0	0	0	0	0	1	0
Houston	0	1	0	0	0	1	0	0	0
MOUNTAIN									
Arizona:									
Phoenix	0	1	0	0	0	0	----	0	0
PACIFIC									
California:									
Los Angeles	0	1	0	0	0	0	0	0	0
San Francisco	1	1	0	0	0	0	0	0	0

[1] Typhus fever: 1 death at New York City, N. Y.
[2] Dengue: 3 cases at Charleston, S. C., and 2 deaths at San Antonio, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended January 16, 1932, compared with those for a like period ended January 17, 1931. The population figures used in computing the rates are estimated mid-year populations for 1931 and 1932, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 34,000,000. The 91 cities reporting deaths have more than 32,400,000 estimated population.

Summary of weekly reports from cities, December 13, 1931, to January 16, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930–31 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Dec. 19, 1931	Dec. 20, 1930	Dec. 26, 1931	Dec. 27, 1930	Jan. 2, 1932	Jan. 3, 1931	Jan. 9, 1932	Jan. 10, 1931	Jan. 16, 1932	Jan. 17, 1931
98 cities	103	[2] 94	72	71	[3] 72	80	[4] 83	81	[5] 88	74
New England	84	143	65	75	84	116	79	79	[6] 87	91
Middle Atlantic	71	62	57	47	56	68	50	63	82	56
East North Central	104	116	69	102	64	91	76	96	[7] 68	95
West North Central	187	89	134	54	130	83	131	98	106	82
South Atlantic	118	108	99	86	71	62	114	85	[8] 95	69
East South Central	157	84	111	84	[9] 107	72	162	117	[10] 82	70
West South Central	189	[2] 202	115	143	129	136	204	142	195	108
Mountain	96	18	26	62	44	62	[4] 136	35	43	52
Pacific	82	83	41	40	[11] 64	55	65	61	97	47

MEASLES CASE RATES

98 cities	128	[2] 194	126	181	[3] 192	281	[4] 301	351	[5] 279	324
New England	637	271	945	305	1,207	268	1,706	490	[6] 1,916	310
Middle Atlantic	79	87	66	70	93	101	146	178	116	158
East North Central	60	28	32	27	93	55	142	62	[7] 182	87
West North Central	25	1,416	50	1,277	38	1,894	157	2,156	78	1,829
South Atlantic	26	138	14	124	79	322	53	435	[8] 35	500
East South Central	52	275	17	323	[9] 31	921	17	869	[10] 9	1,094
West South Central	44	[2] 18	41	24	64	24	43	20	73	7
Mountain	740	167	339	229	513	317	[4] 1,530	226	517	374
Pacific	294	6	259	16	[11] 445	24	784	33	544	55

SCARLET FEVER CASE RATES

98 cities	214	[2] 234	187	222	[3] 226	231	[4] 274	277	[5] 317	316
New England	438	351	389	353	539	327	549	433	[6] 596	539
Middle Atlantic	202	208	205	190	240	229	286	242	380	282
East North Central	264	306	227	285	233	261	298	363	[7] 335	398
West North Central	138	279	126	246	115	238	229	297	220	321
South Atlantic	201	208	107	178	221	262	227	277	[8] 247	305
East South Central	157	197	157	341	[9] 119	299	225	399	[10] 109	470
West South Central	101	[2] 73	41	59	108	108	69	68	99	129
Mountain	261	300	113	379	209	220	[4] 351	322	259	331
Pacific	94	83	61	85	[11] 109	73	141	73	129	73

SMALLPOX CASE RATES

98 cities	5	[2] 9	4	7	[3] 3	7	[6] 6	13	[5] 3	16
New England	55	0	14	0	12	0	26	0	[6] 2	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	4	6	4	2	7	5	1	15	[7] 1	10
West North Central	4	48	10	43	4	46	6	63	17	98
South Atlantic	0	0	0	0	0	0	0	2	[8] 0	0
East South Central	0	0	0	0	[9] 0	0	23	6	[10] 0	18
West South Central	3	[2] 15	7	17	0	17	26	37	16	27
Mountain	0	115	0	35	9	9	[4] 11	9	9	78
Pacific	2	10	8	20	[11] 6	10	19	18	8	29

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1932, and 1931, respectively.
[2] Shreveport, La., not included.
[3] Covington, Ky., and Spokane, Wash., not included.
[4] Salt Lake City, Utah, not included.
[5] Barre, Vt.; Fort Wayne, Ind.; Raleigh, N. C.; Savannah, Ga.; Covington, Ky.; and Memphis, Tenn., not included.
[6] Barre, Vt., not included.
[7] Fort Wayne, Ind., not included.
[8] Raleigh, N. C., and Savannah, Ga., not included.
[9] Covington, Ky., not included.
[10] Covington, Ky., and Memphis, Tenn., not included.
[11] Spokane, Wash., not included.

Summary of weekly reports from cities, December 13, 1931, to January 16, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930–31—Continued.

TYPHOID FEVER CASE RATES

	Week ended—									
	Dec. 19, 1931	Dec. 20, 1930	Dec. 26, 1931	Dec. 27, 1930	Jan. 2, 1932	Jan. 3, 1931	Jan. 9, 1932	Jan. 10, 1931	Jan. 16, 1932	Jan. 17, 1931
98 cities	5	[2] 8	6	7	[2] 5	5	[4] 4	4	5	5
New England	7	10	2	2	12	2	2	5	[6] 0	0
Middle Atlantic	5	3	4	3	3	4	5	2	4	2
East North Central	1	9	2	12	4	4	2	2	[7] 2	2
West North Central	0	8	4	6	2	2	2	0	2	4
South Atlantic	10	12	14	16	6	4	8	10	[8] 14	10
East South Central	23	36	12	18	[9] 38	48	0	12	[10] 36	53
West South Central	34	[2] 26	44	0	3	3	13	20	10	14
Mountain	0	9	0	9	0	18	[4] 11	17	9	9
Pacific	2	6	4	6	[11] 8	6	4	2	0	2

INFLUENZA DEATH RATES

91 cities	8	[2] 10	9	11	[9] 13	16	[4] 18	24	[8] 13	36
New England	5	2	7	2	2	7	10	5	[6] 17	10
Middle Atlantic	6	5	7	10	5	17	12	29	12	59
East North Central	6	10	5	7	10	7	14	12	[7] 5	9
West North Central	6	15	3	9	9	3	9	21	3	18
South Atlantic	12	20	12	24	18	20	35	28	[8] 8	42
East South Central	6	32	32	19	[9] 27	26	31	45	[10] 31	64
West South Central	17	[2] 23	24	32	45	93	30	76	30	79
Mountain	17	18	70	0	131	18	[4] 125	44	103	35
Pacific	14	10	7	17	14	10	23	22	26	10

PNEUMONIA DEATH RATES

91 cities	106	[2] 111	101	126	[9] 121	164	[4] 144	187	[8] 126	219
New England	111	116	94	119	91	160	165	113	[6] 104	159
Middle Atlantic	116	127	101	126	126	184	148	233	133	311
East North Central	63	69	77	94	84	103	104	110	[7] 82	124
West North Central	103	96	118	117	103	180	131	200	119	212
South Atlantic	142	138	132	174	174	230	196	267	[5] 206	237
East South Central	120	110	113	149	[9] 151	207	169	267	[10] 156	229
West South Central	142	[2] 135	131	189	152	199	128	238	148	228
Mountain	200	220	226	194	165	264	[4] 329	244	181	270
Pacific	122	127	89	135	175	135	167	134	158	118

[2] Shreveport, La., not included.
[3] Covington, Ky., and Spokane, Wash., not included.
[4] Salt Lake City, Utah, not included.
[5] Barre, Vt.; Fort Wayne, Ind.; Raleigh, N. C.; Savannah, Ga.; Covington, Ky.; and Memphis, Tenn., not included.
[6] Barre, Vt., not included.
[7] Fort Wayne, Ind., not included.
[8] Raleigh, N. C., and Savannah, Ga., not included.
[9] Covington, Ky., not included.
[10] Covington, Ky., and Memphis, Tenn., not included.
[11] Spokane, Wash., not included.

FOREIGN AND INSULAR

CANADA

Quebec Province—Communicable diseases—Week ended January 16, 1932.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended January 16, 1932, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	85
Chicken pox	180	Poliomyelitis	6
Diphtheria	55	Scarlet fever	110
Erysipelas	7	Tuberculosis	44
German measles	2	Typhoid fever	21
Measles	322	Whooping cough	48

LATVIA

Communicable diseases—October, November, 1931.—Cases of certain communicable diseases were reported in Latvia during the months of October and November, 1931, as follows:

Disease	Cases		Disease	Cases	
	October	November		October	November
Anthrax		1	Mumps	58	116
Botulism	1		Poliomyelitis	9	3
Cerebrospinal meningitis	2	7	Puerperal septicemia		14
Diphtheria	67	79	Scarlet fever	35	62
Erysipelas	28	16	Tetanus	4	2
Influenza	62	101	Trachoma	83	101
Leprosy	3		Typhoid fever	88	66
Measles	11	22	Whooping cough	57	71

PHILIPPINE ISLANDS

Manila—Rat bite fever.—According to information dated January 15, 1932, there was a mild outbreak of rat bite fever in Manila, P. I. Eight cases were identified bacteriologically, and it was thought that there were probably many more unrecognized cases. The distribution of the disease was said to be the same as the former distribution of plague.

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

CHOLERA

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

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

Place		June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Week ended: October, 1931		November, 1931				December, 1931				January, 1932		
						24	31	7	14	21	28	5	12	19	26	2	9	16
Ceylon: Colombo	C		3								1	1	1					
	D		3								1	1	1					
China:																		
Canton	C			2								3						
Hankow	C				8	5	18			6	5	3						
	D				6		1			4	1	1						
Shanghai	C	1	7	125	88	8												
	D			9	13	4												
Swatow	C	7																
India	C	22,074	36,514	39,223	26,705	4,237	4,419	3,648	3,418									
	D	12,093	20,276	21,683	13,257	2,252	2,360	2,400	1,789									
Bombay	C	23	44	42	4	4	1			1	3					1		
	D	16	25	17	3		1			1	4	1				1		
Calcutta	C	237	110	46	51	14	13	19	28	22	19	11	22	11	19			
	D	155	30	15	23	9	4	10	14	10	11	6	15	6	8			
Chittagong	C				1													1
Karikal	C		1	2	1													
	D		1	2														
Madras	C	4	6	5														
Moulmein	C	1																
	D	1																
Negapatam	C			1														
Rangoon	C	4	1		1	1										1		
	D	1	1		1	1										1		
India (French):																		
Chandernagor	C	5	7	2	1	1								2				
	D	1	7	2	1	1								2				
Pondicherry	C	3	3	4	1													
	D	3	2	2														
India (Portuguese)	C	2	2	34	75	18	20	9	1	2	1							
	D	1	2	18	26	3	6	1	1	2	1							

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

CHOLERA—Continued

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

Place		June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Week ended October, 1931		November, 1931				December, 1931				January, 1932		
						24	31	7	14	21	28	5	12	19	26	2	9	16
Indo-China (see also table below):																		
Cochin-China—Rachgia	C		P															
Pnompenh	C	5	2	2	1		2	2										
	D	2	1	2	1													
Saigon and Cholon	C	14			1								P	1		1		
	D	7			1													
Iraq:																		
Abulkhasib	C			6														
	D			5														
Amara	C		2	66	4	2			3	3				2	P			
	D		1	59	1	1			2	4				2				
Amara Province	C			96	95	13	7	15			3							
	D			120	83	10	6	8			2							
Basra	C		547	293	157	38	30	9	1									
	D		287	154	84	7	18	10	1									
Basra Province	C		5	53	42	3	7											
	D		2	30	19	1	4											
Dinwaniyah	C				1													
Dinwaniyah Province	C				61	22	1											
	D				44	10	5											
Iwaniyah	C				23													
	D				15													
Kut Province	C						17	3										
	D						12	2										
Muntafiq Province	C			225	209	17	19	9	23	1	1							
	D			145	160	10	18	6	17	3								
Nasiriyah	C			88	33	4	7	6	7	2	6							
	D			75	28	3	6	3	6		7							
Suqelshuyukh	C			2														
	D			2														
Japan: Taiwan—Kelung	C							2										

Persia: [1]																			
Abadan	C					1		3			1								
Ahwas	C					12		84	16	3		9	37	1					
	D					7		69	21	3		7	31	1					
Khorramabad	C										18	16	80	45	2	1			
	D										10	10	65	30	9	1			
Mohammerah	C					1													
Philippine Islands: [2]																			
Provinces—																			
Capis	C			35	79		7	5			4	16	7	13	4	4	5		
	D			16	59		5	4			4	10	5	10	3	3	3		
Cebu	C		3																
	D		3																
Iloilo	C	27																	
	D	25																	
Siam	C	3	1	1															
	D	1		1															
Ayudhaya Province	C													1					
	D													1					
Bangkok	C	4	1	1															1
	D	2																	1
On vessel:																			
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C	1																	
	D	1																	
S. S. Kohistan, at Basra, from Bushire, Persia	C	2																	
S. S. Cathay, at Kobe, Japan, from Shanghai	C		4																
	D		1																
S. S. Kasagi Maru, at Moji, from Shanghai	C			1															
S. S. Ankoo, at Nagasaki, from Shanghai	C			2															
	D			1															

Place		June, 1931	July, 1931	August, 1931	September, 1931	October, 1931			November, 1931			December, 1931		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (French) (see also table above):														
Cambodia [3]	C	308	241	12	14	1	16	2	3		1		2	1
	D	109	60	2	7	1	16	1					1	1
Cochin-China [3]	C	140	143	39	18	11	2	1	5		1	8	3	3
	D	106	42	32	13	10	2	1	4			5	2	

[1] On Oct. 23, 1931, cholera was reported at Mohammerah, Abadan, and Ahwaz, Persia. During the period from Oct. 22 to Nov. 7, 1931, 141 cases and 97 deaths were reported.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

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

PLAGUE

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

Place		July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Week ended— October, 1931		November, 1931				December, 1931				January, 1932			
					24	31	7	14	21	28	5	12	19	26	2	9	16	23
Algeria:																		
Algiers	C	2																
Philippeville	C	2																
	D	1																
Azores:																		
San Miguel Island	C									2	3							
	D										1							
Terceira Island	C									9	7							
	D									4	2							
Belgian Congo	C															1		
British East Africa (see also table below):																		
Tanganyika	C	8	4	13														
	D	2	4	5														
Uganda	C	285	289	276	71		87	60	41	38	31							
	D	281	207	270	69		84	58	39	35	30							
Canary Islands: Palma Island—Los Llanos	C																8	
	D																5	
Ceylon: Colombo	C	6	3	4						1						4		
	D	6	3	3						1						4		
Plague-infected rats		8									1					1		
Chile:																		
Santiago	C			1														
	D			1														
Plague-infected rats							1											
Valparaiso	C		1															
China: [1]																		
Shansi Province [2]	C					P												
Shensi Province	C					P												
Dutch East Indies:																		
Batavia and West Java	C	58	65	113	28	34	38	39	44	39	40							
	D	58	65	113	28	34	38	39	44	39	40							
Java and Madura	D	205	233	325	97	133	132	150	152	171	167	212						

Ecuador (see table below).																			
Egypt:																			
Alexandria	C	9	5	1	1	1	3	1		1	1	1					1		
	D	3	2				1	1	1	1	1		1	1	1				
Assiout	C													1	1	1			
	D														1	1			
Behetra	C		2																1
Dakahlia	C	2																	1
Girga	C								1		1		1						
	D								1		1		1						
Kena	C								2			2				1	1		
	D								1			2				1	1		
Minieh	C						1	3			1	1	1			3	3		
	D						1	1					1			3	3		
Port Said	C	2			1			1	2		2			1					
	D								2					1					
Tanta	C	2	2						2										
	D								2										
France: Rouen—Devilleles	C					P													
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats		1																	
Maui Island—																			
Haliimaile—Plague-infected rats			1																
Kula District	C	1																	
	D	1																	
Makawao—Plague-infected rats			1																
Pala—Plague-infected rats				1															
Paauilo—Plague-infected rats						1													
India	C	684	1,832	2,550	619	625	600	649											
	D	440	772	1,147	304	287	262	317											
Bassein	C	2	4	1	1														
	D	2	4	1	1														
Bombay	C			1	1					1									
	D			1						1									
Plague-infected rats		47	57	42	4		11	7	11	13	16	16	17	7	9	15			
Madras Presidency	C	28	376	185		23	49	19	26	31									
	D	24	162	105		16	17	7	14	10									
Moulmein	C		5																
	D		9	2															
Rangoon	C	1	3		5				1					1	1				
	D	1	2		1				1					1	1				
Plague-infected rats		3	4	4	1						1	1		1	1				
Indo-China (see table below).																			
Iraq:																			
Baghdad	C	1	3			1		1	1	2	1	3	1			1	2	1	
	D		1						1		1								
Maudhan	C						2	1	1	1									
	D						1		1										

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

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

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

PLAGUE—Continued

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

Place		July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Week ended— October, 1931		November, 1931				December, 1931				January, 1932			
					24	31	7	14	21	28	5	12	19	26	2	9	16	23
Madagascar (see also table below): Tamatave	C	1	2	1										1				
Morocco	C			18		2					11							
	D			8	2	4												
Peru (see table below).																		
Senegal (see table below).																		
Siam	C	1	4	4	1		4		1	3	1		1				1	
	D		3	3	1		1			1	1		1					
Spain: Hospitalet—Barcelona Province	C	5	2	2	5		1	1										
	D	2	1	1	1													
Syria: Beirut	C	1	2	3			1											
Tunisia: Tunis	C		1	1														
Union of South Africa:																		
Cape Province—Plague-infected rats		1																
Orange Free State	C		P	P					P									

Place		June, 1931	July, 1931	August-1931	September, 1931	October, 1931	November, 1931
British East Africa (see also table above):							
Kenya	C	154	484	235	14	64	44
Ecuador:							
Alamor Parish—Los Hoyos	C	------	------	------	1	3	------
Amaluza Parish—Cangochapa	C	------	------	------	------	2	------
Calvas Canton—							
Cariamanga	C	------	------	------	4	1	------
Ovejeria	C	------	1	------	------	------	------
Celicia Canton—Choras	C	------	------	------	------	1	------
Loja Canton—							
Lapaz	C	------	------	------	20	------	------
Nalmuro	C	------	------	------	------	2	------
Paterillo	C	------	1	------	------	------	------
Tuburo	C	------	------	------	------	7	------
Palas Canton—San Antonio	C	------	------	------	1	1	------
Indo-China	C	2	1	------	4	3	------
	D	2	1	------	4	1	------
Madagascar (see also table above):							
Ambositra Province	C	15	1	2	1	8	------
	D	15	1	1	1	5	------
Antisirabe Province	C	12	13	22	19	17	------
	D	12	12	22	19	17	------
Miarinarivo Province	C	------	8	20	14	18	------
	D	------	7	19	12	16	------
Moramanga Province	C	1	1	3	12	13	------
	D	------	------	3	11	11	------
Tananarive Province	C	10	5	45	65	120	------
	D	9	5	44	63	117	------
Peru	C	5	3	19	2	------	------
	D	1	2	14	2	------	------
Barranca—Chancay	C	------	------	------	------	------	4
	D	------	------	------	------	------	1
Callao—Plague-infected rats		------	------	1	------	------	------
Chepen—Pacasmayo	C	------	------	------	------	------	1
	D	------	------	------	------	------	1
Eten—Chiclayo	C	------	------	------	1	------	------
	D	------	------	------	1	------	------

Place		June, 1931	July, 1931	August, 1931	September, 1931	October, 1931	November, 1931
Peru—Continued.							
Huancabamba—Ayacaba	C	------	------	------	------	7	------
	D	------	------	------	------	6	------
Huaura—Chancay	C	------	------	------	1	------	------
	D	------	------	------	1	------	------
Plague-infected rats		------	------	------	------	1	------
La Samana—Hualgayoc	C	------	------	------	------	------	4
Lima—Lima	C	------	------	------	------	------	1
	D	------	------	------	------	------	1
Lima—Lima (haciendas)	C	------	------	------	------	------	2
	D	------	------	------	------	------	1
Paijan—Trujillo	C	------	------	------	------	------	1
Palulo—Hualgayoc	C	------	------	------	------	------	10
	D	------	------	------	------	------	5
Patrovilca—Chancay	C	------	------	------	------	------	1
	D	------	------	------	------	------	1
Quispampa—Huancabamba	C	------	------	------	------	1	------
	D	------	------	------	------	1	------
San Pedro—Pacasmayo	C	------	------	------	------	------	1
Supe—Chancay	C	------	------	------	------	------	2
	D	------	------	------	------	------	1
Senegal:							
Baol [1]	C	------	27	101	13	6	2
	D	------	13	58	8	2	------
Dakar [1]	C	64	95	194	45	4	------
	D	56	73	106	31	4	------
Diourbel [1]	C	------	------	------	13	------	10
	D	------	------	------	5	------	5
Louga [1]	C	4	3	2	10	1	19
	D	2	1	1	4	2	10
Rufisque [1]	C	2	34	2	1	7	12
	D	------	------	------	------	1	2
Thies [1]	C	12	16	26	12	7	16
	D	3	7	16	8	5	7
Tivaouane [1]	C	3	3	------	------	------	------
	D	2	2	------	------	------	------

[1] Reports incomplete.

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

SMALLPOX

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

Place		June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Week ended— October, 1931		November, 1931				December, 1931				January, 1932		
						24	31	7	14	21	28	5	12	19	26	2	9	16
Algeria:																		
Algiers	C	1						1						1				
Constantine	C	1		1														
Brazil:																		
Porto Alegre (alastrim)	C	41	34	48	46	7	24	3	23	9	8	15	19					
	D	1	1	4	2		3					1						
Santos	C												1					
Rio de Janeiro	C														1			
British East Africa: Tanganyika	C	149	19	50	1,184		18			2								
	D	17		5	97		2											
British South Africa:																		
Northern Rhodesia	C	21	26		1													
Southern Rhodesia	C	2		3														
Canada:																		
Alberta	C	1	1		12	1	2	2	1		2	1		9				
British Columbia	C	2	5	2				1	1								1	1
Manitoba	C			1						1	1							
Winnipeg	C			1														
Nova Scotia	C										1							
Ontario	C	35	5	6	17		7	3	5	3	2	5	1	10		2		
Kingston	C			1														1
North Bay	C																	
Ottawa	C			1	8		4	3	5									
Toronto	C										1							
Quebec	C	1														2	1	
Saskatchewan	C	42	26	33	11	11	3	1	18	12	5	9	8			1		
Regina	C				2													
Chile:																		
Antofagasta	C	1																
Santiago	C					2	1											
	D					1	1											
Tocopilla	C															2		

China:																		
Amoy	C	2	1	1	2	1	------	1	6	2	5	11	28	60	66	49	43	37
	D	2	1	1	1	1	------	1	4	------	4	7	25	22	20	19	18	14
Canton	C	2	------	1	------	------	------	1	1	6	3	2	3	6	3	------	4	------
Foochow	C	P	P	P	P	------	P	------	P	------	P	------	P	------	------	------	------	------
Hankow	C	3	3	------	1	------	5	4	9	5	8	11	5	1	------	------	------	------
	D	------	------	------	------	------	------	------	------	------	4	------	2	1	------	------	------	------
Manchuria—Dairen	C	------	------	------	------	------	------	------	------	------	1	------	------	------	------	------	------	------
Nanking	C	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Shanghai—																		
Foreigners only	C	3	------	------	98	1	6	2	12	16	13	20	23	16	40	18	41	------
Including natives	D	6	1	2	13	------	------	1	1	10	6	8	7	8	13	6	14	------
Tientsin	C	3	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Chosen (see table below).																		
Colombia:																		
Cali	C	------	------	------	------	------	------	------	------	------	------	------	------	1	------	------	------	------
Santa Marta	D	------	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Eritrea	C	2	------	10	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	D	------	------	2	------	------	------	------	------	------	------	------	------	------	------	------	------	------
France (see table below).																		
Great Britain:																		
England and Wales	C	187	97	97	161	39	42	71	68	55	56	57	48	44	32	54	68	------
London	C	54	26	32	58	20	27	55	27	38	27	35	18	18	14	28	40	------
London and Great Towns	C	152	69	88	128	31	37	66	45	48	48	53	42	31	22	43	56	------
	D	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Sheffield	C	------	------	2	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Greece (see table below).																		
Honduras:																		
Ceiba	C	------	------	------	14	------	------	------	------	------	------	------	------	------	------	------	------	------
Puerto Castilla	C	------	------	------	1	------	------	------	1	------	------	------	------	1	------	1	1	------
Tegucigalpa	C	------	------	------	------	------	------	------	------	------	8	------	------	------	------	------	------	------
Trujillo	C	------	------	1	1	------	------	------	------	------	------	------	------	------	------	------	------	------
India	C	5,359	2,927	1,705	1,451	197	270	378	307	------	------	------	------	------	------	------	------	------
	D	1,352	746	433	221	46	66	63	71	------	------	------	------	------	------	------	------	------
Bombay	C	6	2	5	------	------	------	------	------	1	------	------	------	2	------	------	1	------
	D	6	1	1	------	------	------	------	------	1	------	------	------	1	------	------	1	------
Calcutta	C	21	13	5	1	1	------	------	------	------	------	1	------	------	1	1	5	------
	D	18	9	5	1	1	------	------	------	------	------	1	------	------	1	1	1	------
Cochin	C	------	3	------	8	3	------	2	------	------	------	------	------	------	------	------	------	------
Karachi	C	------	1	------	------	1	------	------	------	------	------	4	1	2	1	------	------	------
Madras	C	2	1	1	13	2	2	------	1	------	2	2	3	1	2	3	1	------
	D	------	------	------	2	------	------	------	------	------	1	------	1	------	1	1	------	------
Negapatam	C	1	2	4	2	------	------	------	1	------	------	------	1	------	------	------	------	------
	D	------	------	------	1	------	------	------	1	------	------	------	1	------	------	------	------	------
Rangoon	C	3	4	2	3	1	1	1	------	2	2	2	3	4	4	18	13	------
	D	1	2	1	2	------	------	1	------	2	2	1	2	1	------	2	7	------
Tuticorin	C	------	------	2	4	1	------	4	------	------	4	4	------	2	2	------	------	------
	D	------	------	------	1	1	------	------	------	------	------	------	------	------	------	------	------	------
Vizagapatam	C	5	5	6	6	------	------	------	------	------	------	------	------	------	------	------	2	------
	D	1	4	6	1	------	------	------	------	------	------	------	------	------	------	------	------	------

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

SMALLPOX—Continued

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

Place		June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Week ended— October, 1931		November, 1931				December, 1931				January, 1932		
						24	31	7	14	21	28	5	12	19	26	2	9	16
India (French):																		
Chandernagor	C	3																
	D	2																
Karikal	C	4	7	7	8			3	1	1		2	4					
	D	4	6	3	4			3		1		2	4					
Pondicherry Province	C	28	20	26	23	9	18	5	6	9	6	5	6	10	1			
	D	28	20	24	21	9	16	5	6	9	5	5	6	10	1			
Indo-China (see also table below): Saigon and Cholon	C	3	2	6	6		4	2	1	4	6	7	9	13	8	3	8	
	D	1	1	3	3		4	1		2	1	3	6	9	6	2	7	
Iraq:																		
Baghdad	C			1							1	4	6	3	4	4	4	5
	D										1	2	2	1	2	2	3	9
Basra	C																1	
	D																2	
Mosul Liwa	C	1	1		5													
Ivory Coast (see table below).																		
Jamaica	C											1						
Japan: Yokohama	C										1						1	
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	3	2		4			2		1				1				2
Mexico City and surrounding territory	C	22	10	5	7	1	1	1	2	3	4	2	1	6				
	D	8	2	2	4	1												
Monterrey	C						2											1
San Luis Potosí	C															1	1	2
Torreon	C			2	1						1	5	1				2	2
	D			1													2	1
Morocco (see table below).																		
Netherlands: Friesland—Opsterland	C					[1] 1												
Nigeria	C				454		8	61		15								
	D				141			15		1								
Panama: Chiriqui	C											3						
Poland	C	18		1			1		1				1	1				
Portugal:																		
Lisbon	C	45	37	66	48	19	16	17	26	22	23	21	25	35	14	26	33	
Oporto	C		1								1		1	1			1	

Rumania (see table below).																			
Siam	C		1		3														
	D		1																
Spain	C		7																
Straits Settlements	C			1															
Sudan (Anglo-Egyptian)	C				32							2						2	
	D				6														
Syria (see table below).																			
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C									P		P	P	P					
Natal	C			P	P														
Orange Free State	C	P		P	P	P													
Transvaal	C	P					P	P	P			P							
Upper Volta	C		2																
On vessel:																			
Brazilian ship Jaboatao at New Orleans from Brazil	C																1		
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C			1															
S. S. Bellasco at Mobile, from Habana, Cuba, and Hull, England	C																	1	

Place		June, 1931	July, 1931	August, 1931	September, 1931			October, 1931			November, 1931			December, 1931		
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	47	8	72	5	7	27	10	11	26	20	2	98	144	41	324
	D		4	26		4	8	3	3	10	4		18	17	21	55
Ivory Coast	C			7							1					
	D			4							1					
Syria: Beirut	C	1														

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931	November, 1931
China: Harbin	C	13	10					
Chosen	C	1	4	2				2
	D			1				
France	C	54	9	20		4		6
Greece	C	3	1					
Mexico (see also table above)	D	1	2					

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931	November, 1931
Morocco	C	49	48	23	23	59	91	152
Rumania	C	1			1			
Turkey	C	9	1					
Union of Socialist Soviet Republics	C	1,345						

[1] Imported case.

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

TYPHUS FEVER

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

Place		June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Week ended— October, 1931		November, 1931				December, 1931				January, 1932		
						24	31	7	14	21	28	5	12	19	26	2	9	16
Algeria:																		
Algiers	C	2			1		1	1						1		3		
Bone	C		2															
Constantine Department	C	3	1	2	1		11	16	11	1		1	1	1			1	
Oran	C		1	1					1	1								
Bulgaria	C			1		1			1		2		2	1				
	D													1				
Chile:																		
Antofagasta	C	1					1											
Santiago	C					3	19		12	3								
China:																		
Manchuria—Harbin	C			1														
Shanghai	C	3	1		1													
Chosen (see table below).																		
Colombia: Cali	D			1														
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C			2										3		1		
Beheira	C							1										
Cairo	C			1									1					
Gharbieh	C							1										
	D							1										
Greece (see table below).																		
Guatemala (see table below).																		
Irish Free State:																		
Cork County—																		
Schull	C	1																
Skibbereen	C	1																
Donegal County—Stranorlar	C												2					
Limerick County—																		
Croom	C				1													
Glin	C			2	1													
Limerick	C	2	1										1					
Michelstown	C	1																
Rathkeale	C				1													

Mayo County—																		
Castlebar	C		1															
Westport	C		1															
Waterford County—Lismore	C															1		
Lithuania (see table below).																		
Mexico:																		
Durango	D	1																
Guadalajara	D		1															
Mexico City, including municipalities in Federal District	C	53	18	10	14	7	3	1	5	7	3	5	7	4	3			
	D	12	10	4	8	2	2			1	1	1	1	2	1			
San Luis Potosi	D	4	1												1			
Torreon	C	1			2		3											
	D	1			2		5	1										
Morocco	C	102	8		4		1					11	6	4	1	1	3	
	D	8											2	1				
Palestine	C	2	11	4	6	2		1			1			2	1		1	1
Paraguay: Asuncion	D			1														
Peru [1]																		
Poland	C	53	31	11	14	2	6	6	6	16	36	32	22	68	30	46	49	
	D	5	2		1		1	2		2	2		6	5	5	3	1	
Portugal: Oporto	C						3											
Rumania	C	11	23	13	18	12	12	6	8	13	13	13	20					
	D	5	2	1	3	3	3	2	1	1	1	2	2					
Tunisia: Tunis	C	2		3					3		26				1			
	D										2							
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P		P	P						
Municipality of East London	C			P														
Natal	C	P	P	1	P			P			P	P						
Orange Free State	C	12			P	P	P	P										
Transvaal	C	P	P	P	1	P	P	P	P	P	P	P						
Yugoslavia (see table below).																		

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931	November, 1931
Chosen: Seoul	C		6	1				4
	D		1	1				1
Czechoslovakia	C	11	2				18	
Greece	C	6	9	2	13	9	12	4
	D				2	1		
Guatemala	C		33	34	3			
	D		15	5				

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

Typhus fever has been reported in Peru from May to November, 1931, 153 new cases being reported during the months of October and November. The disease has not spread to the coastal regions.

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

YELLOW FEVER

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

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Week ended— Sept. 26, 1931	October, 1931					November, 1931				December, 1931	
							3	10	17	24	31	7	14	21	28	5	12
Brazil:																	
Alagoas State	C			3													
	D			2													
Maceio	D											1					
Utinga	C											3					
	D											2					
Ceara State	C	1		1													
	D			1													
Sobral	C										1						
	D										1						
Pernambuco State	C				2												
	D				2												
Pau d'Alho	C												1				
	D												1				
Recife	C					1											
	D					1											
Sergipe State	C	1															
British Cameroons: Mamfe	C	2															
Colombia: Magdalena Province—Near Cienaga	C		4														
Gold Coast:																	
Akuse	C		2														
	D		1														
Dagomba District	C			4													
Kete Krachi	C							1									
Kintampo	C		1														
	D		1														
Oda	C				1												
	D				1												
Salaga	C															1	
	D															1	
Tamale	C		2			2				1					2	1	
	D		2			2											
Wale Wale	C			1													
	D			1													

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

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