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Trends and Epidemics of Influenza and Pneumonia, 1918-1951

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The virus of human influenza was isolated in 1933 and 1934, following intranasal instillation of throat washings in ferrets, by Smith, Andrewes, and Laidlaw (1, 16). In the late summer of 1934 their evidence was first corroborated in the United States in the laboratories of the Rockefeller Institute (8) by the recovery of a strain of the same virus from an epidemic in Puerto Rico. Since that time several strains and types of influenza virus have been isolated, and from materials from patients in epidemics in 1932 and later years the predominant type of virus has been determined (7).

Although simplified methods of concentrating and purifying influenza virus have been developed (9), it is not practicable at present to use virus findings on individual patients as an aid in diagnosis, as is done with throat cultures in diagnosing diphtheria. However, if a considerable number of patients in an apparent influenza epidemic are tested for influenza virus, it can be stated whether the epidemic was predominantly due to virus A, A', B, or some unknown type. Of the epidemics since 1932, the most common predominant etiologies have been viruses A and A', and more frequently the latter since 1940.

Another development which must have profoundly affected the trend of influenza and pneumonia mortality was the discovery and use of the sulfonamides, penicillin, and other newer chemotherapies in the treatment of the disease. The literature on this subject is extensive but a few studies on pneumonia among humans may be cited. Some early reports on sulfanilamide therapy on human cases of pneumonia were made by Heintzelman, Hadley, and Mellon (11) and Price (12); on sulfanilamide and serum treatment by Price and Myers (13), and on serum treatment by Rogers and Gooch (14).

Obviously, studies of influenza prior to 1933 and 1934, when the virus was first isolated, were rather largely descriptive of the nature of the outbreaks, including explosiveness, extent of the epidemic in terms of deaths in excess of normal seasonal expectancy, cases reported

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to health officers or estimated from household surveys immediately following the epidemic, time covered by the outbreak, regions or States where the epidemic was first noted, and the time and direction of its spread—in the sense of the time between the peaks in the first and last regions affected.

It soon became apparent that influenza reported to health departments was a poor index of the relative importance of the different epidemics and of their intensity in the various geographic sections. Influenza was very poorly reported between epidemics, but reports were greatly increased as soon as the epidemic was in progress. In fact, it was often said that influenza was diagnosed by its epidemiology rather than its clinical course. There were many arguments among epidemiologists as to whether the great pandemic of 1918–19 was of the same etiology as the epidemics of 1920–29, or the same as the epidemics of the early '90's, or an entirely new disease. Although there was no laboratory evidence of the etiology of the pandemic of 1918–19 and the epidemics of 1920–29, Francis (?) points out that epidemiological and other characteristics of the disease in 1918 are such as to warrant calling it and the epidemics following it the same disease.

From household surveys following influenza epidemics, considerable information was obtained about age incidence of influenza and pneumonia, case fatality, complications, and other epidemiological features of the disease, but it was not possible even if profitable to organize such surveys quickly enough to get accurate data about each epidemic.

In the absence of other data, epidemiologists and statisticians turned to weekly reports of deaths from influenza and pneumonia in excess of the normal seasonal expectancy as an index of the size of an epidemic. The present study is largely a review of influenza epidemics as measured by this method, together with a consideration of trends of mortality from influenza and pneumonia aside from and also including excess deaths during epidemics.

Influenza itself has never been one of the consistently large killers, but combined with pneumonia, its most frequent complication, it caused an annual average of 184 deaths per 100,000 population of the registration States in the years 1900–1904. In the older ages, many persons with chronic diseases were and still are easy prey for the influenza-pneumonia combination. Aside from the pandemic of 1918–19, and to a considerably lesser extent the epidemics of 1920 and 1922, the mortality has been relatively low in youth and young adulthood and highest in the older ages.

Trend of Influenza and Pneumonia Mortality, 1900–1951

With the exception of the pandemic of 1918–19 and its more than half-million deaths above normal expectancy (17), and the moderate

epidemics of the next 18 years, the most striking development in influenza and pneumonia is the abrupt acceleration in the downward trend of mortality in the late '30's. In figure 1 the continuous line

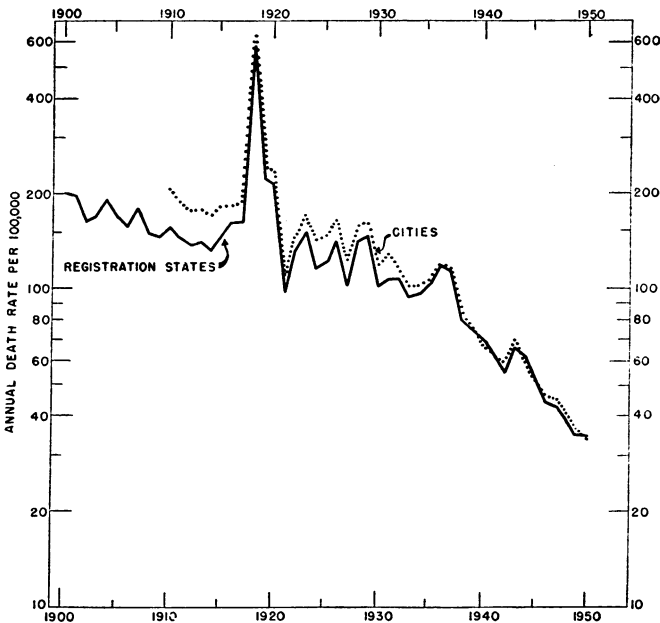


Figure 1. Trend of mortality from influenza and pneumonia in the registration States 1900-50, and in groups of cities in the United States, 1910-50.

NOTE: Logarithmic vertical scale. Rates are for calendar years; 35 cities 1910-19; 90 cities 1920-42; 56 cities 1943-50. Registration States rates for 1949 and 1950 are estimated from the 10-percent sample (18, fifth revision of International List) on the basis of the change in that rate since 1948. For years prior to 1942, see table 2 of reference (10) and (computed from) table 4 of reference (6). The number of registration States increases from year to year.

shows the total annual death rates from influenza and pneumonia in the registration States for calendar years from 1900 to 1950 (table 1 and references therein). Aside from 1918, 1919, and 1920, there is a generally downward trend from 1900 to about 1937 which tends to follow a straight line from the 184 annual deaths per 100,000 in 1900-1904 to roughly 100 in 1937. Just after that year there is a definite and abrupt change in the general slope of the curve with a decline in the rate from about 100 per 100,000 to a provisional low of about 34 in 1950, estimated from the 10-percent sample¹ of death certificates (18). Although the 10-percent sample indicates no decline in 1950 from 1949, data for the 56 large cities for which deaths from influenza and pneumonia are available indicate a continuation of the decline in 1950, as can be seen by the dotted line in figure 1.

Data on influenza and pneumonia deaths for the decade 1910-19

¹ Fifth revision of the International List was used for making 1949 and 1950 estimates comparable with earlier years (see note to fig. 1).

Table 1. *Annual mortality from influenza and pneumonia in the registration States and in 56 cities in the United States, 1942-50*¹

Calendar year	Annual death rate per 100,000		Calendar year	Annual death rate per 100,000	
	Registration States	Cities		Registration States	Cities
1942 ¹	55.7	58.5	1947.....	43.1	45.6
1943.....	67.3	70.0	1948.....	38.7	41.1
1944.....	61.7	60.1	1949 ²	34.5	36.5
1945.....	51.8	51.3	1950 ²	34.3	34.1
1946.....	44.6	46.6			

¹ For years prior to 1942, see table 2 of reference (10) and (computed from) table 4 of reference (6).

² Registration States rates for 1949 and 1950 are estimated from the 10-percent sample on the basis of the change in that rate since 1948. The fifth revision of the International List is used in these estimates to correspond with the years prior to 1949. The rates according to the sixth revision were 27.5 for 1949 and 31.0 for 1950.

are available for 35 large cities at monthly intervals to September 1918. Weekly data are available from September 8, 1918, through 1919. From 1920 to August 1942, weekly data are available for about 90 cities, including a majority of those over 100,000 in population and some smaller cities, particularly in areas like the Mountain States where there are few large cities. From August 1942 to the present, weekly data are available for 56 cities of 100,000 population or more. Since no tabulations have ever been made on weekly data for the United States as a whole, these deaths for groups of cities are the only data available for accurately measuring the extent of the excess over normal seasonal expectancy of influenza and pneumonia during epidemics.²

The dotted line in figure 1 shows total annual death rates from influenza and pneumonia in these groups of cities from 1910 to 1950. Prior to 1920 the city rates are considerably higher and they show less downward trend from 1910 to 1917 than the rates for the registration States as a whole. However, after September 8, 1918, the city data are available by weeks, and weekly data are important in studying epidemics of a disease which may cover the country in as few as 10 weeks. So far as epidemics are concerned, the curves for the cities and for the registration States seem to indicate about the same outbreaks; in the later years of the period the two sets of data are similar in the actual level of the rates.

Figure 2 shows for the groups of cities described above the trend of annual influenza and pneumonia death rates for years ending in mid-August of 1920 to 1951 in terms of total rates and in rates exclusive of the excess during epidemics (table 2). Rates for the year ending in August of 1951 are estimated from data for the first 39 weeks of the

² Data on influenza and pneumonia mortality in Massachusetts are available at monthly intervals for many years, including the epidemics of the early '90's. Aside from epidemic variation these data show no long-time trend from 1887 to 1910 (2).

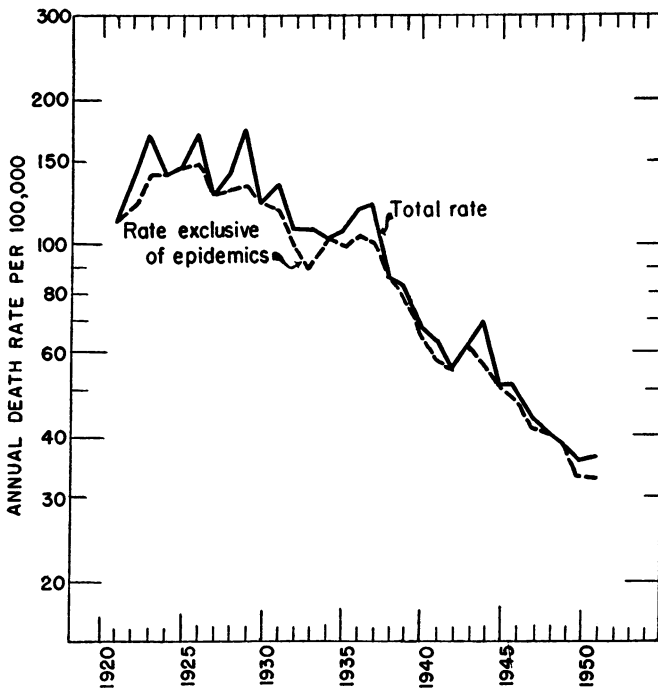


Figure 2. Trend of mortality from influenza and pneumonia in groups of cities in the United States, including and excluding epidemic excess deaths, 1920-51.

NOTE: Logarithmic vertical scale. Rates are for years ending in mid-August, i. e., 32d week of the calendar year; 90 cities 1920-42; 56 cities 1943-51. Rate for year ending in mid-August of 1951 estimated on the basis of the change in the rate for the first 9 months of that year from the rate for the first 9 months of the year ending in mid-August of 1950. For years prior to 1943, see tables 1 and 3 of reference (10).

years ending in August of 1950 and 1951. Whether total rates or rates exclusive of epidemic excesses are used, the acceleration in the downward trend since about 1937 is unmistakable.

Figure 3 shows for large cities the trend by quarters for the years 1935 to 1951, exclusive of epidemic excess deaths (table 3). As would be expected the winter quarter (January-March) has the highest rates

Table 2. Annual mortality from influenza and pneumonia in 56 cities of the United States, 1943-51¹

Year ending in mid-August (thirty-second week)	Annual death rate per 100,000		Year ending in mid-August (thirty-second week)	Annual death rate per 100,000	
	Including epidemic excess deaths	Excluding epidemic excess deaths		Including epidemic excess deaths	Excluding epidemic excess deaths
1943 ¹	62.2	62.2	1948.....	41.4	41.4
1944.....	70.4	56.0	1949.....	38.9	38.9
1945.....	51.4	51.4	1950.....	35.6	32.9
1946.....	51.2	47.5	1951 ²	36.1	32.4
1947.....	44.4	41.9			

¹ For years prior to 1943, see tables 1 and 3 of reference (10).

² The rate for 1951 is estimated on the basis of the change in the rate for the first 9 months of the year ending in mid-August of 1950-51 from the rate for the same period of 1949-50.

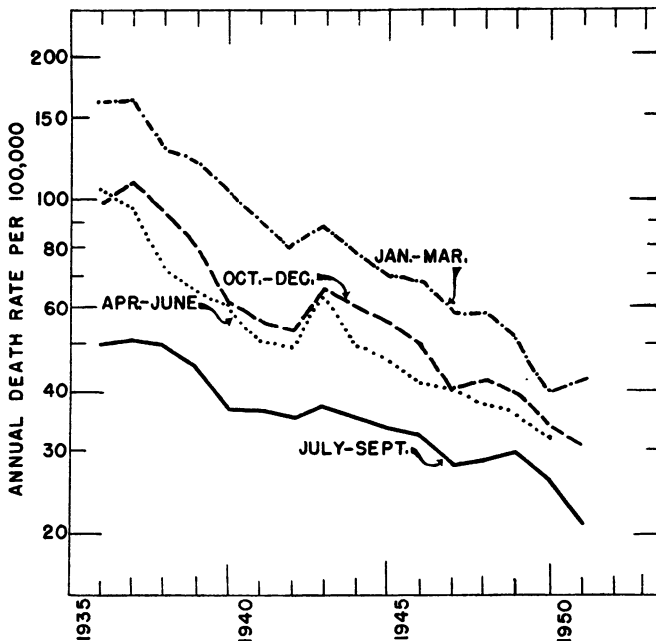


Figure 3. Trend of mortality from influenza and pneumonia, exclusive of epidemic excess deaths, for each quarter-year in groups of cities in the United States, 1935-51.

NOTE: Logarithmic vertical scale; 90 cities 1935-42; 56 cities 1943-51. For years prior to 1943, see table 4 of reference (10).

(annual basis), but it has also the steepest decline. The rates for the two adjacent quarters (October-December and April-June) have roughly the same slopes but less relative decline than those of the winter quarter. The rates for the low summer quarter decline less rapidly than those for the other quarters.

Figure 4 shows total influenza and pneumonia death rates in large cities classified into eight geographic sections (table 4). The light line

Table 3. Quarterly mortality per 100,000 (annual basis) from influenza and pneumonia exclusive of epidemic excess deaths, in 56 cities of the United States, 1942-51¹

Year ¹	Third quarter (27-39 weeks) July-Sep- tember	Fourth quarter (40-52 weeks) October-De- cember	First quarter (1-13 weeks) January- March	Second quarter (14-26 weeks) April-June
1942-43 ²	37.3	65.8	88.1	62.3
1943-44.....	35.0	59.3	79.7	50.5
1944-45.....	33.7	55.8	70.2	46.5
1945-46.....	32.4	50.7	67.1	41.8
1946-47.....	28.4	40.7	58.0	40.4
1947-48.....	28.7	42.3	58.0	37.3
1948-49.....	29.9	39.8	50.6	35.8
1949-50.....	26.3	34.1	40.6	32.5
1950-51.....	21.4	30.9	43.1	.....

¹ Rates (total, normal, and excess) were computed for years ending in mid-August (thirty-second week), but these quarterly rates represent averages for the weeks in standard quarters as indicated by the column headings.

² For years prior to 1943, see table 4 of reference (10).

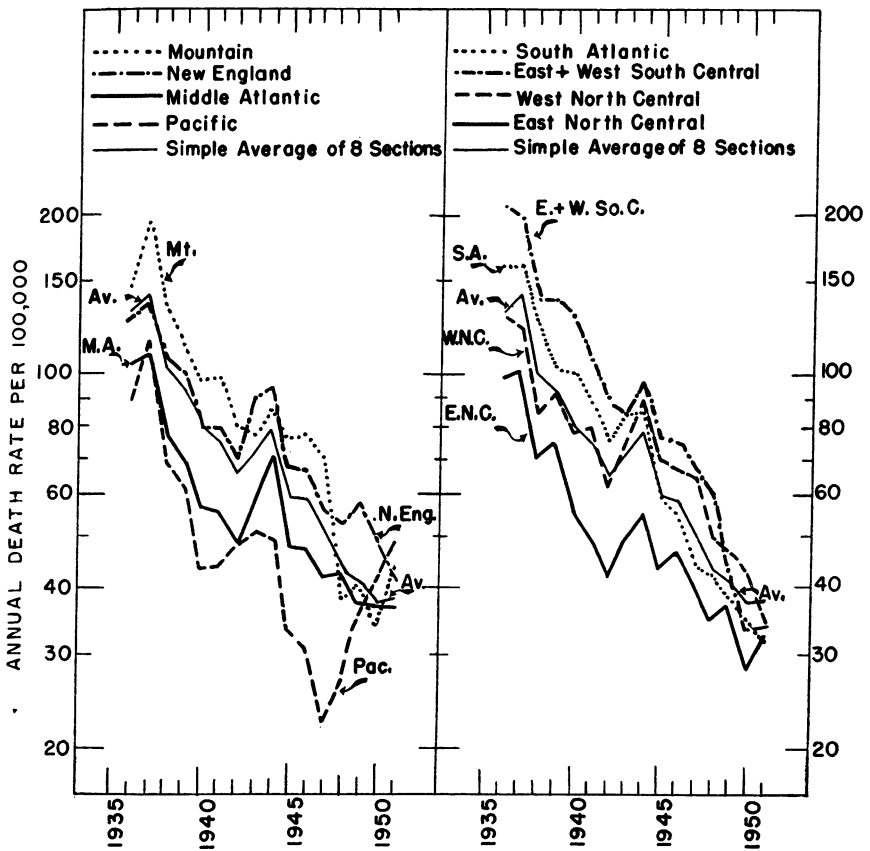


Figure 4. Trend of mortality from influenza and pneumonia in cities in each of eight geographic sections of the United States, 1935-51.

NOTE: Logarithmic vertical scale. U. S. Census geographic sections are used except that East and West South Central are combined. Rates are for years ending in mid-August, i. e., 32d week of the calendar year; 90 cities 1935-42; 56 cities 1943-51. For years prior to 1943, see table 3 of reference (10).

appearing on both halves of the chart is the simple average of the rates in the eight sections, intended to serve as a base line for indicating which sections have higher and which lower rates than the average. Nearly every section shows a generally downward trend in death rates from influenza and pneumonia, aside from epidemic peaks and chance variations. The sole exception is the Pacific section, which declines rapidly to a very low rate for the year ending in mid-August of 1947 but increases in each of the four following years.

Excess Mortality from Influenza and Pneumonia

Since 1918 and even earlier, excess mortality has been used as the best available measure of epidemic periods and of the size and importance of an epidemic. This method involves the finding of a normal seasonal expectancy for influenza and pneumonia mortality

Table 4. *Annual total mortality per 100,000 from influenza and pneumonia in cities of eight geographic sections of the United States, 1943-51*¹

Year ending in mid-August (thirty-second week)	All 56 cities	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East and West South Central	Mountain	Pacific
1943 ¹	62.2	92.7	57.6	49.2	74.6	84.4	84.6	77.1	50.9
1944.....	70.4	95.4	70.0	55.5	89.7	85.3	96.6	86.5	49.3
1945.....	51.4	67.1	47.5	43.2	69.8	59.5	77.5	76.5	34.1
1946.....	51.2	66.6	47.6	46.7	66.2	55.3	75.8	77.7	31.0
1947.....	44.4	56.9	41.9	40.2	65.0	44.4	67.2	69.6	21.6
1948.....	41.4	52.9	42.6	35.0	50.0	42.5	60.9	38.0	26.7
1949.....	38.9	57.7	37.0	37.0	46.4	38.4	42.2	40.1	34.9
1950.....	35.6	48.9	36.4	28.5	42.6	34.6	33.3	33.4	40.7
1951 ²	36.1	41.2	36.2	32.3	34.6	31.7	33.6	43.3	48.3

¹ For years prior to 1943, see table 3 of reference (10).

² See note 2 to table 2.

and measuring the epidemic by the excess over this seasonal expectancy.³ In an early study (4) it was found that roughly half of the excess mortality credited to influenza and pneumonia during an influenza epidemic was charged to pneumonia and the other half to influenza. In fact, influenza may well be thought of as not a killing disease except by the intervention of pneumonia or the presence of chronic disease in the patient. A later study indicated that in small and moderate influenza epidemics, many of the excess deaths are credited to the chronic diseases of the older ages (3), presumably because of the high mortality of influenza and pneumonia among persons with chronic disease.

In and around the pandemic of 1918-19, the excess mortality method was used on weekly influenza and pneumonia death rates back to the late '80's in an effort to compare the epidemics of the early '90's and the early 1900's with excesses in the pandemic of 1918-19 (19).

Figure 5 shows excess death rates by weeks from influenza and pneumonia from 1918 to 1951 for the total of the various groups of cities described in an earlier section of this report. Aside from the great pandemic of 1918-19, the two largest epidemics occurred early in 1920 and in the winter of 1928-29. However, three other epidemics of considerable size occurred in the decade 1920-29 and three in the decade 1930-39. In the period 1940-51, only the epidemic of 1943-44 was comparable in size with the ones occurring in the two preceding decades.⁴ However, minor epidemics were scattered throughout the whole range of years; counting all sizes which showed a measurable excess in the group of cities as a whole, the epidemic of 1951 was the

³ For details of the methods used, see appendix to this report.

⁴ The considerable number of exceptionally large deviations below seasonal expectancy which occurred in the decade 1920-29 are the result of a difference in the method of estimating the seasonal expectancy. In 1920-29 there was little trend in the rates for the cities and no attempt was made to adjust the curve of expectancy to the level of the nonepidemic rates for the year under consideration. The closer fit in the two decades 1930-50 comes from the adjustment of the seasonal norm to the level of the nonepidemic rates, first by years and later by quarters. For details of method, see appendix.

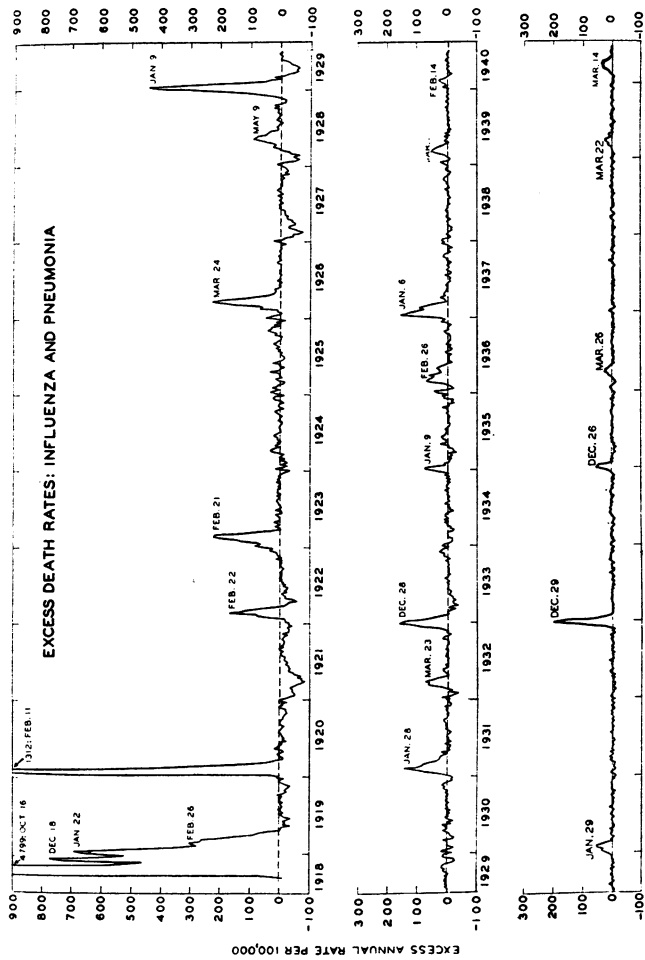


Figure 5. Weekly excess mortality (annual basis) from influenza and pneumonia in groups of cities in the United States, September 1918 to May 1951.

NOTE: Dates on charts are middle, Wednesday, of peak weeks. In 1920-29 excess rates are deviations from the smoothed median rate for corresponding weeks for the period 1921-27; in 1930 and later years they are deviations from average rates for corresponding weeks of years exclusive of or without serious epidemics, with adjustment for the downward trend in nonepidemic rates. See appendix to this study and references (4, 6, 10, 16) for details of computation; 35 cities 1918-19; 90 cities 1920-42; 56 cities 1943-51. Note that rate scale on this chart is twice the scales on the similar charts by geographic sections.

twentieth outbreak since the pandemic of 1918-19. This count includes some extremely small outbreaks such as that of March 1947 and March 1950, but it excludes three epidemics which affected some geographic regions but did not show appreciable excess when all cities were combined into one group.

By summing weekly excess rates computed on an annual basis (fig. 5) and reducing the total from an annual to an actual basis, one can make a fair estimate of the total deaths charged to influenza and pneumonia in excess of seasonal expectancy during the whole period of a given outbreak. Table 5 includes such a summary. Considering all cities combined, the excess influenza and pneumonia rates for epidemics since 1918-19 ranged in total excess deaths per 100,000 from 99.3 for the 1920 epidemic to 1.9 for a small epidemic of January and February of 1940 which affected only four geographic regions, and 2.5 for the epidemic of February-April of 1947; the three epidemics which involved only two geographic sections and showed no excess for the group of cities as a whole are not counted in this total.

Referring again to figure 5 and table 5, it should be noted that with the exception of the small epidemic of March to May of 1928 all the other outbreaks in the decade 1920-29 are larger in terms of total excess influenza and pneumonia deaths than any that have occurred since that time. It is equally apparent that in the decade 1930-39 more and larger epidemics occurred than in the period 1940-51—in fact, the only epidemic of any size that occurred since the beginning of 1940 was that of 1943-44. Thus, it appears that one or more of several things may have happened: (1) the mortality of diseases designated as influenza may be decreasing by reason of change in what is now diagnosed as influenza because of recently acquired knowledge of the etiology and the early clinical manifestations of the disease; (2) influenza fatality may be becoming less by reason of (a) greater natural immunity acquired by more individual contact because of greater movement of the population; (b) milder strains of the virus becoming widespread; or (c) more successful treatment of influenza and its most frequent complication, pneumonia, by the use of the newer chemotherapies.

Epidemics in Different Geographic Sections

The method of excess mortality from influenza and pneumonia has been applied to the data for each geographic section of the country. Figure 6 covers the period 1920-30 in each of the nine census sections; figures 7 and 8 include, roughly, the next two decades, bringing the record up to May 1951. The major epidemics, such as those of early 1920 and of the winter of 1928-29, show up in every geographic section, and the same is true of many of the epidemics that are minor in terms of excess death rates. For example, the 1922 epidemic

Table 5. Summary of period covered by epidemics and of the excess¹ mortality from influenza and pneumonia in epidemics in groups of cities² in the United States, 1920-51

Date of epidemic and geographic section	Total excess mortality during whole epidemic per 100,000 population ^{3,4}	Date of middle (Wednesday) of peak week	Actual excess ³ per 100,000 for peak week	Total number of weeks included	Approximate dates of epidemic	
					Beginning	End
Early 1920:⁵						
All cities.....	99.3	Feb. 11	25.2	12	Jan. 4	Mar. 27
New England.....	96.6	..do....	26.2	12	Jan. 11	Apr. 3
Middle Atlantic.....	95.2	..do....	26.5	8	Jan. 18	Mar. 13
East North Central.....	109.4	Feb. 4	32.5	11	Jan. 4	Mar. 20
West North Central.....	121.9	Feb. 11	33.0	12	..do....	Mar. 27
South Atlantic.....	94.2	Feb. 18	24.4	9	Jan. 11	Mar. 13
East South Central.....	99.1	Feb. 25	24.5	11	..do....	Mar. 27
West South Central.....	91.2	Feb. 11	19.5	12	..do....	Apr. 3
Mountain.....	159.5	..do....	50.8	14	Jan. 4	Apr. 10
Pacific.....	57.7	..do....	15.5	11	Jan. 18	Apr. 3
Winter 1921-22:^{3,4}						
All cities.....	18.3	Feb. 22	3.20	12	Jan. 8	Apr. 1
New England.....	29.5	Mar. 1	6.62	13	Jan. 15	Apr. 15
Middle Atlantic.....	24.7	Feb. 22	3.97	14	Jan. 8	Do.
East North Central.....	11.4	Mar. 8	1.61	10	Jan. 15	Mar. 25
West North Central.....	34.8	Feb. 22	5.35	12	Jan. 1	Do.
South Atlantic.....	9.4	Mar. 29	1.28	8	Feb. 19	Apr. 15
East South Central.....	16.0	Feb. 22	1.28	14	Dec. 18	Mar. 25
West South Central.....	14.6	Mar. 8	3.18	5	Feb. 26	Apr. 1
Mountain.....	36.2	..do....	9.07	11	Jan. 29	Apr. 15
Pacific.....	36.3	Feb. 22	10.15	9	..do....	Apr. 1
Winter 1922-23:³						
All cities.....	29.9	Feb. 21	4.22	17	Nov. 26	Mar. 24
New England.....	36.6	Jan. 31	3.97	17	..do....	Do.
Middle Atlantic.....	26.5	Feb. 28	4.83	16	Dec. 3	Do.
East North Central.....	32.2	Feb. 21	4.79	14	Dec. 10	Mar. 17
West North Central.....	53.3	Feb. 28	7.96	18	Nov. 26	Mar. 31
South Atlantic.....	42.7	Feb. 7	5.02	17	..do....	Mar. 24
East South Central.....	44.0	Jan. 31	5.50	20	Dec. 31	May 19
West South Central.....	6.7	Feb. 28	2.40	10	Jan. 14	Mar. 24
Mountain.....	17.6	Feb. 21	3.05	14	Dec. 31	Apr. 7
Pacific.....	11.3	Feb. 28	2.11	9	Feb. 4	Do.
Winter 1925-26:³						
All cities.....	25.3	Mar. 24	4.33	17	Jan. 31	May 29
New England.....	30.0	Mar. 31	6.88	15	Mar. 7	June 19
Middle Atlantic.....	41.2	Mar. 24	6.73	16	Feb. 14	June 5
East North Central.....	22.2	..do....	4.18	14	Mar. 7	June 12
South Atlantic.....	26.2	Feb. 17	5.95	18	Dec. 20	Apr. 24
East South Central.....	38.2	Mar. 24	7.12	17	Feb. 14	June 12
West South Central.....	58.8	Feb. 10	9.88	20	Nov. 8	Mar. 27
Mountain.....	16.8	Feb. 24	4.24	11	Dec. 27	Mar. 13
Pacific.....	9.3	Jan. 6	2.07	9	..do....	Feb. 27
Spring 1928:³						
All cities.....	11.6	May 9	1.75	19	Mar. 11	July 21
New England.....	15.4	May 23	3.11	12	Apr. 29	Do.
Middle Atlantic.....	20.9	May 9	2.53	19	Mar. 11	Do.
East North Central.....	17.9	..do....	2.80	13	Mar. 18	June 16
West North Central.....	4.9	May 2	1.17	10	Apr. 8	Do.
East South Central.....	11.9	May 23	2.99	9	Apr. 15	Do.
West South Central.....	13.7	Mar. 21	1.69	13	Mar. 11	June 9
Mountain.....	7.7	Feb. 29	1.57	14	Feb. 26	June 2
Winter 1928-29:						
All cities.....	44.4	Jan. 9	8.44	12	Nov. 25	Feb. 16
New England.....	42.3	Jan. 23	9.72	9	Dec. 30	Mar. 2
Middle Atlantic.....	43.0	Jan. 9	7.21	11	Dec. 2	Feb. 16
East North Central.....	43.7	Jan. 2	10.61	10	Nov. 25	Feb. 2
West North Central.....	42.8	Jan. 9	6.16	13	Dec. 2	Mar. 2
South Atlantic.....	47.6	..do....	11.20	10	..do....	Feb. 9
East South Central.....	92.0	..do....	28.84	9	..do....	Feb. 2
West South Central.....	68.2	Jan. 2	19.91	10	Nov. 25	Do.
Mountain.....	68.7	Dec. 12	22.19	9	Nov. 18	Jan. 19
Pacific.....	43.0	Dec. 5	9.00	13	Oct. 21	Do.
Winter 1930-31:						
All cities.....	16.4	Jan. 28	2.78	16	Dec. 28	Apr. 18
New England.....	13.8	Feb. 4	3.32	8	Jan. 11	Mar. 7
Middle Atlantic.....	24.3	Jan. 28	5.22	14	Dec. 28	Apr. 4
East North Central.....	9.7	Feb. 25	1.78	10	Jan. 11	Mar. 21
West North Central.....	14.0	..do....	2.15	11	Feb. 15	May 2
South Atlantic.....	27.2	Feb. 11	4.43	16	Dec. 28	Apr. 18
West South Central.....	17.7	..do....	1.99	16	..do....	Do.

See footnotes at end of table.

Table 5. Summary of period covered by epidemics and of the excess¹ mortality from influenza and pneumonia in epidemics in groups of cities² in the United States, 1920-51—Continued

Date of epidemic and geographic section	Total excess mortality during whole epidemic per 100,000 population ^{3,4}	Date of middle (Wednesday) of peak week	Actual excess ¹ per 100,000 for peak week	Total number of weeks included	Approximate dates of epidemic	
					Beginning	End
Early 1932:						
All cities.....	7.4	Mar. 23	1.40	9	Feb. 14	Apr. 16
Middle Atlantic.....	13.5	Mar. 9	2.47	10	do	Apr. 23
East North Central.....	4.6	Mar. 2	1.23	7	do	Apr. 2
West North Central.....	19.4	Feb. 17	3.41	13	Jan. 31	Apr. 30
South Atlantic.....	8.0	Mar. 23	1.99	7	Feb. 28	Apr. 16
East South Central.....	8.6	Apr. 6	2.03	10	Mar. 6	May 14
West South Central.....	7.2	Mar. 23	1.99	6	Feb. 28	Apr. 9
Mountain.....	24.1	Jan. 6	4.05	17	Dec. 13	Do.
Winter 1932-33:						
All cities.....	19.2	Dec. 28	3.15	11	Nov. 20	Feb. 4
New England.....	22.8	Jan. 25	5.54	10	Dec. 4	Feb. 11
Middle Atlantic.....	18.1	Jan. 11	3.53	11	Nov. 27	Do.
East North Central.....	13.8	Dec. 28	2.68	12	Nov. 6	Jan. 28
West North Central.....	42.7	do	7.75	15	Nov. 20	Mar. 4
South Atlantic.....	22.1	Dec. 21	4.39	9	Dec. 4	Feb. 4
East South Central.....	33.9	do	8.00	9	Nov. 20	Jan. 21
West South Central.....	41.1	Dec. 7	7.82	8	do	Jan. 14
Mountain.....	34.7	Dec. 14	7.77	9	do	Jan. 21
Pacific.....	16.7	Jan. 11	2.45	15	do	Mar. 4
Winter 1934-35:						
All cities.....	5.4	Jan. 9	1.50	9	Dec. 2	Feb. 2
New England.....	8.1	do	3.07	7	Dec. 30	Feb. 16
Middle Atlantic.....	5.3	Jan. 2	1.25	9	Nov. 18	Jan. 19
East North Central.....	6.3	Jan. 9	1.90	7	Dec. 16	Feb. 2
West North Central.....	11.1	do	1.98	14	Nov. 18	Feb. 23
South Atlantic.....	14.5	do	3.87	10	Dec. 23	Mar. 2
East South Central.....	28.3	do	4.70	17	Nov. 25	Mar. 23
West South Central.....	10.7	Feb. 27	1.71	15	do	Mar. 9
Mountain.....	13.4	Jan. 30	2.86	11	do	Feb. 9
Winter 1935-36:						
All cities.....	12.5	Feb. 26	1.36	22	Dec. 22	May 23
New England.....	16.9	Jan. 1	2.24	14	do	Mar. 28
Middle Atlantic.....	7.1	Mar. 4	1.38	8	Feb. 9	Apr. 4
East North Central.....	5.7	Mar. 25	1.02	9	Mar. 15	May 16
West North Central.....	24.0	Mar. 18	2.84	16	Jan. 26	Do.
South Atlantic.....	10.7	Feb. 26	3.03	8	Feb. 2	Mar. 28
East South Central.....	61.1	Mar. 25	8.04	24	Dec. 1	May 16
West South Central.....	28.9	do	4.51	12	Feb. 16	May 9
Pacific.....	4.5	Mar. 4	1.28	6	Feb. 9	Mar. 21
Winter 1936-37:						
All cities.....	18.4	Jan. 6	3.01	11	Dec. 20	Mar. 6
New England.....	25.3	Feb. 10	3.64	12	Dec. 13	Do.
Middle Atlantic.....	11.4	Jan. 6	3.13	7	Dec. 27	Feb. 13
East North Central.....	16.1	do	4.07	13	Dec. 6	Mar. 6
West North Central.....	27.0	Jan. 20	5.95	9	Dec. 27	Feb. 27
South Atlantic.....	17.7	Feb. 17	2.72	16	Nov. 29	Mar. 20
East South Central.....	41.2	Feb. 24	7.84	15	Jan. 31	May 15
West South Central.....	24.5	Feb. 17	6.29	8	Jan. 17	Mar. 13
Mountain.....	68.0	Jan. 20	14.10	11	Dec. 13	Feb. 27
Pacific.....	31.0	Feb. 10	7.38	9	Jan. 3	Mar. 6
Early 1939:						
All cities.....	5.2	Mar. 1	1.02	9	Feb. 5	Apr. 8
New England.....	5.2	Apr. 5	1.57	6	Feb. 26	Do.
Middle Atlantic.....	2.9	Feb. 8	2.98	7	Jan. 22	Mar. 11
East North Central.....	11.8	Mar. 1	2.55	7	Feb. 12	Apr. 1
West South Central.....	9.2	Mar. 8	2.09	7	Feb. 19	Apr. 8
East South Central.....	8.7	Mar. 22	2.13	7	Feb. 26	Apr. 15
Early 1940:						
All cities.....	1.9	Feb. 14	.54	6	Jan. 21	Mar. 2
West North Central.....	6.2	Feb. 7	1.42	8	Jan. 14	Mar. 9
South Atlantic.....	5.8	Jan. 31	2.42	5	Jan. 21	Feb. 24
East South Central.....	6.5	Feb. 14	2.57	4	Jan. 28	Do.
West South Central.....	13.5	Feb. 7	3.51	8	Jan. 21	Mar. 16
Winter 1940-41:						
All cities.....	5.4	Jan. 29	1.02	10	Dec. 15	Feb. 22
New England.....	12.4	Jan. 22	2.97	6	Jan. 5	Feb. 15
Middle Atlantic.....	4.1	Jan. 29	1.07	6	Jan. 12	Feb. 22
East North Central.....	1.9	do	.61	4	Jan. 19	Feb. 15
West North Central.....	7.2	Jan. 15	1.57	10	Dec. 22	Mar. 1
South Atlantic.....	5.6	Jan. 29	1.96	8	Jan. 12	Mar. 8
East South Central.....	15.2	Jan. 22	3.93	6	Dec. 29	Feb. 8
West South Central.....	13.2	Jan. 1	3.11	7	Dec. 22	Do.
Mountain.....	15.6	Jan. 8	4.18	6	do	Feb. 1
Pacific.....	8.7	Dec. 25	2.03	7	Dec. 1	Jan. 18

See footnotes at end of table.

Table 5. Summary of period covered by epidemics and of the excess¹ mortality from influenza and pneumonia in epidemics in groups of cities² in the United States, 1920-51—Continued

Date of epidemic and geographic section	Total excess mortality during whole epidemic per 100,000 population ^{3,4}	Date of middle (Wednesday) of peak week	Actual excess ³ per 100,000 for peak week	Total number of weeks included	Approximate dates of epidemic	
					Beginning	End
Winter 1942-43:						
All cities.....	0					
New England.....	5.4	Apr. 14	1.53	8	Mar. 21	May 15
East and West South Central.....	9.1	Jan. 13	1.11	16	Dec. 20	Apr. 10
Winter 1943-44:						
All cities.....	14.4	Dec. 29	3.78	11	Nov. 28	Feb. 12
New England.....	21.9	...do....	6.41	14	Nov. 21	Feb. 26
Middle Atlantic.....	15.2	...do....	3.99	11	...do....	Feb. 5
East North Central.....	12.3	...do....	3.22	11	...do....	Do.
West North Central.....	16.9	Dec. 15	3.97	11	...do....	Do.
South Atlantic.....	21.3	Dec. 29	5.27	17	...do....	Mar. 18
East and West South Central ⁴	25.7	...do....	5.08	15	Nov. 28	Mar. 11
Mountain.....	25.2	Dec. 22	5.18	16	...do....	Mar. 18
Pacific.....	9.8	Jan. 5	2.59	11	Dec. 5	Feb. 19
Winter 1945-46:						
All cities.....	3.7	Dec. 26	1.02	11	Nov. 25	Feb. 9
New England.....	6.9	Jan. 9	2.49	9	Dec. 23	Feb. 23
Middle Atlantic.....	5.7	Jan. 2	1.25	12	Nov. 25	Feb. 16
East North Central.....	6.5	...do....	1.44	11	...do....	Feb. 9
West North Central.....	4.3	Dec. 26	1.34	8	Dec. 9	Feb. 2
South Atlantic.....	7.3	...do....	2.30	12	Dec. 2	Feb. 23
East and West South Central ⁴	13.5	Jan. 2	1.80	16	Nov. 25	Mar. 16
Mountain ⁴	16.9	Feb. 20	1.73	13	Dec. 2	Mar. 2
Pacific.....	2.9	Dec. 26	.50	12	Dec. 23	Mar. 16
Winter 1946-47:						
All cities.....	2.5	Mar. 26	.59	11	Feb. 16	May 3
Middle Atlantic.....	3.0	Apr. 9	.58	19	Dec. 22	Do.
East North Central.....	4.3	Mar. 26	1.34	8	Mar. 2	Apr. 26
West North Central.....	9.3	Mar. 12	2.07	12	Feb. 16	May 10
South Atlantic.....	2.6	Apr. 2	.61	8	Mar. 9	May 3
East and West South Central.....	7.7	...do....	1.09	21	Dec. 22	May 17
Mountain.....	9.1	Feb. 19	2.44	12	...do....	Mar. 15
Winter 1947-48:						
All cities.....	0					
East and West South Central.....	6.5	Feb. 25	1.78	12	Dec. 28	Mar. 20
Pacific.....	4.1	Jan. 14	.98	14	Dec. 14	Do.
Winter 1948-49:						
All cities.....	0					
East and West South Central.....	2.9	Feb. 2	.65	8	Dec. 26	Feb. 19
Mountain.....	2.6	Mar. 16	1.11	8	Mar. 13	May 7
Early 1950:						
All cities.....	2.7	Mar. 22	.48	9	Feb. 26	Apr. 29
Middle Atlantic.....	3.2	...do....	.65	9	...do....	Do.
West North Central.....	3.3	Mar. 29	.92	8	Feb. 19	Apr. 15
South Atlantic.....	3.2	...do....	.79	11	Feb. 12	Apr. 29
East and West South Central.....	3.3	...do....	.69	11	Feb. 19	May 6
Mountain ⁴	3.2	Feb. 22	1.28	6	...do....	Apr. 1
Early 1951:						
All cities.....	3.7	Mar. 14	.65	10	Feb. 11	Apr. 21
New England.....	8.2	Feb. 28	2.34	8	...do....	Apr. 7
Middle Atlantic.....	5.3	...do....	1.21	7	...do....	Mar. 31
East North Central.....	2.2	Mar. 28	.58	7	Mar. 4	Apr. 21
South Atlantic.....	1.2	Dec. 6	.48	3	Nov. 26	Dec. 16
East and West South Central.....	3.8	Feb. 14	.67	11	Feb. 4	Apr. 21
Mountain.....	3.2	Oct. 25	1.30	5	Oct. 15	Nov. 18
Pacific.....	5.7	Mar. 14	1.05	11	Feb. 18	May 5

NOTE: Geographic sections omitted from the table had no excess mortality from influenza and pneumonia during the particular epidemic.

¹ For methods of computation, see appendix to this study.

² The number of cities included in the studies were approximately: 90 cities 1920-42; 56 cities 1943-51. For names of cities see appendix tables in this study and in references (4, 5, 10).

³ In table 1 of reference (4), the peak rate for the epidemics of the winters of 1921-22, 1922-23, 1925-26, and of the spring of 1928 were computed as the average of the rates for the 3 highest consecutive weeks. In this table no such averages were used, so the peak rates are somewhat different from those in the earlier paper.

⁴ In the epidemic of the winter of 1921-22, a correction was made to the base line because weeks on both sides of the epidemic were well below the median base line. For details see notes to table 1 of (4). A similar situation in which the base line seemed too high occurred in the East and West South Central section in the epidemics of the winters of 1943-44 and 1945-46; the excesses were measured from a parallel line 10 per 100,000 below the original base line. Similarly, a correction of 15 per 100,000 was made in the base line in the Mountain section in the epidemic of the winter of 1945-46 and of 10 in the epidemic of early 1950.

⁵ See reference (2), table 1 for similar data on epidemics for a group of 35 large cities, 1915-19, and in Massachusetts, 1887-1915.

appears to involve nearly all of the geographic sections, but the rates in the South Atlantic and East South Central are negligible. The 1923 epidemic similarly involves most of the sections but is negligible in the West South Central region. The smaller the epidemic the more likely it is that not every section will be involved. For example, the epidemic of 1935-36 is moderately large in the East and West South Central sections but is of little importance in other sections. On the other hand, the epidemic of 1936-37, which was not so much larger than that of 1935-36, involves to some extent every one of the nine geographic sections.

In the decade of the forties the epidemics are all small. It has already been noted that there was only one moderate epidemic in this whole decade, but that epidemic could have been large in one or two sections and negligible in others. However, every section was affected by the epidemic of 1943-44.

Because of the smaller number of cities with available data after 1942, it was necessary to combine the East and West South Central sections. In figure 8 the rates are shown for these sections separately, as far as data for the larger number of cities were available. It is seen that the situation in the two sections is rather similar, and therefore the combined picture would be expected to be fairly representative. The Mountain section also had a very small population, but its combination with the much larger population in cities of the Pacific section would have reflected nothing but the Pacific section. It therefore seemed advisable to maintain the Mountain cities as a separate unit even though the population was small.

To summarize, all geographic sections in the 1940-51 decade show the same general picture of declining excess rates in the epidemics, as compared with epidemics of earlier years.

To supplement the data shown in figures 5, 6, 7, and 8, table 5 summarizes each epidemic in each geographic section. Probably the best index of the extent of the epidemic is the total excess rate during the whole period of the epidemic. The summary table 5 shows the total excess rate (actual basis), the date (Wednesday of the peak week) of each epidemic, the excess rate (actual basis) in the peak week, the total number of weeks considered as included in the epidemic, and the date of the first day of the first week and the last day of the last week of the epidemic.

In terms of the total excess mortality credited to influenza and pneumonia, the epidemics of 1950 and 1951 were both small, 2.7 and 3.7 per 100,000 population, respectively. In the five geographic sections involved in 1950, the total excess rates varied only from 3.2 to 3.3 per 100,000. In the 1951 epidemic the total excess rates varied in the seven regions involved from 1.2 per 100,000 in the South Atlantic region to 8.2 in New England. The rates for the Pacific

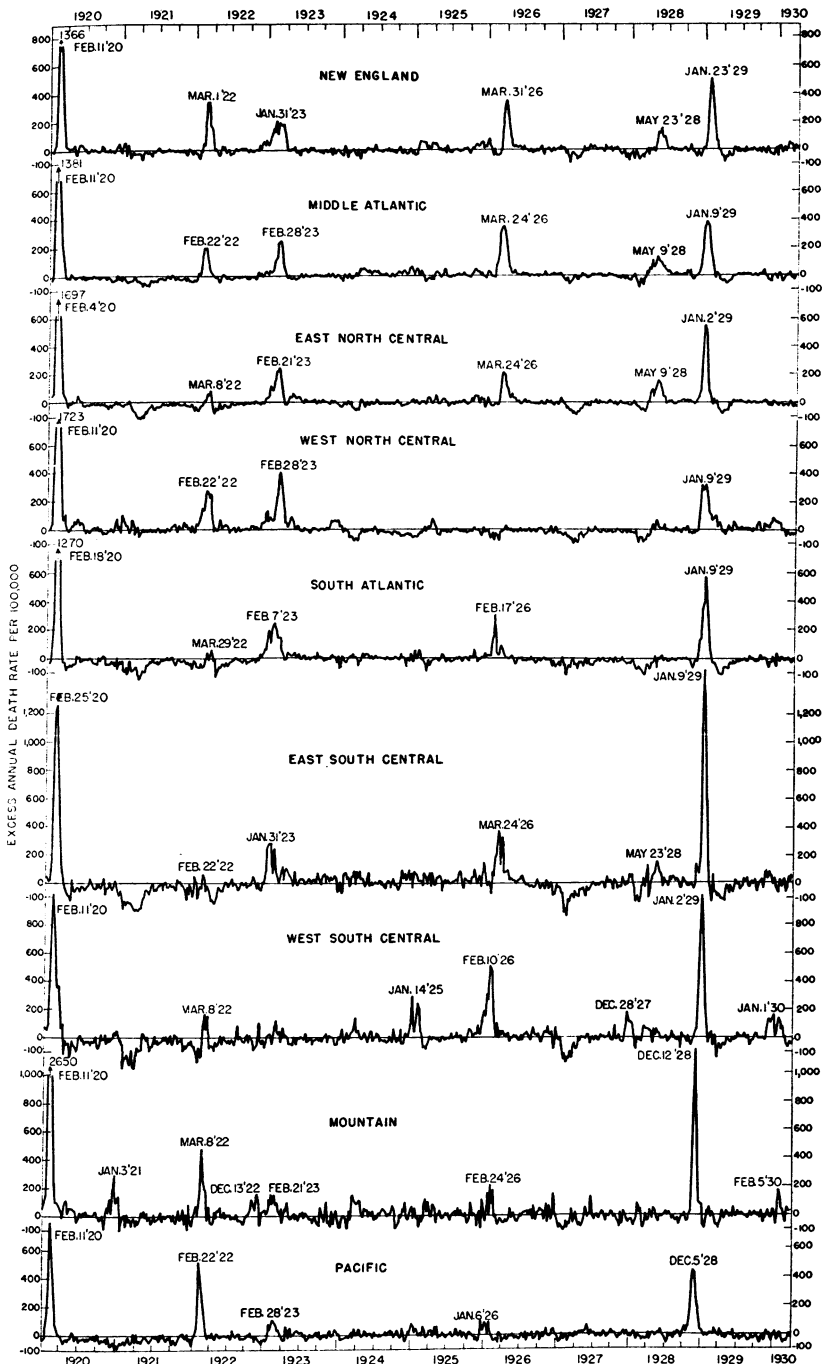


Figure 6. Weekly excess mortality (annual basis) from influenza and pneumonia in groups of cities in each geographic section, 1920-29. (See notes and references on fig. 5 for details.)

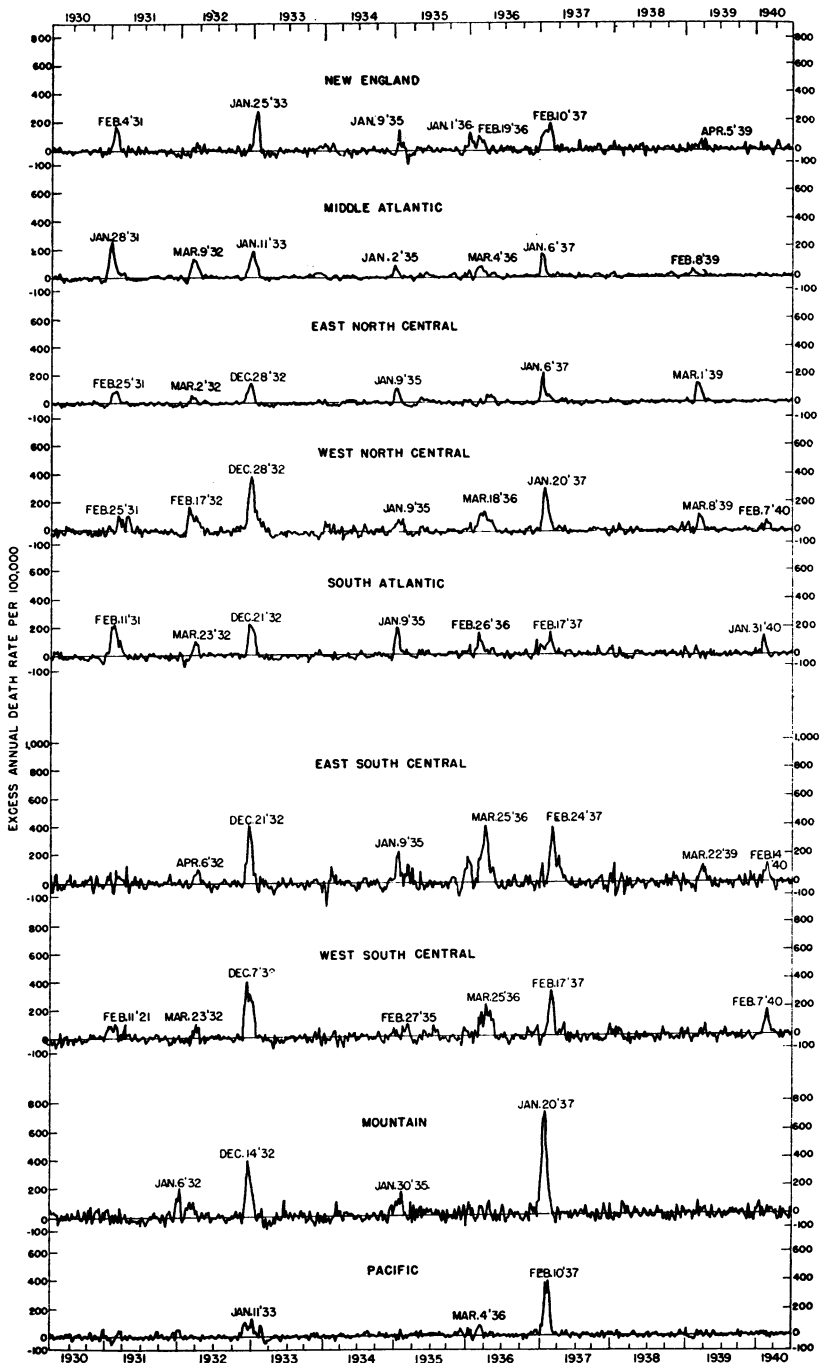


Figure 7. Weekly excess mortality (annual basis) from influenza and pneumonia in groups of cities in each geographic section, 1930-40. (See notes and references on fig. 5 for details.)

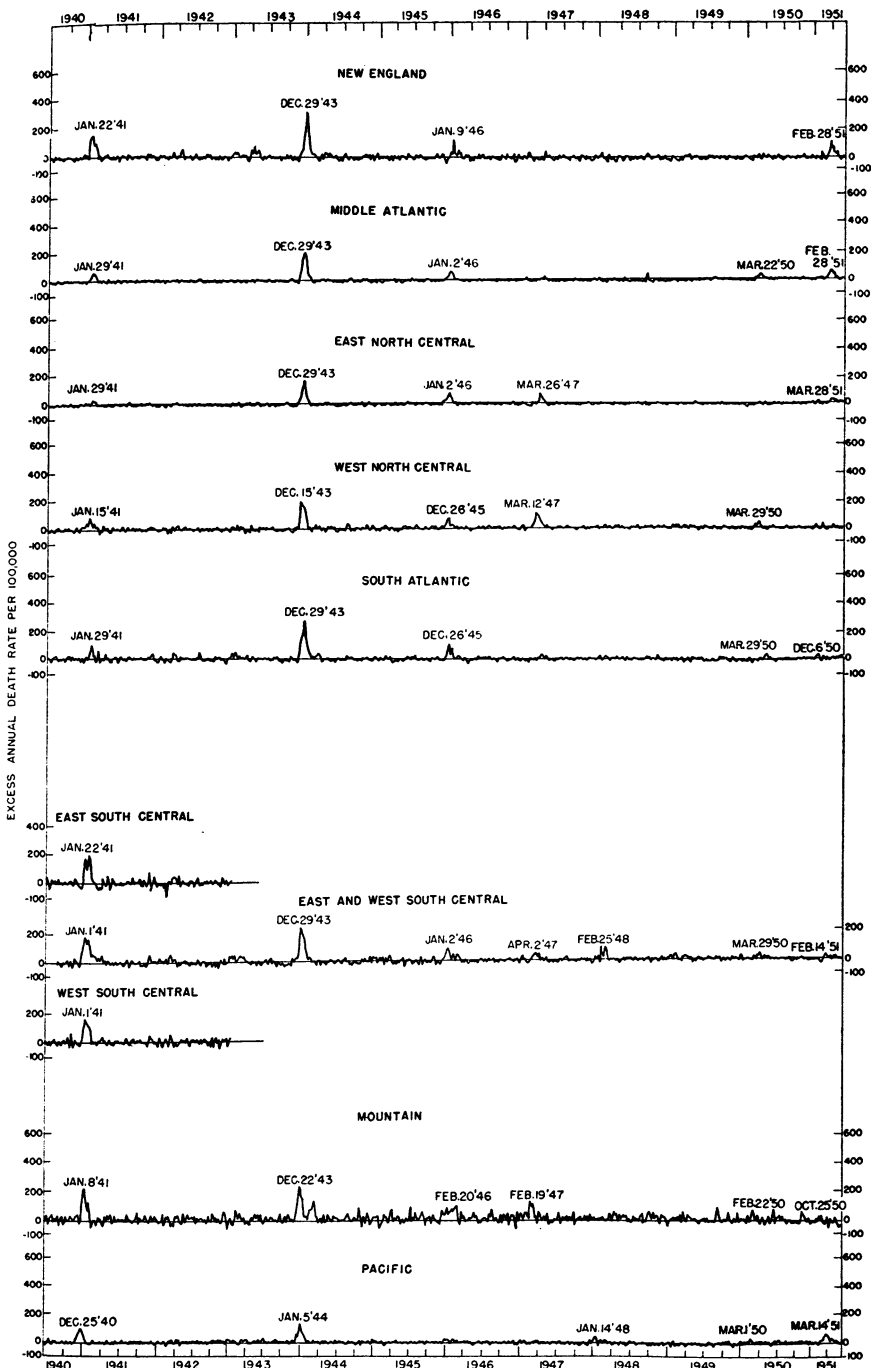


Figure 8. Weekly excess mortality (annual basis) from influenza and pneumonia in groups of cities in each geographic section, 1941-51. (See notes and references on fig. 5 for details.)

section were 5.7 per 100,000 and 5.3 for the Middle Atlantic, but only 2.2 in the East North Central region which was next to the lowest of the seven sections involved.

Summary

This study reviews the history of total annual mortality charged to influenza and pneumonia and the history of epidemics as measured by influenza-pneumonia mortality above normal seasonal expectancy. The data used were weekly death rates from influenza and pneumonia in groups of cities reporting to the Public Health Service, supplemented by monthly and annual death rates from the same causes in the registration States. No weekly mortality data are available for the total registration States.

The long-term trend of influenza and pneumonia mortality was moderately downward from an annual rate of 184 per 100,000 population for 1900-1904 to about 100 for 1937. After that time the trend turned abruptly to a steeper decline until in 1950 the rate was only about 34 per 100,000. Rates in the group of cities were considerably higher than in the registration States from 1910 until the early thirties, with less downward trend; after about 1937 there was little difference in the level of the two series of rates (fig. 1).

The trend since 1920 in the cities is easily seen both in the total rates and the rates exclusive of excess epidemic rates (fig. 2).

Influenza and pneumonia rates decreased more rapidly in the first or winter quarter (January-March) of the year than in the summer quarter of July-September (fig. 3).

Aside from epidemic and other fluctuations, the generally steeper decline in influenza and pneumonia mortality after the late thirties appeared in every geographic section except the Pacific, which declined rapidly until 1947 but increased steadily in the next 4 years (fig. 4).

In terms of influenza and pneumonia deaths in excess of normal seasonal expectancy, epidemics in the decade following the pandemic of 1918 were generally larger than in the next decade. After 1937 the epidemics were distinctly smaller as measured in excess deaths from influenza and pneumonia; the only one comparable in size with the earlier periods was that of 1943-44 (fig. 5).

An examination of excess deaths in groups of cities in each geographic section indicates roughly the same developments in each region as described above for all cities combined. However, some epidemics did not affect all of the regions (figs. 6, 7, 8).

The epidemic of 1951 was the 20th outbreak of influenza and pneumonia since the pandemic of 1918-19. This count includes some epidemics with very small excess death rates but it excludes three epidemics which affected some geographic sections but did not show

an appreciable excess when cities in all regions were combined into one group.

The epidemics of 1950 and 1951 were small in total excess mortality from influenza and pneumonia, but the latter caused more mortality, particularly in some geographic sections.

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APPENDIX

The method of computing a normal seasonal curve of influenza and pneumonia mortality which was used for the years 1920-35 in the group of cities has been described in detail in earlier reports (4, 5). For the years 1920-29 the normal seasonal curve was based on median rates for each week for the 7-year period 1921-27; the 52 weekly medians were smoothed by a 5-week moving average and used for the whole 10-year period without adjustment for change in average annual level of the rates. It should be noted that the use of the one normal seasonal expectancy throughout the period 1920-29 without any attempt to adjust for year-to-year differences in the level of nonepidemic rates led to a considerable number of minus fluctuations during nonepidemic periods and such exceptionally low rates as occurred in 1921, the first halves of 1922 and 1927, in January and February of 1928, and in March and April of 1929. The closer fit of later years comes from the adjustment of the seasonal norm to the level of the actual rates, first by year and later by quarters.

For the years 1930-35 the normal seasonal curve was based on the mean of the rates for corresponding weeks in the 4 years 1930-33 with interpolated values substituted for obviously epidemic rates. The 52 weekly means of these rates were then smoothed by a 5-week moving average and used as a relative basis for seasonal expectancy. Adjustment for the change in level from year to year in the average annual influenza and pneumonia death rate was made by multiplying each of these 52 weekly rates of the normal seasonal curve by a constant; this constant was the ratio of the average of the 52 rates for a specific year (with epidemic items replaced by interpolated values) to the average of the 52 rates of the normal seasonal curve, the process being repeated for each of the nine geographic sections. The curve of normal seasonal expectancy adjusted to the level of the year in question was then subtracted from the actual rates to give weekly excess rates for each year. Although there was some downward trend in influenza and pneumonia rates from 1930 to 1935, this method gives a reasonable normal seasonal curve from which to obtain excess rates.

Some change in the method of computing a normal seasonal curve of influenza and pneumonia was made necessary by the rapid decline in the rates which has taken place since 1937. If the 52 smoothed mean rates obtained from the 3-year period 1939-42 are multiplied by a constant ratio, as was done for the years 1930-35, the derived normal seasonal curve obtained gives a very poor fit to the rates for the period 1935-37. This is due, at least in part, to the fact that influenza-pneumonia mortality during this period declined at a slower rate during the third quarter (July-September), so that the seasonal curve of influenza and pneumonia mortality had a smaller amplitude in the year 1941-42 than it had in 1935-36.

To avoid this difficulty, the level of the normal seasonal curve used in 1935-42 was adjusted quarterly instead of annually. The detailed computations were made as follows: The normal seasonal curve was based on the mean of the rates for corresponding weeks in the 3 years ended in August (32d week of year) of 1942, with interpolated values substituted for obviously epidemic rates. This period was chosen because of the small number of epidemic items and the similarity of the seasonal mortality in the 3 years. The 52 weekly values in these 3-year means of rates (with epidemic items replaced by interpolated values) were smoothed by a 5-week moving average and used as a relative basis for seasonal expectancy. Adjustment for change in level of the actual rates was made at quarterly intervals by the following procedure: The average of the actual rates (epidemic items replaced by interpolated values) for the 13 weeks of each quarter for each year was related to the average of the rates for the 13 weeks of the corresponding quarter of the normal seasonal curve to obtain a ratio of the actual to the expected rate for

each quarter of each year. Between these quarterly ratios (centering in the middle of each quarter) straight line interpolations were made to get such a ratio for each week of each year. Then the rate in the normal seasonal curve for a given week was multiplied by the above ratio for the corresponding week to obtain a seasonal expectancy for each week of each year; this process was repeated for each of the nine geographic sections.

From 1943-50 the procedure has been about the same as that described for 1935-42, except that the years selected for use as the basis of the normal seasonal curve were without any apparent epidemics or at least had only very minor outbreaks. In applying this criterion to each of the various geographic sections, it was not possible to use the same 3 years for every section. For all 56 cities and for the Middle Atlantic, East North Central, Mountain, and Pacific sections, the 3 years used were 1941-42, 1942-43, and 1944-45. For the New England and West North Central sections, 1947-48 was substituted for 1942-43 because of epidemics in the latter year in those sections; for South Atlantic and East and West South Central the years used were 1944-45, 1946-47, and 1947-48. One other difference in method was that from 1943-48 final monthly influenza and pneumonia death rates for the same 56 cities were used as the basis for computing normal seasonal expectancy. After 1948 the weekly reports from the 56 cities and the 10-percent mortality sample (18) were the only available data. In a few instances where the populations were small, the monthly mortality rates were adjusted by a 3-month moving average prior to the other statistical operations on the data.

It should be noted that the process of substituting obviously epidemic items with straight line interpolations is not a determining factor in the final seasonal norm: (1) Relatively few weekly rates in a year are cut off as epidemic; (2) the exact level at which the cut-off is made does not fix the level of the final seasonal norm; (3) the nonepidemic weeks in which there is no cut-off are the ones that really determine the final level of the seasonal curve and are the ones which are used as a criterion of whether the seasonal expectancy is a proper fit of the non-epidemic weekly rates.

The methods of deriving normal seasonal curves of influenza and pneumonia as outlined above are admittedly rough. Moreover, the use of quarterly ratios results in a changing yearly norm which seems to be necessary for the years during which the decline was rapid. The seasonal norms as computed, however, serve as a base from which to estimate the approximate magnitude of marked fluctuations such as occur in influenza epidemics.

Appendix tables A to I give the deviations from the seasonal expectancy for each section, together with the seasonal norms and other data necessary to derive the actual rates.

Appendix table A. Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51

ALL 56 CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1	73	+30	+5	+3	+148	+5	+50	+3	+11	-1	-2	+2
2	76	+31	+5	+6	+74	0	+44	+8	+6	-1	0	+3
3	77	+30	-4	+5	+35	-9	+12	+5	-5	-1	-6	-3
4	77	+47	-6	+1	+20	-2	-1	-6	-9	-5	0	0
5	77	+48	-5	+6	+1	-3	+7	-5	+4	-8	-3	-6
6	77	+33	+3	-7	-1	+2	-4	-12	-4	-1	0	0
7	77	+26	-4	-4	-2	+2	+3	-6	+2	-2	-1	+9
8	76	+5	-4	+2	0	+3	-3	-3	+4	-2	+1	+9
9	75	+5	+9	-4	-1	0	-4	+2	-2	-3	+16	+32
10	73	+1	+11	-7	-1	-3	-9	+4	0	-4	+13	+28
11	72	-4	+1	+1	+1	+1	-8	+14	-1	+2	+19	+34
12	70	+2	+15	-2	+2	+1	-6	+16	-2	+6	+25	+25
13	67	+5	-3	+1	+2	-5	-7	+31	-1	+8	+25	+29
14	65	+4	0	-2	+1	-7	-11	+22	+1	-2	+15	+14
15	62	-2	+11	+8	+6	-2	-2	+24	-5	-5	+8	+11
16	60	+8	-2	-7	+2	-3	-7	+12	+1	+1	+14	+2
17	57	-4	+4	+6	+4	-3	+1	+8	-1	+6	+8	-2
18	54	-7	-1	+6	+2	-7	-1	0	-3	+4	0	0
19	51	-4	0	+6	+3	-5	0	-2	+5	0	+4	-2
20	48	-2	-4	-5	+2	-1	-2	0	-3	-5	+1	...
21	46	-3	-2	+2	+1	+4	+2	-2	+3	-1	+1	...
22	44	0	+1	-1	-5	+6	+4	-3	-6	-2	+2	...
23	42	+2	-7	-1	-4	+4	+2	-4	-2	-1	+6	...
24	40	-5	-6	-2	-7	+1	+1	-2	-3	-1	0	...
25	39	-6	-3	+3	-5	+7	0	-4	-1	+3	+3	...
26	37	+1	-4	+9	-3	+3	+1	-4	+2	+3	+3	...
27	36	+2	-1	-6	-5	+1	-4	-1	0	+2	+2	...
28	35	-1	+4	-4	+3	+2	+2	+3	-2	-2	-1	...
29	34	-5	+8	-1	-1	-3	0	-2	+3	-1	+1	...
30	33	0	-2	+2	-4	+4	+1	-3	0	-4	-2	...
31	33	+11	-1	-4	+2	+1	+1	0	-2	+2	+1	...
32	32	+3	-4	+2	+7	-3	+1	+2	-6	+4	+1	...
33	31	-1	+1	-1	+8	-6	+2	+4	0	+8	-1	...
34	31	-4	+2	-2	0	+1	-2	+2	+2	+2	+2	...
35	32	-4	0	+3	-5	+2	0	0	+22	+1	-3	...
36	32	+1	-6	-2	-4	+6	+1	-1	+1	+2	-2	...
37	32	-1	+5	-2	-2	+4	+3	+3	+1	+2	+3	...
38	34	+2	-3	-1	0	-3	+5	+1	+1	0	+1	...
39	37	+2	-1	+1	0	-4	+1	-4	0	-1	+2	...
40	40	-5	+4	+2	-4	-1	+3	-4	-2	+5	+2	...
41	43	0	0	-3	+3	-5	+2	+2	+1	+1	+1	...
42	45	-9	-1	+1	+7	-2	-4	-3	+3	-2	+4	...
43	48	+2	0	+3	+2	+2	+1	-4	+1	-1	+3	...
44	50	+3	-5	-5	+4	-6	+1	+1	+3	+1	-1	...
45	52	+4	-3	-8	+4	-9	-1	-4	-4	-4	-2	...
46	54	+3	+1	+1	+4	-4	+6	-2	+2	+4	+2	...
47	57	+3	-1	-10	-2	-12	-5	-2	-4	-2	-3	...
48	60	+1	-7	+10	-7	-3	+1	-2	0	-1	0	...
49	63	-2	+1	+27	0	0	-5	-3	-2	-6	+2	...
50	66	-6	-1	+96	-2	+7	-5	-1	-1	-1	-4	...
51	69	-6	-3	+141	-5	+19	-6	+2	-6	-1	-5	...
52	71	-9	+16	+197	+4	+53	-2	-5	0	+5	-5	...
53	...	-5	...	...	...	...	...	+2	...	...	...	...

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.)	1.170	1.042	1.176	1.070	0.943	0.949	0.796	0.778	0.679	0.532	0.564
2d Q. (14-26 wk.)	.988	.975	1.260	1.023	.940	.847	.861	.754	.725	.643	.727
3d Q. (27-39 wk.)	.998	1.075	1.053	1.012	.975	.854	.862	.900	.790	.643	.....
4th Q. (40-52 wk.)	.913	1.141	1.112	1.011	.977	.736	.766	.720	.616	.559	.....

¹ Excess over or deviation from a normal seasonal expectancy computed as outlined in the appendix. Relative seasonal expectancy was computed for years ending about the middle of August (thirty-second week of calendar year). The height of the smoothed seasonal curve was adjusted to the level of the average nonepidemic rates for each quarter.

For years prior to 1941, see corresponding tables in references (4, 5, 10).

² Enumerated population of the 56 cities in 1950 was 35,556,074 (preliminary). See list of cities in notes to tables for geographic sections.

³ The first week of the calendar year is the calendar week that contains at least 4 days in January; thus it can be a week ending (Saturday) on any date from Jan. 4 to Jan. 10.

⁴ Based on the 3 years ending in August of 1942, 1943, and 1945.

Appendix table B. *Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51*

NEW ENGLAND CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1	64	-11	-1	+44	+231	+4	+25	+9	+13	+7	+10	-2
2	65	+139	+2	+24	+151	+1	+130	-11	+39	0	+1	-13
3	66	+154	+2	+44	+52	-3	+23	+33	+7	-13	-8	+40
4	67	+158	0	+4	+33	+5	+17	+34	+1	-17	-19	+1
5	68	+78	-20	+4	+30	-5	+59	-3	-7	-21	-22	-13
6	68	+80	0	+19	+19	+5	+25	-4	-28	-2	+9	-8
7	69	+43	-10	+25	+9	-24	+38	-26	+24	-11	-7	+19
8	68	-3	-4	+8	-9	-2	-2	-1	-10	-15	+1	+41
9	66	+11	+45	+18	-21	+5	-7	-7	-11	+13	-11	+122
10	66	-14	-6	-17	-7	-20	+16	-9	+10	+20	+23	+68
11	65	+7	-11	-26	+25	+13	+18	-13	-16	+16	-21	+74
12	63	+2	-2	+3	-5	+7	+7	-9	-31	+20	+6	+34
13	62	+13	-5	+53	+36	-5	+16	+3	-11	+22	+20	+23
14	60	+5	+25	+30	+38	+8	-24	-22	+16	-12	+8	+44
15	58	+24	+64	+80	+29	-22	+8	+51	-1	-2	+2	-1
16	56	+3	-8	+25	+5	+7	-21	+1	+13	+13	+16	-15
17	54	-17	+3	+37	+26	+5	+9	+3	-26	+6	+3	+5
18	51	-13	-7	+55	+19	+1	0	+20	-11	+11	0	-6
19	49	+11	-5	-3	+8	-7	-8	+6	+12	+1	-14	+6
20	47	-12	-4	-1	0	-18	+22	-7	+12	-12	-9	.....
21	45	+2	+16	-16	+12	+22	-10	-28	+11	-13	+15	.....
22	43	+2	-25	+13	-1	+15	+5	-6	-18	-6	-10	.....
23	41	-25	-12	-9	-21	+7	+13	+3	-8	+1	+12	.....
24	38	-6	-11	+11	-15	+4	-9	-15	-11	-12	+16	.....
25	37	+4	+19	+14	+9	-12	-7	+16	-2	+18	-10	.....
26	36	+8	-15	+11	-26	-8	+5	-6	+17	-7	+13	.....
27	35	+2	-15	-8	+15	+12	+9	+4	-13	+17	-16	.....
28	33	-26	-12	+8	+23	+14	-11	+11	-4	-5	-8	.....
29	32	+18	-13	-8	+8	+5	+6	-1	-6	+19	-4	.....
30	32	+13	+1	+1	-15	+13	+6	-2	+13	-10	+6	.....
31	32	+11	-6	-6	+2	+5	-1	-7	-11	+3	+2	.....
32	32	-10	+4	-8	+5	-2	-3	-19	-14	+11	-5	.....
33	31	-4	+21	+9	0	-2	-16	+2	+7	+3	-6	.....
34	32	-3	-2	-16	-11	-16	+7	+4	+18	-10	-6	.....
35	32	-9	+14	+7	-7	-11	-21	+19	+31	+13	-4	.....
36	33	0	-17	-5	-8	-10	+26	-11	+10	0	-13	.....
37	34	-12	-1	-8	-17	-5	+3	+4	-14	+11	+15	.....
38	35	+10	+1	+21	-5	-4	+2	+8	+1	-13	+14	.....
39	37	-6	-16	-8	+3	+2	-16	-28	+2	-12	-5	.....
40	38	+2	+7	+16	-5	-6	+24	+10	+4	+6	+9	.....
41	40	-1	-8	+13	+6	+5	+3	+15	+11	0	+6	.....
42	41	-22	+25	-8	+14	+22	+3	+11	+17	+4	+28	.....
43	43	+28	+12	-14	+22	+6	-10	-18	-18	0	-10	.....
44	45	+14	-20	+15	+3	0	0	+11	-9	-9	-12	.....
45	48	+24	+4	-13	+16	+16	+24	-2	-10	-17	-3	.....
46	50	+2	+28	-3	-16	+24	-35	+3	-1	+3	-7	.....
47	52	+19	+5	-25	+17	+7	-22	-20	+19	0	-6	.....
48	55	-4	-14	+15	-28	-19	+31	-22	-10	-5	+13	.....
49	57	-29	+13	+27	-21	-38	-7	-12	-11	-13	-5	.....
50	60	-20	-2	+66	+6	5	0	+20	-7	-12	-9	.....
51	62	-34	+20	+173	+14	-1	-15	-8	-25	+12	-5	.....
52	63	+14	+56	+334	-13	+40	+15	+14	+10	+14	+2	.....
53	.....	-13	.....	.....	.....	.....	.....	+12	.....	.....	.....	.....

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.).....	1.353	1.452	1.685	1.373	1.309	1.258	1.176	1.021	1.177	0.962	0.689
2d Q. (14-26 wk.).....	1.154	1.679	1.669	1.515	1.332	1.056	1.217	1.144	1.140	1.083	.663
3d Q. (27-39 wk.).....	1.073	1.382	1.404	1.433	1.332	1.029	1.021	1.270	1.321	.603	.....
4th Q. (40-52 wk.).....	1.312	1.849	1.502	1.455	1.335	1.184	1.102	1.026	.998	.660	.....

¹ See notes 1 and 3 to appendix table A.

² Enumerated population of the 8 cities in 1950 was 2,018,655: Boston, 788,554; Fall River, 112,091; Springfield, 162,601; Worcester, 201,875; Providence, 254,027; Bridgeport, 158,678; Hartford, 176,623; New Haven, 164,206.

⁴ Based on the 3 years ending in August of 1942, 1945, and 1948.

Appendix table C. Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51

MIDDLE ATLANTIC CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1	64	+4	+1	-6	+156	+2	+65	+6	+28	+8	+2	+1
2	66	+11	+6	-2	+62	-5	+57	+19	+6	0	-1	-1
3	67	+19	-9	+8	+35	-13	+30	+17	-10	+3	-9	-4
4	69	+46	+3	+6	+28	-5	+9	+1	-4	0	+3	+6
5	70	+60	+3	+1	-2	0	+10	-4	+2	-12	-8	-9
6	72	+55	+4	-7	-13	-3	+7	-7	+5	-4	-2	-3
7	73	+36	-4	-5	-5	0	+5	-5	-1	-2	-9	+10
8	71	+20	+2	+3	+2	+4	0	-1	+3	-2	-6	+22
9	69	+3	+3	0	+2	+7	0	-2	+5	-4	+14	+63
10	67	+10	+11	-11	-3	+3	-5	+9	+2	-5	+13	+54
11	65	+2	0	+8	+3	+4	-2	+6	+15	-8	+30	+50
12	63	+17	+15	+1	+7	+10	+4	+9	+4	+3	+34	+34
13	62	+9	-9	-7	-9	-9	-3	+17	+5	+6	+31	+42
14	61	+2	+3	+3	-1	-8	-10	+7	0	-3	+24	+4
15	60	-8	+4	+12	+9	+7	+5	+30	-8	-8	+11	+9
16	58	+14	-1	-9	+11	0	-3	+20	+5	-2	+5	0
17	55	+3	-2	+11	+3	-9	+7	+15	+5	+7	+5	-7
18	52	-6	+4	+8	+4	-10	+4	-2	-3	0	-2	-4
19	49	-4	-3	+6	+5	-6	0	+3	+15	-2	+5	-2
20	46	-6	-2	+4	-5	0	-5	+5	-2	-3	-2	.....
21	44	-11	-8	-1	+5	+1	+7	-1	-2	-1	+1	.....
22	41	+3	+2	-2	-9	+4	+2	+6	-5	-1	-5	.....
23	39	+5	-8	+1	-2	+5	-2	-5	-5	-2	+3	.....
24	37	-1	-8	-8	-9	-1	+2	+1	0	+4	+1	.....
25	35	-8	+4	+4	-8	+14	-2	-7	-3	+4	+6	.....
26	34	+7	-4	+8	-5	+3	-3	+1	0	+7	+1	.....
27	33	+6	+1	-5	-9	+7	-1	+2	-5	+6	+1	.....
28	31	+6	+11	-5	+11	+6	+3	+6	+3	-6	-1	.....
29	31	+5	+14	+2	-3	-5	+1	-4	-2	-2	+5	.....
30	30	-1	-4	-7	-4	-2	-2	-2	-3	-1	-5	.....
31	30	+10	-3	-1	+2	+1	+1	-2	+1	+5	-2	.....
32	30	-3	-3	+4	+10	-3	+4	-2	-10	+8	0	.....
33	30	+3	-2	-3	+10	-10	-5	+1	-2	+12	+1	.....
34	30	-4	0	+3	+4	-3	-6	+3	-12	0	+2	.....
35	30	-8	-6	-2	-9	+2	+1	-2	+45	-2	0	.....
36	30	+7	-3	0	-4	+8	-1	+4	+2	0	-1	.....
37	30	-4	+1	-5	+2	+5	+7	+9	+1	-4	+3	.....
38	32	+3	-1	-2	-2	+3	+8	+1	-1	+2	-2	.....
39	35	-1	+2	-1	-5	-2	-2	-2	-6	-2	+5	.....
40	37	-4	+1	-2	-2	-1	0	-3	-2	+3	+4	.....
41	40	-2	-7	+2	0	-8	+3	+5	+3	+5	+4	.....
42	42	-10	-5	+8	+14	-3	-7	-5	+4	-8	+6	.....
43	44	+1	+1	+10	+3	-1	+3	+1	-7	+1	+4	.....
44	45	+6	-8	+1	+17	-6	0	+1	+6	+4	-2	.....
45	47	+5	+7	-4	-2	-4	-4	0	-6	-2	-3	.....
46	49	-3	+4	+3	+3	-1	+7	-4	+10	+3	-4	.....
47	51	0	+1	-16	-11	-3	-5	-3	-6	-2	-3	.....
48	54	-5	-6	+6	-4	+3	-2	+1	-3	0	-6	.....
49	56	+6	-3	+34	-5	+8	-5	+7	+3	-5	+1	.....
50	59	-6	0	+96	-4	+15	-1	+8	-2	-4	-5	.....
51	61	+1	+5	+166	-18	+24	0	+14	-1	+2	-8	.....
52	63	-5	+6	+208	+8	+63	+4	+1	-1	+1	0	.....
53	.....	+4	.....	.....	.....	.....	.....	+13	.....	.....	.....	.....

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.)	1.106	1.004	1.171	1.132	0.953	0.833	0.776	0.828	0.677	0.589	0.611
2d Q. (14-26 wk.)	1.016	.849	1.350	1.098	.963	.858	.826	.838	.760	.743	.649
3d Q. (27-39 wk.)	1.058	1.082	1.043	1.056	.993	.874	.970	.909	.883	.705	.....
4th Q. (40-52 wk.)	.921	1.111	1.197	.990	.885	.769	.796	.753	.696	.581	.....

¹ See notes 1 and 3 to appendix table A.

² Enumerated population of the 9 cities in 1950 was 12,390,642: Buffalo, 576,506; New York City, 7,841,610; Rochester, 331,292; Syracuse, 220,067; Camden, 124,474; Newark, 437,833; Trenton, 127,894; Philadelphia, 2,057,210; Pittsburgh, 673,756.

⁴ Based on the 3 years ending in August of 1942, 1943, and 1945.

Appendix table D. Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51

EAST NORTH CENTRAL CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1	65	+20	+10	+3	+115	+6	+75	+1	-6	0	-6	0
2	67	+23	+6	+7	+44	0	+49	+7	0	-1	-2	+15
3	69	-7	-3	+1	+26	-9	+17	0	-2	-1	-16	-7
4	68	+33	-19	0	+16	+3	+7	-12	+1	-3	-5	-7
5	68	+46	-7	+12	-1	-4	+18	-8	+1	-9	-8	-8
6	68	+45	+11	-11	+6	+3	-8	-13	+2	-2	-6	-1
7	67	+40	-4	-16	-12	+8	+8	+11	-1	+1	-1	+1
8	67	+14	-4	-1	+1	+1	+6	-1	+1	+3	-4	-8
9	67	+14	+7	-15	-6	-2	+2	+12	-8	-8	+6	-1
10	67	+10	+2	+9	+2	-5	-5	-1	-6	+5	+6	+5
11	66	-1	+1	-4	+4	-2	-4	+13	-5	-3	+5	+16
12	63	+9	+18	+4	+5	+7	0	+26	+7	+6	+12	+28
13	60	0	+3	+14	0	+5	0	+70	+4	+3	+2	+30
14	57	+3	+2	-7	+5	-6	-6	+48	-2	-2	+8	+17
15	54	-1	+3	-6	+11	-2	0	+39	0	-7	-4	+15
16	51	+12	+3	-5	-4	+1	+5	+22	-5	-2	+15	+4
17	50	-4	+3	+7	+13	-1	+4	+3	+7	+9	+5	+7
18	48	-2	0	+10	-1	-7	+5	-3	-5	+14	-5	+10
19	46	-6	-2	+11	0	-8	0	-11	0	+1	-1	+6
20	44	-3	-5	-11	+7	-6	+2	+6	-12	-2	-7	.....
21	42	+2	-11	+2	-5	+1	-2	+10	+1	-2	-3	.....
22	40	+4	+8	-2	-7	+15	+11	-1	-6	-6	+6	.....
23	38	+3	-8	-8	-7	-1	+6	0	-2	-5	-1	.....
24	37	-1	-3	+1	-5	+4	-1	+7	0	-3	-4	.....
25	34	-5	-3	+13	-5	+1	-5	0	+2	-1	0	.....
26	33	-3	+1	+4	-6	+3	0	-4	+7	-1	+3	.....
27	31	+3	-8	-14	-3	-6	-3	+1	+5	-1	-1	.....
28	29	+2	+3	-5	+1	+4	+7	+1	-6	+1	+1	.....
29	27	-1	+7	+3	+2	0	-1	+3	+11	0	-5	.....
30	27	-3	-1	+2	-7	+5	0	-4	-1	-5	-3	.....
31	26	+22	-2	-12	-1	+3	-2	+2	+2	-2	+7	.....
32	25	+5	0	+3	+6	+1	0	+5	-7	-1	+1	.....
33	25	-8	-1	-6	+11	-5	-3	-1	+1	+9	-1	.....
34	25	-5	+2	+1	0	+3	-1	-2	+11	+7	-1	.....
35	26	-6	-1	+2	-7	+7	+4	+2	+12	-1	-4	.....
36	27	-8	-3	-2	-5	+6	-6	-6	-5	0	+4	.....
37	28	-3	+8	+3	-2	+4	-3	+5	-6	+12	+3	.....
38	30	-3	-7	+1	-2	-3	+2	-3	+3	+3	+4	.....
39	33	+6	+3	+13	+8	-8	+6	-1	0	-3	+1	.....
40	36	+10	+1	+12	-3	+2	+2	-9	0	+6	+2	.....
41	38	+7	+6	-6	+13	-2	+7	-2	-2	-6	-4	.....
42	41	-5	-9	-5	+7	-2	0	-3	+2	+4	-3	.....
43	43	+10	-1	-1	-10	+4	-1	+1	+9	0	-6	.....
44	44	+2	0	-11	-3	-3	-2	+5	0	+2	+1	.....
45	46	+11	-4	-3	+2	-2	-2	-1	+2	-4	-2	.....
46	48	+5	-6	-7	+12	+2	+14	+7	-4	-1	+7	.....
47	50	-3	0	+5	0	-7	-9	+6	-3	-4	-2	.....
48	53	0	-3	+14	-2	+14	-2	+3	+1	0	+1	.....
49	55	-2	+1	+34	+4	+23	-11	-4	-5	-6	+2	.....
50	57	-11	+4	+90	-14	+31	-3	-4	-2	+2	+1	.....
51	59	-6	-8	+126	-5	+44	-3	-1	-1	-1	-4	.....
52	62	-14	+20	+168	+3	+62	+5	+3	-1	0	-3	.....
53	.....	-1	.....	.....	.....	.....	.....	-3	.....	.....	.....	.....

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.)	0.970	0.973	1.091	0.899	0.913	0.789	0.732	0.701	0.748	0.526	0.578
2d Q. (14-26 wk.)	.954	.893	1.096	.891	.909	.937	.838	.708	.745	.670	.821
3d Q. (27-39 wk.)	.919	.980	.933	.916	.985	.817	.827	.983	.855	.673	.....
4th Q. (40-52 wk.)	.857	1.046	1.019	.941	.835	.731	.794	.829	.564	.558	.....

¹ See notes 1 and 3 to appendix table A.

² Enumerated population of the 11 cities in 1950 was 8,896,816: Cincinnati, 499,744; Cleveland, 909,546; Columbus, 373,821; Fort Wayne, 132,831; Indianapolis, 424,683; South Bend, 115,402; Chicago, 3,631,835; Detroit, 1,837,617; Flint, 162,752; Grand Rapids, 175,647; Milwaukee, 632,938.

⁴ Based on the 3 years ending in August of 1942, 1943, and 1945.

Appendix table E. *Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51*

WEST NORTH CENTRAL CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1	74	+69	-4	+23	+149	+8	+70	+16	+17	-19	+6	+26
2	75	+55	+27	+22	+102	-4	+14	+17	-19	-5	+2	0
3	76	+80	+15	0	+20	-25	+2	-1	+19	-10	-4	-4
4	75	+87	+6	-3	-13	-6	-16	-22	+1	-5	+6	0
5	75	+41	-23	+34	+12	+9	-3	+2	-12	+27	-13	+8
6	74	+48	-28	-18	-25	-4	0	-6	+18	+6	-5	+32
7	74	+64	+5	+23	+12	+21	+11	-5	+19	+20	-10	-1
8	72	+28	-29	+14	-2	+14	-17	0	-11	-4	+2	-11
9	71	+48	+17	+12	+28	+1	+5	+15	+8	+3	+18	-14
10	69	-20	+7	-27	-7	-11	+9	+40	+6	-2	+32	-5
11	68	+5	-10	-32	+10	+10	-1	+108	-9	+13	+23	+3
12	65	+6	+13	+9	+22	+10	-8	+98	-10	-4	+31	-5
13	63	+43	+15	-12	-12	-14	+23	+82	-6	+20	+48	+3
14	61	+33	+9	-21	+12	-20	0	+53	+18	-2	+15	+22
15	59	+21	+11	+30	-3	-7	-8	+37	+2	-13	+3	-7
16	57	+26	+3	-14	-18	-32	-9	+23	+18	+15	-2	+9
17	55	-8	+13	+4	-11	-10	-19	+3	-4	+4	+7	0
18	52	-3	+15	-9	+18	-3	-10	+23	-8	0	-4	-6
19	50	-1	-1	+4	+4	-6	-2	+1	+10	+11	-7	-7
20	48	+25	-10	-26	+18	+15	-3	-1	-12	-5	+6	0
21	47	+8	0	+19	+4	+18	-2	+2	-1	-2	0	0
22	45	-10	+2	-6	+15	+16	+8	-24	0	-12	+8	0
23	44	-5	0	+12	-8	0	+11	+11	-5	-11	+16	0
24	43	-1	-18	+12	-16	+16	+1	-5	-20	+8	-4	0
25	42	-9	-12	-15	-14	+8	+14	-8	-1	-5	+3	0
26	41	+2	-5	+18	+10	+7	+11	+1	+5	+18	+1	0
27	40	+7	+9	+1	-6	-8	-11	+7	+10	+12	-4	0
28	39	+8	+7	+9	-7	-4	0	+8	-8	+3	-5	0
29	39	-11	-23	+6	-5	+7	+11	+1	+19	-4	-4	0
30	39	+10	+9	+22	-10	+22	+19	-9	+1	-6	-5	0
31	38	+8	+13	-6	-7	-4	-1	+1	-13	+1	+6	0
32	38	+2	-9	-5	+25	-7	-9	+18	-1	-7	+11	0
33	38	0	-3	-4	+4	-6	+10	+16	-5	+13	-2	0
34	38	-2	+3	-5	-18	-7	-3	0	+3	-5	-5	0
35	39	-13	+10	-6	+3	-10	+5	-4	+11	-9	-5	0
36	39	0	-12	-1	-9	+13	+1	-6	-9	+1	-5	0
37	40	-3	+10	-14	-14	+4	+9	0	+8	-5	+6	0
38	41	+7	-13	-8	+4	-10	-6	-5	-10	0	0	0
39	43	-7	-13	-8	+5	-13	-15	-18	+9	+9	-1	0
40	44	-15	+12	+6	+3	-1	-2	+1	+4	+14	+4	0
41	46	-7	+3	+1	-4	+13	+5	+6	-13	+4	+13	0
42	48	-9	+18	+13	-4	+2	-5	-4	-2	+2	-4	0
43	51	-14	+20	-8	+10	+14	+7	0	-2	-17	+4	0
44	54	+5	-1	-19	+1	-2	+2	+16	+16	-5	-4	0
45	57	+5	-7	-25	-4	-10	-2	-11	-10	+5	-4	0
46	60	+17	-11	+8	+28	+2	-4	-17	0	+8	-5	0
47	62	-2	-1	-19	+6	-15	-7	+3	-8	-10	-5	0
48	64	+5	-18	+21	-13	+19	+19	-19	+14	-3	+2	0
49	67	-2	+11	+7	0	-4	0	+9	-2	-5	+2	0
50	69	-1	-15	+207	+22	+2	-12	-1	+3	+6	-11	0
51	71	-10	-19	+185	+9	+24	-18	-3	-13	-11	+12	0
52	72	-12	-10	+176	-27	+70	+2	0	+4	+8	0	0
53		-2						-2				

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.)	1.085	1.065	1.519	1.461	1.341	1.147	1.002	0.905	0.797	0.672	0.567
2d Q. (14-26 wk.)	.970	1.118	1.442	1.388	1.209	1.074	1.071	.873	.841	.813	.861
3d Q. (27-39 wk.)	.998	1.072	1.217	1.106	1.025	1.088	1.063	.929	.805	.585	
4th Q. (40-52 wk.)	.916	1.212	1.333	1.370	1.199	.957	.922	.802	.702	.587	

¹ See notes 1 and 3 to appendix table A.

² Enumerated population of the 7 cities in 1950 was 2,650,215: Duluth, 104,066; Minneapolis, 517,410; St. Paul, 310,155; Kansas City, Mo., 453,290; St. Louis, 852,523; Omaha, 247,397; Wichita, 165,374.

⁴ Based on the 3 years ending in August of 1942, 1945, and 1948.

Appendix table F. Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51

SOUTH ATLANTIC CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1.....	66	+49	+29	+6	+144	-8	+33	-3	+17	-12	-15	+12
2.....	67	+11	+6	+35	+90	+12	+77	-13	+20	+10	-20	+1
3.....	68	+54	+9	+49	+47	+6	+12	+4	-13	-7	-6	-5
4.....	68	+71	+4	+7	+46	+2	+3	-24	+3	+8	-2	+8
5.....	68	+120	+17	+26	+4	-8	-1	+9	+10	-20	-5	-1
6.....	68	+42	+9	+9	+22	+24	+13	-6	+25	-5	-7	-8
7.....	68	+52	+20	+7	+2	+4	+24	0	+15	-3	+4	-5
8.....	67	10	-1	+8	+29	+1	+13	-10	+3	+6	+13	-2
9.....	65	+38	+11	+4	-1	+16	-5	+7	-15	-6	+3	+10
10.....	63	+101	+60	+14	+45	-10	-12	-21	+6	-23	+6	+1
11.....	62	+29	+60	+32	+13	-26	+14	+21	+7	+19	+19	+8
12.....	59	+12	+56	-4	0	-18	-15	+5	+5	+6	+37	+4
13.....	56	+38	+6	-11	-13	-10	-35	+30	+3	+8	+41	+14
14.....	53	+19	+2	+4	+3	-6	-15	+32	+15	-2	+5	+15
15.....	50	+53	+30	+27	+1	-15	-4	-2	+9	0	+24	+28
16.....	47	+6	0	+3	+1	+3	-6	+13	-5	+14	+13	0
17.....	45	+25	+11	-19	+6	-5	-8	+23	-4	+1	-2	-6
18.....	43	-26	-4	+6	-14	-15	-4	+10	+16	+13	-3	-7
19.....	40	-16	0	+8	-8	+1	+3	-12	-4	0	-16	-3
20.....	38	-4	-12	0	-1	-1	-12	-8	-15	-19	-2	-----
21.....	36	+7	-4	+2	+1	+1	+20	-3	+12	0	-2	-----
22.....	33	+12	-11	-1	-15	+17	+9	-12	-10	-8	+7	-----
23.....	30	+11	-5	+5	+8	+13	-7	-17	-5	+7	+5	-----
24.....	28	-24	-7	+3	+9	-3	+10	+7	-9	-8	+5	-----
25.....	27	0	0	0	+8	+19	+9	+7	+2	+7	-1	-----
26.....	27	+6	-1	+13	-5	+1	+14	-6	+8	+4	+4	-----
27.....	26	+6	+24	-12	+4	+25	+2	+5	-4	-4	+2	-----
28.....	26	-2	+4	-1	-4	-6	0	+8	+1	-4	-3	-----
29.....	26	-1	+40	-5	-6	+17	-4	-6	-4	+4	+3	-----
30.....	27	-17	-6	+15	+23	+2	+4	-1	-2	-2	-9	-----
31.....	27	+3	-7	+2	+1	+3	-9	+7	-5	+12	+1	-----
32.....	28	+26	-4	+15	-4	+5	-2	+5	0	+5	+5	-----
33.....	28	+6	-5	+9	+10	-9	-8	-6	-8	+11	-4	-----
34.....	29	-13	-2	-12	+14	-9	-19	+4	+3	-4	-2	-----
35.....	30	+4	-1	-3	-11	-4	-9	-1	+13	+12	+4	-----
36.....	31	-15	-11	-24	-1	+6	+7	-7	+5	-5	-6	-----
37.....	31	-3	-8	-6	-11	-7	+9	-12	+17	-1	+4	-----
38.....	32	-4	-7	+1	-14	-12	+4	-4	-12	-12	-3	-----
39.....	33	-8	-15	-12	-5	+13	+12	+5	+8	0	+12	-----
40.....	34	-4	+46	+4	-17	+6	+6	+1	+3	+22	-5	-----
41.....	35	-12	+6	-29	+5	-1	-13	+6	-5	+6	+9	-----
42.....	36	-10	+10	+15	+3	+4	-8	+7	+8	-5	0	-----
43.....	39	-13	+16	+10	-1	+14	-2	-7	+23	-9	+5	-----
44.....	42	+3	+5	-9	+4	+13	+1	+3	0	+1	-6	-----
45.....	45	+4	0	+4	+11	-5	-8	-12	-6	+1	-3	-----
46.....	48	+2	+2	-6	-8	+1	+11	-8	-6	+2	-7	-----
47.....	51	+11	-3	-23	-8	-6	-8	-6	-10	-13	-1	-----
48.....	54	+33	-19	+23	-16	+1	+1	+3	+2	+4	+24	-----
49.....	57	-8	-7	+61	-9	-3	+6	-1	-8	-4	+25	-----
50.....	60	-2	+26	+139	+27	+28	-5	+3	-6	-10	+12	-----
51.....	62	-13	+41	+169	+11	+58	-10	-1	-4	-9	-17	-----
52.....	64	-24	+80	+275	+7	+120	+9	-8	+10	+15	-13	-----
53.....	-----	-12	-----	-----	-----	-----	-----	+5	-----	-----	-----	-----

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.).....	1.539	1.585	1.603	1.424	1.283	0.995	0.972	0.836	0.768	0.671	0.744
2d Q. (14-26 wk.).....	1.835	1.612	1.964	1.321	1.354	1.075	1.128	.986	.873	.755	.784
3d Q. (27-39 wk.).....	1.398	1.671	1.460	1.301	1.273	1.030	.996	1.021	.854	.640	-----
4th Q. (40-52 wk.).....	1.395	1.694	1.647	1.351	1.142	.855	.904	.860	.744	.527	-----

¹ See notes 1 and 3 to appendix table A.

² Enumerated population of the 6 cities in 1950 was 2,522,946: District of Columbia, 792,234; Atlanta, 326,962; Baltimore, 939,865; Richmond, 229,905; Tampa, 124,073; Wilmington, 109,907.

⁴ Based on the 3 years ending in August of 1945, 1947, and 1948.

Appendix table G. Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51

EAST AND WEST SOUTH CENTRAL CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1	71	+187	+43	+38	+238	+33	+94	+14	+29	+14	-12	-4
2	73	+171	+18	+58	+182	+5	+84	+36	+9	+25	-3	+9
3	75	+132	+15	+25	+98	+3	+22	+19	+43	+19	0	-15
4	75	+164	+6	+52	+47	+28	+24	+10	-25	+9	-1	-19
5	75	+122	+18	+5	+27	0	+61	-4	+80	+34	+12	-14
6	75	+52	+34	+19	+42	+29	+8	-22	+19	+34	0	+14
7	75	+69	+1	+25	+31	-23	+27	-4	+19	-1	-4	+35
8	73	+50	+39	+46	+6	+21	+48	+7	+93	-5	-18	+19
9	70	+48	+65	+41	+17	-8	+46	+22	+17	0	+29	+11
10	68	+22	+53	+33	-6	+15	+22	+31	+15	-9	-7	+11
11	65	+46	+13	+41	-14	+42	-12	+54	-1	+17	+30	+30
12	63	+17	+28	+12	+13	-3	-1	+55	-2	+21	+26	+5
13	60	+34	+4	+18	+15	-6	-10	+27	-6	+30	+36	+17
14	57	+58	-25	+7	-16	-12	+15	+57	+5	+21	-1	+24
15	54	+8	+17	+8	+9	-7	-2	+5	-15	+15	+2	+22
16	51	+23	-22	-5	+4	-14	-25	+10	-2	-3	+31	+12
17	48	-17	+9	+10	-22	+1	+3	+26	-6	+12	+11	+1
18	45	+13	0	0	+6	-4	-10	+2	-12	-14	+5	+1
19	42	-8	+13	+11	-2	+4	+1	+27	-9	+2	+14	-5
20	38	-4	-7	-21	+13	+6	-6	-4	+8	-7	+2	.....
21	37	+7	+22	+18	+12	+21	+4	-8	+14	+9	-12	.....
22	36	-10	+1	+11	+5	-21	-7	-2	-7	+10	+1	.....
23	35	+11	-18	-13	-8	+13	-7	-3	+14	-2	-5	.....
24	34	-4	+20	-3	-10	+4	+4	-9	+12	+1	0	.....
25	33	-6	-4	-1	+8	+20	+13	0	+4	-6	+3	.....
26	33	-8	+5	+6	+12	+13	+9	-9	+8	0	-2	.....
27	33	+4	-3	+24	0	-10	-13	-13	0	-2	-5	.....
28	32	-12	+6	-5	-4	-3	-11	+4	-3	+6	+1	.....
29	32	-20	+24	+17	+11	-4	-15	+6	+9	+10	+2	.....
30	33	+10	+7	+33	+4	+12	+2	-8	+9	+4	+2	.....
31	33	+27	+1	+1	+28	-1	+17	+4	-7	+5	0	.....
32	34	+5	-11	+12	+2	-12	+2	+16	-3	-6	+12	.....
33	35	-17	+13	+11	-1	-6	+5	+27	+1	-3	+3	.....
34	35	-7	+8	-29	-14	+22	+15	+1	-1	+10	+15	.....
35	36	+20	+7	+8	-9	-10	-12	-6	-11	+6	-11	.....
36	37	+5	-23	-1	-15	+1	-6	-8	-3	+3	-14	.....
37	38	-1	+2	-19	-10	+12	-11	-7	-1	-14	-9	.....
38	39	0	-10	-6	+3	-6	+13	-5	+6	-14	+1	.....
39	40	-3	+3	-9	-1	-5	+9	-10	+6	+4	-13	.....
40	41	+16	-32	-29	-12	-10	+6	-10	-25	-14	+6	.....
41	42	-13	-3	-12	-7	-1	-1	+1	+7	+1	-9	.....
42	44	-15	+1	-13	-4	+18	-4	-2	+1	+4	+15	.....
43	46	-14	-31	-6	+22	+37	+2	-12	-2	-2	+17	.....
44	49	-6	+3	-13	-8	-4	+2	+2	+16	-14	-7	.....
45	51	-24	-31	-24	+21	-20	+10	-2	-12	-7	+9	.....
46	54	+20	+24	+25	+4	-6	-6	+1	-7	+13	+9	.....
47	57	+58	+9	-3	+3	-16	-3	-9	-5	+7	-11	.....
48	59	+10	+10	+31	-3	-2	-3	+20	+10	-2	-7	.....
49	62	+11	+36	+23	+45	+5	-2	-9	-9	+6	-5	.....
50	65	+12	-6	+54	-3	+15	+12	-3	+8	-5	0	.....
51	67	+14	-2	+131	+39	+27	+1	-24	-7	-1	-9	.....
52	69	+5	+55	+265	+27	+71	-25	-11	+14	+27	-5	.....
53	.....	-1	.....	.....	.....	.....	.....	+14	.....	.....	.....	.....

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.)	1.383	1.409	1.275	1.389	1.283	1.215	1.057	1.133	0.729	0.579	0.643
2d Q. (14-26 wk.)	1.560	1.605	1.693	1.522	1.480	1.327	1.406	1.143	.772	.719	.692
3d Q. (27-39 wk.)	1.646	1.665	1.856	1.532	1.324	1.381	1.230	.914	.728	.500	.....
4th Q. (40-52 wk.)	1.542	1.331	1.417	1.651	1.327	1.136	1.027	.702	.527	.605	.....

¹ See notes 1 and 3 to appendix table A.

² Enumerated population of the 7 cities in 1950 was 2,866,916: Birmingham, 298,747; Dallas, 432,805; Houston, 593,600; Memphis, 394,025; Nashville, 173,359; San Antonio, 405,973; New Orleans, 568,407.

⁴ Based on the 3 years ending in August of 1945, 1947, and 1948.

Appendix table H. *Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51*

MOUNTAIN CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1	73	+273	-14	+5	+149	+11	+81	+35	-13	-30	-11	+12
2	75	+231	+6	-39	+57	+18	+39	+23	-3	-5	-5	-8
3	76	+114	-15	-41	+16	+16	+47	+1	-3	-5	+1	+24
4	75	+96	+8	-9	+18	-63	+67	+39	-2	-4	-35	+6
5	74	+131	-53	+65	0	-42	+48	+39	-1	+5	+25	+31
6	73	-48	+44	+46	+63	-22	+68	+10	+10	-3	-20	-21
7	71	-13	+14	+6	+65	+29	+88	0	-7	+7	-21	-30
8	71	+9	+23	+39	+65	+10	+90	+127	-17	-17	+67	-6
9	71	-22	-22	0	+126	+12	-16	+90	-9	+28	+32	+35
10	71	-43	-13	-9	+15	-27	-43	+101	-10	-25	-3	-52
11	71	+11	-47	+14	+15	-26	+46	+7	+26	+58	-3	+23
12	69	+14	-26	-33	-23	+58	+1	+11	+26	+15	+25	-2
13	66	+17	+28	-7	-20	+63	+16	-33	-19	0	-9	-18
14	63	-2	+8	-23	+3	-22	-19	+48	+46	-15	-33	+34
15	61	-31	+20	-39	-25	+2	-15	+23	+28	+33	+4	+26
16	59	+3	-22	-4	+28	-5	-12	-12	+38	+17	+14	-25
17	58	-18	-2	+9	-22	+17	0	+9	-27	+10	-21	-34
18	57	+48	-34	-9	-11	+19	-2	+11	+28	+2	-29	-35
19	56	+17	+39	+34	+31	-39	+4	-6	0	-5	+15	-18
20	55	+40	-14	+6	+2	-27	+45	+34	+9	+5	-19	-----
21	55	-25	+41	+28	-8	-8	+6	-33	+18	-3	-9	-----
22	55	-25	+44	-11	-18	-29	+25	-23	+9	-29	+1	-----
23	54	+8	+5	+32	+13	0	-23	-13	+19	-10	+81	-----
24	54	-14	+7	+3	+4	-10	-14	-23	-27	-9	-23	-----
25	52	-13	+1	-35	+6	-19	-32	-2	-8	-7	+14	-----
26	51	-23	-7	+9	-4	+80	-3	-11	-26	+3	+24	-----
27	49	-21	-2	+13	-11	-17	0	-9	-24	-23	+35	-----
28	47	-10	-19	-15	-9	+4	+1	+50	+5	+15	+1	-----
29	46	-8	-5	-2	-7	-5	-17	-25	-4	-11	+29	-----
30	44	-8	-13	+11	-6	+46	-26	-5	-3	-19	+4	-----
31	43	-17	+1	+13	-4	+7	+33	+6	-11	-9	+6	-----
32	41	+48	-7	-16	+7	-12	+5	-3	-19	-16	-19	-----
33	40	+17	-4	-13	+39	-1	+65	+8	+18	-6	-9	-----
34	41	+5	+5	-4	+8	+10	-13	+19	+37	-15	-10	-----
35	41	-7	-8	-16	-14	+51	-4	-19	-29	+21	+8	-----
36	41	-18	-21	-7	-15	+12	+6	+11	-20	+83	-19	-----
37	41	-19	+19	+32	-6	-47	-33	-17	-21	-15	-19	-----
38	43	-22	-6	-22	+12	+2	-25	+50	+24	+2	-3	-----
39	46	+39	-21	-26	-12	0	+22	-38	+41	-17	-22	-----
40	48	-28	+37	+11	-6	+18	-39	-19	+29	-17	-14	-----
41	50	+11	+63	+18	+82	-34	+28	-10	-1	0	-25	-----
42	53	-3	-38	-18	+17	+14	-4	-1	+43	-10	+18	-----
43	56	-8	-2	+29	-59	+32	-7	+8	+3	+52	+68	-----
44	59	-2	-20	-8	-13	0	+39	-12	+19	-3	+58	-----
45	63	+15	-17	-4	+12	-12	-42	-13	+6	-22	+21	-----
46	67	-12	-47	0	-35	-24	+23	+16	-34	-23	+1	-----
47	67	-33	-5	-20	+45	-35	+22	-13	-7	+2	-9	-----
48	67	+21	+16	+12	+4	-46	+20	+17	+21	-9	+15	-----
49	68	+33	+57	+64	-38	+53	-30	-21	+12	-28	-21	-----
50	68	+1	+57	+209	-29	+32	-71	+27	+11	+42	+4	-----
51	69	+22	-40	+270	+10	+30	+44	-1	-36	-23	-16	-----
52	71	+21	-11	+166	+17	+37	-18	-2	-56	+1	-19	-----
53	-----	-1	-----	-----	-----	-----	-----	+8	-----	-----	-----	-----

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.)	0.934	0.984	1.508	1.084	1.409	1.226	1.203	0.492	0.780	0.667	0.781
2d Q. (14-26 wk.)	.839	1.403	1.205	1.071	1.215	.951	.947	.677	.554	.661	1.107
3d Q. (27-39 wk.)	.916	.880	.845	1.045	1.503	1.039	.988	.692	.383	.452	-----
4th Q. (40-52 wk.)	1.148	1.491	1.237	1.283	1.103	.970	.630	.794	.345	.511	-----

¹ See notes 1 and 3 to appendix table A.

² Enumerated population of the 2 cities in 1950 was 594,725: Denver, 412,823; Salt Lake City, 181,902.

³ Based on the 3 years ending in August of 1942, 1943, and 1945.

Appendix table I. Excess¹ weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1941-51

PACIFIC CITIES²

Week of year ³	Smoothed mean ⁴	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1	73	+94	+4	+18	+135	+15	+17	+4	+20	+7	-2	-4
2	74	+49	+13	+10	+78	+17	+21	+13	+51	+13	+14	-12
3	75	+36	+7	-5	+48	+12	+16	-8	+14	-3	+13	-4
4	76	+3	0	-9	+20	-5	-4	+5	-18	-12	+3	+8
5	76	+1	-4	+8	+10	+1	+6	+8	+16	+4	+11	-5
6	76	+1	-4	+3	+5	-7	+22	+1	+20	+14	+1	-13
7	76	-4	-4	-11	+8	+11	+17	-8	+15	-5	+12	+7
8	75	-1	-14	-12	-2	-8	+8	-5	+8	-3	+7	+3
9	73	+18	+1	-12	-5	-18	+15	-7	+21	-4	+30	+22
10	72	-1	+12	-9	+10	+3	+7	-2	+18	-10	+16	+44
11	71	-5	+12	+14	+3	-7	-1	+3	-3	+10	+7	+55
12	69	-2	+18	-5	+2	+4	+4	-3	+1	+5	+1	+54
13	68	-6	-1	+4	+2	-7	+1	+2	+6	+4	+4	+44
14	67	+11	-8	+11	-2	0	+6	+10	-11	-5	+8	+16
15	66	-6	+17	-15	-10	+3	+7	+2	-4	-10	+3	+18
16	64	-3	+11	-10	+6	0	+2	-10	+2	-6	+9	+15
17	62	+3	+18	-3	+7	+10	+11	+4	0	-1	+4	+6
18	60	-10	-24	-11	-4	-3	-10	-1	+2	+2	-3	+17
19	58	+11	0	0	+11	-1	+5	+3	-4	-1	+1	-6
20	56	+4	+4	+5	-5	+1	-11	-6	+8	-5	+4	.....
21	54	-7	+6	-1	-10	-3	-13	-1	+4	+1	-12	.....
22	53	-12	-3	-5	-3	-9	-11	-1	-4	+9	-2	.....
23	51	+1	+3	+17	+3	+3	-2	-6	+1	+10	-1	.....
24	49	-13	-13	0	-9	-4	+2	-6	-13	-4	-16	.....
25	47	+6	0	+6	-10	-3	+4	+2	-9	+12	-8	.....
26	45	-4	-12	+23	+12	-9	-1	0	-4	-3	+3	.....
27	43	0	+4	+3	-6	-4	-9	+2	+17	-7	+16	.....
28	41	-1	+9	+2	+3	+6	+9	-2	+9	+4	+1	.....
29	39	+3	+2	-11	+9	+1	0	+3	+4	-3	+3	.....
30	38	+12	+5	-2	0	-2	+8	+6	+8	+4	+14	.....
31	37	-5	+7	+1	+7	+4	+4	-1	-3	-6	-9	.....
32	36	-3	-10	-9	-4	-6	+2	-4	0	+15	-4	.....
33	36	+2	-6	-4	-3	-1	-10	+1	+1	-2	-5	.....
34	36	-9	-4	0	-7	+8	-4	-4	+2	+4	+6	.....
35	36	-7	-6	+16	+7	+5	+6	-1	0	-8	-10	.....
36	37	+3	-11	-2	-4	+5	-4	+5	+7	-1	-4	.....
37	38	+6	+2	-3	+2	+8	0	-4	+2	0	+4	.....
38	39	-3	-10	-12	+1	-10	+3	+4	+3	-1	-4	.....
39	40	+10	+2	+3	-9	-6	-3	-3	-9	-5	+8	.....
40	42	-6	+1	-4	-11	+7	0	+2	-10	+7	-6	.....
41	44	+7	+11	+1	-8	0	-7	-6	+7	-5	+2	.....
42	46	-5	+15	-4	-5	-1	+2	0	-11	+15	+5	.....
43	49	+11	-13	+9	+13	-1	+5	-8	+3	0	+6	.....
44	52	-3	+5	+2	-14	+5	+1	-9	-8	+9	+7	.....
45	55	-12	-4	-10	+9	-1	0	-4	-3	-5	-10	.....
46	58	-2	+3	+7	0	+4	+13	+1	+2	+16	+15	.....
47	60	-8	-5	+10	0	-2	+9	+9	-3	+4	0	.....
48	63	-6	+4	-3	-1	-4	-6	-3	-8	-10	-2	.....
49	65	-14	-7	-4	+7	+2	+7	-8	+4	+20	+3	.....
50	67	+9	+5	+62	+9	-8	-11	-13	+8	-2	-22	.....
51	69	-6	-9	+37	-12	-2	-8	+27	-4	-1	+9	.....
52	71	-2	+4	+106	+20	+26	-10	-5	-3	-6	-8	.....
53	.....	-12	.....	.....	.....	.....	.....	+3	.....	.....	.....	.....

QUARTERLY FACTORS FOR ADJUSTMENT OF MEANS TO CURRENT NONEPIDEMIC LEVEL

1st Q. (1-13 wk.)	0.613	0.945	0.935	0.770	0.644	0.519	0.414	0.401	0.664	0.695	0.701
2d Q. (14-26 wk.)	.538	.877	.924	.638	.523	.436	.349	.404	.587	.701	.777
3d Q. (27-39 wk.)	.679	.800	.683	.631	.563	.418	.390	.809	.510	.845	.....
4th Q. (40-52 wk.)	.675	.989	.705	.671	.522	.385	.346	.580	.658	.747	.....

^{1, 2} See notes 1 and 3 to appendix table A.

³ Enumerated population of the 6 cities in 1950 was 3,615,159: Seattle, 462,981; Spokane, 160,473; Tacoma, 142,975; Los Angeles, 1,954,036; Sacramento, 134,313; San Francisco, 760,381.

⁴ Based on the 3 years ending in August of 1942, 1943, and 1945.

Incidence of Disease

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

UNITED STATES

Reports From States for Week Ended October 27, 1951

Diphtheria incidence and mortality have shown a steady decline in the past few decades, and, like typhoid fever, the very marked seasonal rise in incidence has almost disappeared. The incidence has decreased more slowly in the Southern States (South Atlantic, East South Central, and West South Central) than in other parts of the United States. In 1930, 33 percent of the total cases reported in the United States occurred in the South although in the past 3 years, 1948-50, 54 percent of the total were reported by these States and since July 1 of the current year, 62 percent.

The peak incidence of diphtheria in the United States usually has been reached in October or November. During the period when a much larger proportion of cases was being reported from the northern part of the country, the peak for the country as a whole was reached in November. The larger proportion of cases reported from the Southern States in recent years has caused the peak to be reached in October, since the seasonal occurrence of the disease begins earlier in the South. For the current year, all of the seasonal upswing in the number of cases has been accounted for by cases from the South. For the 4 weeks ended July 28, the average weekly number of cases reported was 21 for the three groups of Southern States, 19 for the remainder of the country. For the 4 weeks ended October 20, the average was 95 for the Southern States and only 20 for all other parts of the United States. For the current week there was a total of 141 cases of which 112 were reported in the three groups of Southern States.

Epidemiological Reports

Eastern Equine Encephalomyelitis Infection in Pheasants

Dr. J. C. Hart, Connecticut Department of Health, has reported that on October 19, 1951, word was received from the Department of Animal Diseases, College of Agriculture of the University of Connecticut, that encephalitis was present in pheasants on two widely separated pheasant farms. On one farm about 65 out of 200 pheasants had died from the disease and on the other about 15 were ill out

of a total of 2,500 on the farm. Preliminary virus neutralization tests on strains isolated from one farm indicated that the etiological agent is eastern equine encephalomyelitis virus. Follow-up studies are being continued at the University of Connecticut and in other laboratories to verify the findings. Pheasants from these two farms are under quarantine. Should the strain of virus be verified as eastern equine encephalomyelitis, it will be the first time it has been identified in the northeastern part of the country since 1938, when a serious epidemic occurred in human beings and horses in Massachusetts. During that year, 29 horses were ill with encephalitis in Connecticut and the virus was isolated from a pheasant from Connecticut. There have never been any human cases, however, reported in this State. This year there have been no cases of illness suggesting sleeping sickness in horses and only one reported case of encephalitis in humans. This was a 66-year-old woman reported in March 1951. The type of encephalitis in this patient is unknown. The neighboring State departments of health have been notified of the existence of this infection in Connecticut.

Trachoma

Dr. R. W. Williams, Office of Indian Affairs, reports that 88 cases of conjunctivitis were found during routine physical examinations of children in the Pipestone Indian School, Minnesota. These are thought to be mild cases of trachoma that are being treated as such pending further investigation.

Comparative Data for Cases of Specified Reportable Diseases: United States

[Numbers after diseases are International List numbers, 1948 revision]

Disease	Total for week ended—		5-year median 1946-50	Seasonal low week	Cumulative total since seasonal low week		5-year median 1945-46 through 1949-50	Cumulative total for calendar year—		5-year median 1946-50
	Oct. 27, 1951	Oct. 28, 1950			1950-51	1949-50		1951 1950		
								1951	1950	
Anthrax (062).....		1	1	(1)	(1)	(1)		49	40	43
Diphtheria (055).....	141	150	327	27th	1, 211	1, 706	3, 051	3, 219	4, 834	7, 661
Encephalitis, acute infectious (082).....	23	32	16	(1)	(1)	(1)	(1)	886	816	543
Influenza (480-483).....	365	615	615	30th	4, 014	6, 144	6, 144	120, 069	144, 908	133, 260
Measles (085).....	2, 003	1, 201	1, 190	35th	9, 295	5, 805	5, 767	478, 206	293, 976	560, 009
Meningitis, meningococcal (057.0).....	84	69	66	37th	358	367	325	3, 419	3, 166	2, 932
Pneumonia (490-493).....	605	1, 011	(2)	(1)	(1)	(1)	(1)	51, 047	68, 752	(2)
Poliomyelitis, acute (080).....	903	1, 314	830	11th	23, 544	26, 688	23, 068	24, 756	27, 819	23, 418
Rocky Mountain spotted fever (104).....	4	1	1	(1)	(1)	(1)	(1)	318	445	535
Scarlet fever (050) ²	811	961	1, 152	32d	4, 859	5, 315	6, 850	58, 245	45, 485	63, 246
Smallpox (084).....	1			35th	1	1	3	12	27	51
Tularemia (059).....	4	14	14	(1)	(1)	(1)	(1)	551	767	807
Typhoid and paratyphoid fever (040,041) ⁴	66	83	73	11th	2, 212	2, 471	2, 849	2, 647	2, 980	3, 334
Whooping cough (056).....	1, 109	1, 543	1, 543	39th	3, 783	5, 909	5, 909	57, 558	103, 104	82, 058

¹ Not computed.

² Data not available.

³ Including cases reported as streptococcal sore throat.

⁴ Including cases reported as salmonellosis.

Reported Cases of Selected Communicable Diseases: United States, Week Ended Oct. 27, 1951

[Numbers under diseases are International List numbers, 1948 revision]

Area	Diph- theria (055)	Encepha- litis, in- fectious (082)	Influ- enza (480-483)	Measles (085)	Mening- itis, menin- gococcal (057.0)	Pneu- monia (490-493)	Polio- myelitis (080)
United States	141	23	365	2,003	84	605	903
New England	5		2	294		42	12
Maine.....			2	48		6	
New Hampshire.....				32		8	
Vermont.....				32			
Massachusetts.....	5			132			3
Rhode Island.....				10		1	
Connecticut.....				40		27	9
Middle Atlantic	9	5	3	618	14	68	87
New York.....	5	4	(1)	270	6		47
New Jersey.....		1	3	109	1	29	11
Pennsylvania.....	4			239	7	39	29
East North Central	6	1	6	363	22	60	221
Ohio.....	1			78	3		41
Indiana.....	3		3	10		3	17
Illinois.....	1		3	131	9	45	67
Michigan.....	1	1		66	5	12	39
Wisconsin.....				78	5		57
West North Central	4		6	25	5	37	96
Minnesota.....	1		2	5		16	25
Iowa.....				1	2		8
Missouri.....	1			2			18
North Dakota.....			2			7	1
South Dakota.....			1	1		1	1
Nebraska.....				3			9
Kansas.....	2		1	6	1	13	34
South Atlantic	55	2	19	185	12	91	71
Delaware.....							
Maryland.....		1		88		18	15
District of Columbia.....	1			14		10	1
Virginia.....	15	1		31	2	52	8
West Virginia.....	3			13			22
North Carolina.....	18			16	6		6
South Carolina.....	9		2	4	1	4	2
Georgia.....	9		17	16	2	7	10
Florida.....				3	1		7
East South Central	36	7	2	220	12	28	71
Kentucky.....	12			182	2		10
Tennessee.....	1	2		7	1		16
Alabama.....	20	4		11	8	15	19
Mississippi.....	3	1	2	20	1	13	26
West South Central	21	3	99	24	8	191	107
Arkansas.....	5		87	1		20	14
Louisiana.....	3	1	1	2	1	14	20
Oklahoma.....			11	2		9	17
Texas.....	13	2		19	7	148	56
Mountain	3		158	132	1	44	67
Montana.....			2	35			5
Idaho.....				6			4
Wyoming.....				1		3	9
Colorado.....			11	12	1	8	8
New Mexico.....	1		4	38		23	3
Arizona.....	2		141	7		10	5
Utah.....				33			31
Nevada.....							2
Pacific	2	5	70	142	10	44	171
Washington.....			56	23	2	1	16
Oregon.....			5	20	1	18	15
California.....	2	5	9	99	7	25	140
Alaska.....							
Hawaii.....	1		57	195			1

¹ New York City only.

**Reported Cases of Selected Communicable Diseases: United States,
Week Ended Oct. 27, 1951—Continued**

[Numbers under diseases are International List numbers, 1948 revision]

Area	Rocky Mountain spotted fever (104)	Scarlet fever ¹ (050)	Small-pox (084)	Tulare-mia (059)	Typhoid and paratyphoid fever ² (040,041)	Whooping cough (056)	Rabies in animals
United States.....	4	811	1	4	66	1,109	128
New England.....	40				5	142	
Maine.....					2	19	
New Hampshire.....	1					19	
Vermont.....	1					16	
Massachusetts.....	29				3	75	
Rhode Island.....	1						
Connecticut.....	8					13	
Middle Atlantic.....	120				4	220	25
New York.....	60				1	99	11
New Jersey.....	23					47	
Pennsylvania.....	37				3	74	14
East North Central.....	200			1	8	224	8
Ohio.....	62				3	34	2
Indiana.....	19				1	31	5
Illinois.....	22			1	3	48	
Michigan.....	66				1	62	
Wisconsin.....	31					49	1
West North Central.....	48				4	32	22
Minnesota.....	1				1	1	15
Iowa.....	9					13	6
Missouri.....	18				1	8	1
North Dakota.....	4				1	1	
South Dakota.....	1				1		
Nebraska.....	1						
Kansas.....	14					9	
South Atlantic.....	1	139		1	7	89	13
Delaware.....		4					
Maryland.....		13				5	
District of Columbia.....		13				3	
Virginia.....		15			3	21	1
West Virginia.....		6			1	30	1
North Carolina.....	1	60		1	1	12	
South Carolina.....		10			1	1	6
Georgia.....		14			1	10	5
Florida.....		4				7	
East South Central.....	1	76		1	7	99	31
Kentucky.....		25			2	39	13
Tennessee.....		38		1	1	36	7
Alabama.....	1	8			2	21	8
Mississippi.....		5			2	3	3
West South Central.....		20		1	11	172	29
Arkansas.....		3			6	26	2
Louisiana.....		3				5	
Oklahoma.....		5				10	2
Texas.....		9		1	5	131	25
Mountain.....	1	34	1		5	69	
Montana.....		6			1	13	
Idaho.....		12				4	
Wyoming.....			1			1	
Colorado.....		2			1	11	
New Mexico.....		1			2	28	
Arizona.....		3			1	12	
Utah.....	1	10					
Nevada.....							
Pacific.....	1	134			15	62	
Washington.....		23			2		
Oregon.....		13			2	3	
California.....	1	98			11	59	
Alaska.....							
Hawaii.....					1		

¹ Including cases reported as streptococcal sore throat.

² Including cases reported as salmonellosis.

FOREIGN REPORTS

CANADA

Reported Cases of Certain Diseases—Week Ended October 13, 1951

Disease	Total	New-found-land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Brucellosis.....	6					2	3				1
Chickenpox.....	375	8				36	132	16	39	71	73
Diphtheria.....	5					5					
Dysentery, bacillary.....	10					4	2				4
Encephalitis, infectious.....	4					2	1		1		
German measles.....	106			2		4	11		17	20	52
Influenza.....	12			3			3	1			5
Measles.....	466	6		33	2	26	44	7	9	262	77
Meningitis, meningococcal.....	7	3				2	1				1
Mumps.....	195	8				22	80	12	28	8	37
Poliomyelitis.....	62			2	6	13	32	1	3	2	3
Scarlet fever.....	220				2	50	37	30	14	37	50
Tuberculosis (all forms).....	196	22		3	1	74	25	24	4	19	24
Typhoid and paratyphoid fever.....	19				2	7					
Veneral diseases:										10	
Gonorrhoea.....	260	7		8	8	76	40	21	16	42	42
Syphilis.....	77	4		5	6	34	7	2	3	5	11
Primary.....	6			1	1	3	1				
Secondary.....	5			1	1	1	1			1	1
Other.....	66	4		3	5	30	5	2	3	4	10
Whooping cough.....	176	4		2		57	37	15	28	25	8

CUBA

Reported Cases of Certain Diseases—5 Weeks Ended September 29, 1951

Disease	Total	Pinar del Rio	Habana		Matanzas	Santa Clara	Camaguey	Oriente
			Habana City	Total				
Cancer.....	118	4		14	22	30	19	29
Chickenpox.....	2							2
Diphtheria.....	17		2	6	8			3
Leprosy.....	1		1	1				
Malaria.....	132			1			4	127
Measles.....	42		20	26	9			7
Poliomyelitis.....	1							1
Tuberculosis.....	84	2	4	6	21	23	18	14
Typhoid fever.....	78	14	7	15	4	19	12	14
Whooping cough.....	1			1				

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

The following reports include only items of unusual incidence or of special interest and the occurrence of these diseases, except yellow fever, in localities which had not recently reported cases. All reports of yellow fever are published currently.

Cholera

India. The incidence of cholera has been decreasing in Madras since the week ended September 22, when 181 cases were reported. For the week ended October 20, there were 26 cases reported. In Calcutta, however, the incidence has increased from 33 cases to 66 during this period.

Smallpox

Cameroon (British). Three cases of smallpox were reported for the week ended September 1, one of which was reported in Victoria.

French Equatorial Africa. During the period October 1-10, 13 cases of smallpox were reported.

Indochina. For the week ended October 20, 24 cases of smallpox were reported in Hanoi, Viet Nam; and two cases were reported in Haiphong.

Pakistan. During the week ended October 20, smallpox was reported in ports of Pakistan as follows: Lahore, three cases, and Chittagong, one.

Spain. One case of smallpox was reported in Spain for the week ended September 8.

Typhus Fever

Germany (French Sector). During the period September 2-29, nine cases of typhus fever were reported in the French Sector of Berlin.

Puerto Rico. Two cases of murine typhus fever were reported in San Juan for the week ended September 29.

Yellow Fever

Venezuela. A fatal case of jungle yellow fever was reported on September 29 in La Frontera in the region of Tumeremo, Bolívar State.