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THE INFLUENZA EPIDEMIC OF 1928–29 IN 14 SURVEYED LOCALITIES IN THE UNITED STATES

An Analysis, According to Age, Sex, and Color, of the Records of Morbidity and Mortality Obtained in the Surveys [1]

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CONTENTS

Immediately following the influenza epidemic of the winter of 1928–29, the Public Health Service made surveys in 10 large cities and in 4 groups of rural communities to determine the extent of illness from influenza and other minor respiratory diseases. The general method of the surveys and the data for the 14 localities considered as a whole have already been published (1). In the present paper it is intended to consider the general aspects of the epidemic in each of the localities that were surveyed. Although the average results for all localities are of interest, information on the variation from place to place in the extent and severity of respiratory conditions probably adds as much to the knowledge of the nature of such epidemics as do the average results for all places.

In arrangement the present paper follows that of a similar study by the Public Health Service of the extent and severity of the 1918–19 epidemic in 12 localities surveyed at that time (2).

[1] From the Office of Statistical Investigations, U.S. Public Health Service.

CHRONOLOGY

In each locality respiratory sickness was recorded as influenza, grippe, pneumonia, and colds (insofar as the family informant remembered them) for an average period of about 2½ months, the period varying from about 9 to 14 weeks in the different communities.

Figure 1 shows for each locality the case rate per 1,000 persons canvassed for each week for which sickness was recorded.[2] The canvassed population of each city comprises a total of 10,000 to 15,000 persons living within 10 to 20 districts scattered throughout the city. The numbers of deaths in the surveyed populations of the various cities were small, but they can be supplemented by records of mortality from influenza and pneumonia for the city as a whole. Figure 1 includes weekly mortality from influenza and pneumonia (broken line) in the city as a whole for the weeks during which influenza was epidemic. To indicate the extent of the excess mortality during these epidemic weeks over what usually occurred in preceding years, there is plotted a weekly expected or normal death rate (dotted line) which is based on the median rate for corresponding weeks of the 7 years 1921–27. There are no data for preceding years to indicate the expected sickness rate, and the dotted line for the expected mortality is in no way applicable as an indication of what the expected illness rate would be. The sole purpose of plotting morbidity and mortality on the same graph is to indicate that the apparently high sickness rate was paralleled by an excess in the mortality from influenza and pneumonia in these cities.

[2] The illness curves refer to the cases of influenza, grippe, pneumonia, and colds in bed. It might be said, however, that the deduction of colds in bed from this group of respiratory causes does not materially change the picture of the epidemic in the various cities. (See table 1.)

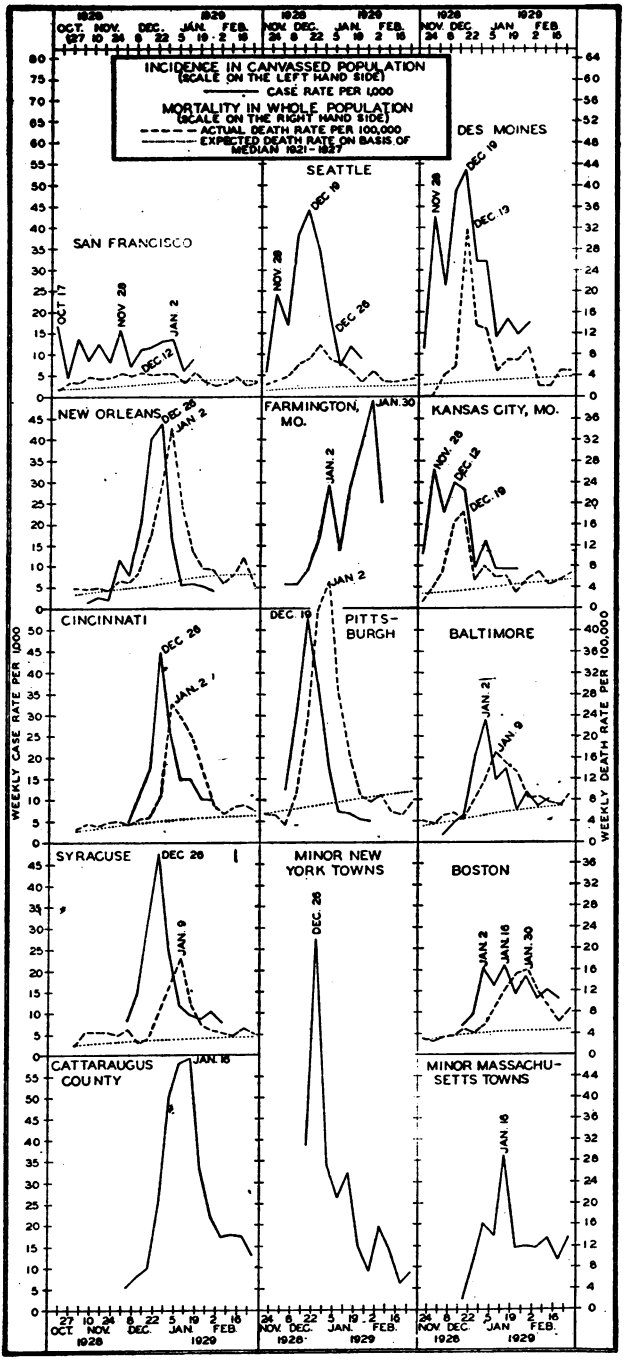

FIGURE 1.—Weekly incidence of respiratory cases and of mortality from influenza and pneumonia in each surveyed locality during the epidemic of 1928–29. Dates are middle (Wednesday) of peak weeks. Respiratory cases include influenza, grippe, pneumonia, and colds in bed.

TABLE 1.—*Weekly incidence of respiratory diseases during the epidemic of 1928–29 in canvassed families in certain localities in the United States*

[Weekly[1] case rates per 1,000 persons canvassed]

Week ending—	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Colds in bed	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Colds in bed	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Colds in bed	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Colds in bed
	San Francisco			Seattle								
Oct. 20	16.8	14.8	2.0									
27	4.5	4.1	.4									
Nov. 3	13.6	12.3	1.3									
10	8.5	7.4	1.1									
17	12.4	10.4	2.0									
24	8.4	7.6	.8	5.6	4.1	1.5						
Dec. 1	15.6	12.5	3.1	24.0	18.7	5.3						
8	7.3	6.0	1.3	16.8	15.1	1.7						
15	11.2	8.6	2.6	38.2	31.2	7.0						
22	11.8	8.9	2.9	44.3	37.1	7.2						
29	13.2	10.3	2.9	35.2	29.6	5.6						
Jan. 5	13.6	10.0	3.6	19.0	14.6	4.5						
12	6.3	5.0	1.3	7.4	5.5	1.9						
19	8.8	5.1	3.7	11.8	9.2	2.6						
26				9.1	5.9	3.2						
	Des Moines			Kansas City, Mo.			Farmington, Mo.			New Orleans		
Nov. 10										1.2	1.1	0.1
17										2.5	2.3	.2
24	11.2	10.5	0.7	12.9	10.1	2.8				1.8	1.7	.1
Dec. 1	42.5	38.9	3.6	32.9	27.1	5.8				11.3	10.3	1.0
8	26.2	24.8	1.4	22.6	18.1	4.5	5.7	4.9	0.8	7.7	5.9	1.8
15	48.5	43.7	4.8	29.8	24.3	5.5	5.7	3.3	2.5	19.6	17.6	2.0
22	53.6	48.6	5.0	28.2	22.4	5.8	9.0	7.4	1.6	39.8	35.4	4.4
29	31.7	29.8	1.9	19.2	16.2	3.2	16.3	13.1	3.3	43.6	38.5	5.1
Jan. 5	31.5	27.3	4.2	16.2	12.2	4.0	29.4	16.3	13.1	16.6	14.5	2.1
12	14.0	12.3	1.7	9.3	7.8	1.5	13.9	11.4	2.5	5.5	5.0	.5
19	18.2	14.6	3.6	9.2	6.4	2.8	28.6	20.4	8.2	5.6	5.1	.5
26	14.6	11.3	3.3	9.3	5.3	4.0	38.4	30.2	8.2	5.2	4.1	1.1
Feb. 2	17.2	13.6	3.6				49.0	31.0	18.0	4.0	2.9	1.1
9							25.3	13.1	12.3			

[1] In some localities the first and last weeks are based on 4 to 6 days' data, but the rates have been raised to a 7-day, or weekly, basis. Cases were tabulated only to the day canvass was begun, and so total surveyed population is under observation for every week.

TABLE 1.—*Weekly incidence of respiratory diseases during the epidemic of 1928–29 in canvassed families in certain localities in the United States*—Continued

Week ending—	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Colds in bed	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Colds in bed	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Colds in bed	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Colds in bed
	Pittsburgh			Syracuse			Cattaraugus County			Minor New York Towns		
Dec. 8	12.2	9.3	2.9	7.2	6.1	1.1	5.4	3.9	1.5			
15	31.0	25.7	5.3	14.9	11.5	3.4	7.9	6.9	1.0			
22	52.1	40.2	11.9	31.6	26.0	5.6	9.9	7.7	2.2	38.8	36.6	2.2
29	37.1	29.9	7.2	47.5	38.2	9.3	25.0	20.3	4.7	87.0	83.1	3.9
Jan. 5	18.2	13.6	4.6	24.4	16.6	7.8	49.7	43.3	6.4	34.0	29.7	4.3
12	7.2	4.9	2.3	11.6	7.8	3.8	58.2	50.8	7.4	26.3	22.4	3.9
19	6.7	4.7	2.0	9.5	5.3	4.2	59.1	52.2	6.9	32.3	26.7	5.6
26	5.3	3.1	2.2	8.6	5.3	3.3	32.9	28.7	4.2	14.2	13.8	.4
Feb. 2	4.9	2.4	2.5	10.3	5.3	5.0	21.8	19.1	2.7	9.0	8.1	.9
9				7.8	2.4	5.4	17.1	15.1	2.0	19.4	15.9	3.5
16							17.6	15.1	2.5	14.2	11.2	3.0
23							17.1	12.4	4.7	6.5	3.9	2.6
Mar. 2							12.9	8.2	4.7	8.6	5.6	3.0
	Cincinnati			Baltimore			Boston			Minor Massachusetts Towns		
Dec. 8	4.6	3.9	0.7	1.9	1.6	0.3						
15	10.9	9.3	1.6	4.4	3.5	.9						
22	17.2	13.7	3.5	6.3	5.4	.9	6.6	4.9	1.7	2.4	1.6	0.8
29	44.6	37.2	7.4	20.3	17.3	3.0	9.4	6.1	3.3	10.8	8.6	2.2
Jan. 5	26.1	19.9	6.2	28.7	24.3	4.4	20.3	14.2	6.1	20.3	16.2	4.1
12	14.9	11.3	3.6	14.5	12.2	2.3	16.3	10.7	5.6	17.3	13.7	3.6
19	14.8	10.6	4.2	17.3	15.1	2.2	20.8	13.6	7.2	36.1	28.0	8.1
26	10.1	7.3	2.8	7.5	6.3	1.2	14.1	9.6	4.5	14.4	11.3	3.1
Feb. 2	9.0	5.7	3.3	11.9	9.1	2.8	18.3	12.8	5.5	14.8	11.9	2.9
9				8.6	7.3	1.3	13.4	9.2	4.2	14.5	11.1	3.4
16				10.3	7.1	3.2	15.4	7.9	7.5	16.7	13.1	3.6
23							13.3	6.8	6.5	11.7	8.7	3.0
Mar. 2										17.2	11.0	6.2
	Great Barrington, Mass.			Palmer, Mass.			Saugus, Mass.			Nantucket, Mass.		
Dec. 22	1.6	1.2	0.4	2.7	1.1	1.6	1.2	0.8	0.4	4.0	3.2	0.8
29	17.8	15.6	2.8	7.8	6.2	1.6	9.9	7.9	2.0	7.5	5.1	2.4
Jan. 5	32.0	23.3	8.7	13.3	10.9	2.4	20.5	17.7	2.8	15.5	12.7	2.8
12	29.6	25.3	4.3	15.3	10.2	5.1	10.6	8.2	2.4	13.5	11.1	2.4
19	54.5	39.9	14.6	25.5	19.6	5.9	22.9	18.6	4.3	41.7	34.2	7.5
26	13.0	9.8	3.2	13.3	9.8	3.5	14.6	12.6	2.0	16.7	13.1	3.6
Feb. 2	14.2	10.2	4.0	19.6	17.2	2.4	17.0	13.8	3.2	8.3	6.3	2.0
9	18.2	13.5	4.7	18.4	13.7	4.7	10.3	9.9	.4	11.1	7.5	3.6
16	11.9	8.3	3.6	27.4	21.9	5.5	13.0	10.2	2.8	14.3	11.5	2.8
23	7.9	3.9	4.0	18.0	16.4	1.6	10.3	7.9	2.4	10.7	6.7	4.0
Mar. 2	13.0	6.7	6.3	20.8	14.1	6.7	25.2	16.9	8.3	9.5	5.9	3.6
9				6.7	3.6	3.1	12.6	10.2	2.4	7.1	3.5	3.6
16							11.0	7.8	3.2	16.7	8.4	8.3
23							13.0	7.1	5.9			

TABLE 2.—*Weekly death rates from influenza and pneumonia in the whole population of each of the 10 surveyed cities during the epidemic of 1928–29*

[Deaths classified according to date of death]

Week ending—	All 10 cities [1]	San Francisco	Seattle	Des Moines	Kansas City, Mo.	New Orleans	Cincinnati	Pittsburgh	Baltimore	Syracuse	Boston
	Actual weekly death rate per 100,000										
1928											
Nov. 3	2.48	2.90	2.09	2.15	2.80	3.72	2.42	1.92	2.05	1.52	2.13
10	2.57	3.91	1.30	.71	1.28	3.72	3.62	2.95	2.05	4.01	1.50
17	2.83	3.24	.79	.71	1.02	3.95	2.90	4.14	3.24	4.01	2.74
24	3.15	3.74	2.09	0	1.28	3.03	3.62	5.18	3.95	4.01	2.99
Dec. 1	3.58	4.43	2.86	0	4.08	4.87	3.85	5.04	3.61	3.51	2.38
8	4.10	3.59	3.89	4.28	6.88	4.64	3.13	3.11	4.68	4.51	2.99
15	6.10	4.60	6.25	5.72	16.32	6.50	4.10	8.44	5.16	2.01	3.24
22	11.18	4.08	7.29	31.39	18.35	13.69	4.33	23.53	4.29	3.01	4.74
29	13.52	4.43	9.90	13.56	5.35	22.53	8.44	43.36	8.17	8.02	3.99
1929											
Jan. 5	17.89	4.43	7.29	12.85	8.15	33.91	26.04	48.98	11.53	13.02	5.37
12	13.80	2.72	6.25	5.01	5.87	19.50	23.15	28.27	16.82	18.01	8.86
19	10.94	4.78	4.95	7.13	6.64	11.14	19.29	16.72	14.88	9.51	11.99
26	8.24	2.90	2.86	7.13	3.82	7.44	13.02	8.73	12.96	5.50	15.09
Feb. 2	7.42	2.05	4.68	9.28	5.87	7.19	7.23	7.56	8.17	4.51	15.84
9	6.13	2.72	3.13	2.15	7.13	4.64	5.06	8.73	8.65	4.01	11.99
16	5.42	3.91	2.86	2.15	4.58	6.04	6.50	5.48	7.69	3.51	8.98
23	5.58	2.05	3.13	5.01	5.10	9.53	6.75	5.18	6.96	5.01	6.12
Mar. 2	5.69	2.55	3.38	5.01	6.64	4.18	5.79	7.10	8.65	4.01	8.36
9	5.20	2.05	4.68	1.42	3.57	6.73	7.00	8.00	6.37	5.01	5.73
16	4.78	1.53	2.09	1.42	6.64	5.81	5.54	6.81	6.00	6.50	4.99
23	4.76	1.19	1.30	3.57	4.85	1.63	5.54	6.65	4.93	5.01	5.12
30	3.66	2.05	.79	2.15	5.35	3.95	3.13	5.33	3.84	5.01	4.37
Apr. 6	3.67	2.05	1.04	2.86	4.85	4.87	4.10	4.30	4.79	7.00	1.38
	Excess [2] weekly death rate per 100,000										
1928											
Nov. 3	−0.06	[3] +1.11	+0.84	+0.38	+0.40	+0.84	+0.27	−2.59	−0.73	−0.31	−0.17
10	−.06	+2.05	+.02	−1.19	−1.21	+.61	+1.23	−1.84	−.96	+2.09	−.96
17	+.03	+1.28	−.56	−1.35	−1.67	+.65	+.31	−.94	+.02	+1.99	+.13
24	+.18	+1.63	+.65	−2.21	−1.50	−.46	+.75	−.20	+.56	+1.90	+.21
Dec. 1	+.44	+2.22	+1.32	−2.35	+1.15	+1.19	+.69	−.61	+.02	+1.30	−.59
8	+.78	+1.28	+2.30	+1.77	+3.82	+.77	−.23	−2.80	+.84	+2.17	−.17
15	+2.60	+2.11	+4.56	+3.08	+13.10	+2.47	+.56	+2.26	+1.09	−.42	−.15
22	+7.49	+1.40	+5.56	+28.69	+15.00	+9.44	+.59	+17.01	−.15	+.42	+1.19
29	+9.62	+1.52	+8.07	+10.71	+1.80	+18.07	+4.51	+36.55	+3.47	+5.33	+.25
1929											
Jan. 5	+13.77	+1.23	+5.41	+9.88	+4.32	+29.21	+22.02	+41.88	+6.44	+10.24	+1.44
12	+9.46	−.71	+4.33	+1.90	+1.80	+14.42	+19.02	+20.85	+11.35	+15.13	+4.79
19	+6.39	+1.23	+2.93	+3.88	+2.32	+5.77	+15.07	+8.96	+9.03	+6.50	+7.81
26	+3.53	−.65	+.79	+3.79	−.69	+1.69	+8.71	+.67	+6.88	+2.44	+10.84
Feb. 2	+2.56	−1.50	+2.57	+5.88	+1.07	+1.15	+2.82	−.79	+1.86	+1.34	+11.53
9	+1.14	−.79	+.96	−1.35	+2.15	−1.69	+.56	+.15	+2.19	+.75	+7.63
16	+.34	+.46	+.65	−1.40	−.59	−.38	+1.90	−3.38	+1.11	+.15	+4.56
23	+.44	−1.21	+.92	+1.42	−.36	+3.11	+2.09	−3.93	+.25	+1.55	+1.67
Mar. 2	+.49	−.58	+1.17	+1.37	+.92	−2.15	+1.05	−2.24	+1.90	+.46	+3.82
9	0	−.92	+2.47	−2.27	−2.34	+.69	+2.17	−1.50	−.35	+1.36	+1.13
16	−.14	−1.19	−.12	−2.27	+.59	+.06	+.71	−2.68	−.61	+2.86	+.38
23	−1.06	−1.50	−.81	−.12	−1.19	−3.64	+.75	−2.74	−1.50	+1.42	+.52
30	−1.15	−.54	−1.23	−1.56	−.50	−.84	−1.48	−3.74	−2.21	+1.55	−.13
Apr. 6	−1.01	−.44	−.84	−.88	−.71	−.65	−.25	−4.33	−.81	+3.74	−2.88

[1] The rates for the 10 cities combined are weighted averages of rates for corresponding weeks for the individual cities, the weights being proportional to the size of the canvassed population in the different cities. This method was followed to put the rates in the whole population for all cities on the same basis as those for the canvassed population in all cities.

[2] The excess rates are deviations from an expected rate computed from median monthly rates for the period 1921–1927, as follows: For each city the median rates for the different months were plotted and a smooth line drawn to pass through all of the 12 monthly medians except the very irregular points. From this line representing the seasonal curve of mortality from influenza and pneumonia, the approximate medians for each week were read. In the case of Des Moines, which was not in the registration area during all of this 7-year period, averages of monthly rates for the calendar years 1924, 1925, and 1927 were used instead of medians.

[3] Excess rates for San Francisco for weeks prior to those shown in this table were as follows: Oct. 27, +1.09; Oct. 20, −0.02; Oct. 13, −0.49; Oct. 6, −0.44.

Data from current weekly reports from cities as published in the Public Health Reports. For more details on deaths see notes to table 17.

In every one of the surveyed communities except San Francisco the incidence of respiratory diseases rises rather sharply to a definite peak, after which it declines about as sharply to the level of approximately 10 weeks previous. In Seattle, Des Moines, and Kansas City there is an early peak followed by another about 2 or 3 weeks later. In Seattle and Des Moines the second peak is distinctly the larger one, but in Kansas City the first is slightly greater than the second. In San Francisco there is little indication of any definite peak at any time covered by the survey. The mortality in San Francisco as a whole likewise shows only a very small excess over the expected rate.

In each city the sickness records cover only the weeks during which respiratory diseases seemed to be unusually prevalent, and it is impossible to combine the data for all of the cities and get a sickness record by weeks for the whole period of the epidemic. In table 3 the communities have been combined into three groups, designated as (*a*) West and West Central, (*b*) East Central and East, and (*c*) New England. The West and West Central group consists of San Francisco, Seattle, Des Moines, and Kansas City, and the peaks in their death rates came the last half of December. The East Central and Eastern group consists of New Orleans, Cincinnati, Pittsburgh, Baltimore, and Syracuse, and in all of these cities the peak in the death rate came in the first half of January. The New England group consists of Boston and four minor towns in Massachusetts, with a peak in the death rate during the last half of January. The grouping was suggested not solely by geographic location but by the fact that the peak of the epidemic came at different times in the three groups.

TABLE 3.—*Weekly incidence of different respiratory diagnoses reported during the epidemic of 1928–29 in 3 groups of canvassed localities*

Week ending—	Weekly case rate per 1,000 persons canvassed (cases classified according to date of onset)								Weekly mortality rate from influenza and pneumonia per 100,000 population (deaths classified according to date of death)		
	Influenza, grippe, pneumonia, and colds in bed	Influenza	Grippe	Total pneumonia	Influenza-pneumonia	Pneumonia, unqualified	Colds in bed	Colds not in bed	In canvassed population	In whole population of surveyed cities [1]	
										Actual rate	Expected rate based on median 1921–27
	West and West Central [2] (46,605 persons canvassed)										
1928											
Nov. 24	9.3	7.3	0.4	0.17	0.15	0.02	1.4	3.0	-------	2.00	2.14
Dec. 1	27.1	20.9	1.2	.64	.41	.24	4.3	7.8	4.3	3.02	2.25
8	17.0	13.8	.5	.49	.43	.06	2.1	3.4	4.3	4.54	2.36
15	29.8	23.5	.8	.67	.45	.21	4.8	7.2	10.7	7.82	2.51
22	32.3	25.7	1.2	.36	.26	.11	5.0	9.8	12.9	14.03	2.62
29	23.9	18.7	1.2	.51	.36	.15	3.4	9.7	8.6	7.88	2.80
1929											
Jan. 5	19.2	13.5	1.2	.45	.30	.15	4.1	13.3	6.4	7.76	2.99
12	8.9	6.5	.6	.15	.11	.04	1.6	5.4	12.9	4.71	3.16
19	11.6	7.5	.7	.24	.11	.13	3.2	8.8	10.7	5.75	3.31
	East Central and Eastern [3] (69,385 persons canvassed)										
1928											
Dec. 8	6.7	3.4	1.7	0.22	0.09	0.13	1.4	2.1	-------	4.04	4.02
15	16.4	9.4	4.1	.33	.17	.16	2.6	4.1	5.8	5.58	4.23
22	29.6	16.3	7.1	.88	.52	.36	5.3	7.2	13.0	10.69	4.47
29	37.4	19.1	11.0	1.15	.66	.49	6.1	9.2	23.1	19.62	4.70
1929											
Jan. 5	22.6	9.5	7.6	.78	.43	.35	4.8	6.7	24.5	27.80	4.95
12	10.5	4.2	3.5	.48	.22	.26	2.4	3.9	17.3	21.24	5.23
19	10.7	4.0	4.0	.26	.14	.12	2.4	5.3	7.2	14.29	5.49
26	7.1	2.4	2.5	.20	.09	.12	2.0	3.4	10.1	9.57	5.72
Feb. 2	7.9	2.0	2.9	.17	.03	.14	2.8	6.7	7.2	7.10	5.95
	New England [4] (27,616 persons canvassed)										
1928											
Dec. 22	5.0	1.2	2.2	0.29	0.11	0.18	1.4	2.1	3.6	4.74	3.55
29	9.9	2.6	4.1	.36	.11	.25	2.9	3.0	7.2	3.99	3.74
1929											
Jan. 5	20.3	4.6	9.6	.62	.33	.29	5.4	6.0	-------	5.37	3.93
12	16.7	3.9	7.4	.54	.14	.40	4.8	4.0	-------	8.86	4.07
19	26.4	4.8	13.6	.58	.18	.40	7.5	8.0	14.5	11.99	4.18
6	14.2	3.0	7.1	.18	-------	.18	4.0	4.1	10.9	15.09	4.25
Feb. 2	17.0	2.8	9.2	.51	.22	.29	4.5	5.4	-------	15.84	4.31
9	13.8	1.6	7.9	.51	.11	.40	3.9	4.0	7.2	11.99	4.36
16	15.9	2.1	7.2	.47	.14	.33	6.1	6.0	3.6	8.98	4.42
23	12.7	2.1	5.4	.18	.11	.07	5.2	8.4	3.6	6.12	4.45

[1] The mortality rates for the whole population for the groups of cities are weighted averages of rates for corresponding weeks for the individual cities, the weights being proportional to the size of the canvassed population in the different cities. This method was followed to put the rates for the whole population on the same basis as those for the canvassed population. Data from current weekly reports from cities as published in the Public Health Reports.

[2] San Francisco, Seattle, Des Moines, and Kansas City.

[3] New Orleans, Cincinnati, Pittsburgh, Baltimore, and Syracuse.

[4] Boston and the 4 minor Massachusetts towns, except that the figures in the last 2 columns for mortality in the whole population are for Boston only.

In figure 2 weekly case rates for the various specific diagnoses have been plotted for the three groups of cities. In the West and West Central few cases were designated as grippe, but in New England grippe was reported more frequently than influenza. Of more importance than this difference in terminology is the fact that cases designated as grippe tended to rise to a peak in the same week as influenza, and cases reported as colds, whether or not the patient was in bed, also came to a peak in the week of the influenza peak. This is most clearly shown in the East Central and Eastern cities, but it is also indicated in the other two groups in which there is a tendency for two or more small peaks; the cases reported as colds usually show subsidiary peaks in the same weeks as the cases reported as influenza or grippe. In view of the time correspondence in the peaks of the various diagnoses, it does not seem reasonable in the study of the results of these influenza surveys to disregard completely cases reported as colds. In the majority of the tabulations the more severe colds that caused the patient to go to bed are included with influenza and grippe. In a very high percentage of the influenza and grippe cases the patient was in bed.

The middle section of figure 2 shows weekly pneumonia case rates in each of the three groups of cities. Some of the pneumonia cases were definitely designated as influenza-pneumonia, but a large proportion of them was reported as pneumonia without any information as to whether it followed influenza. It will be seen that the weekly incidence of both categories of pneumonia was similar. The similarity is particularly marked in the East Central and Eastern cities. This group covers a larger population and the cities in it tended to have more definite and higher peaks in the incidence of respiratory diseases than did the other cities.

In the bottom section of figure 2 influenza and pneumonia death rates in the whole populations of these groups of cities have been plotted with death rates in the canvassed populations of the same cities. The numbers of deaths in the canvassed populations were small, and the rates show considerable chance variation. In the New England places, which covered only 25,000 persons, the deaths in the canvassed population were too few to give any indication of the chronology of the mortality. In the other two groups there is a rather close correspondence between the chronology of the mortality in the canvassed population and in the whole population of the same cities. The peaks come later in the death rates than in the case rates, since the deaths are classified according to the date of death and the cases according to the date of onset of the case.

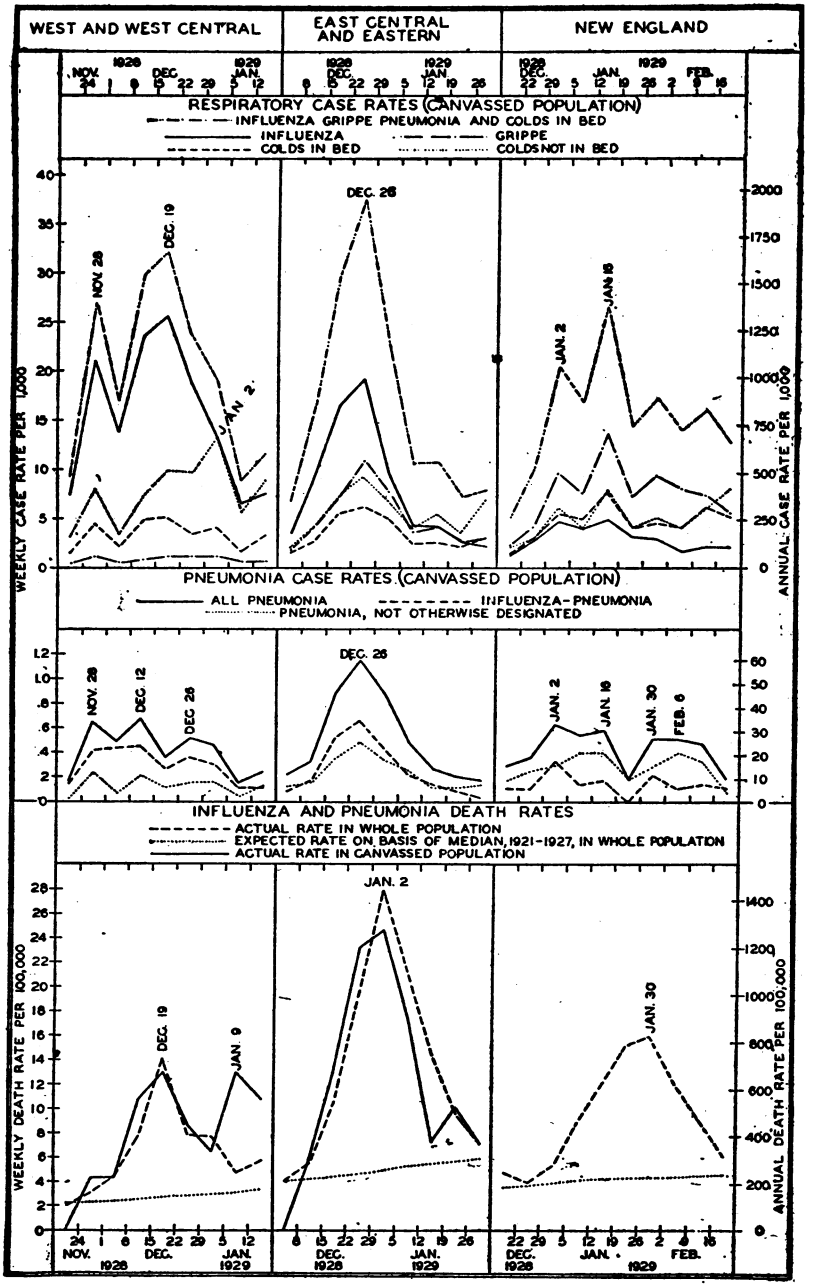

FIGURE 2.—Weekly incidence of various respiratory diagnoses and of mortality from influenza and pneumonia in 3 groups of surveyed localities during the epidemic of 1928–29.

REPRESENTATIVENESS OF THE CANVASSED POPULATION AND OF THE 10 CITIES AS A WHOLE

Of the many cities in the United States it was practicable to survey only 10. Only a small sample of the total population of a surveyed city was canvassed, but the sample was made up of families in various parts of the city. Two questions arise in regard to the representativeness of the samples: (*a*) Is the surveyed population in a given city representative of the total population of that city? and (*b*) Are these 10 cities representative of the general urban population of the United States? The only available data that afford any indications of the answers to these questions are the deaths from influenza and pneumonia in the surveyed and other cities in the United States.

Considering first the question whether the surveyed districts are representative of the city in which they are located, table 4 shows for each city the death rate per 100,000 in the surveyed and in the whole population. For the purpose of this table, deaths in both groups refer to those that occurred within the period for which sickness was recorded. This procedure was necessary because the only dates available for deaths in the whole city were the dates of death. The period for which sickness was recorded varied both in date and in length in the different cities.

TABLE 4.—*Mortality from influenza and pneumonia in the canvassed population and in the whole population of each of the 10 surveyed cities for the period [1] for which cases were recorded*

	All 10 cities	San Francisco	Seattle	Des Moines	Kansas City, Mo.	New Orleans	Cincinnati	Pittsburgh	Baltimore	Syracuse	Boston
	Death rates per 100,000 population (actual basis)										
Influenza or pneumonia was sole or primary cause:											
Canvassed population	85	7	26	164	59	54	43	269	103	56	57
Whole population	98	42	55	68	82	119	100	171	109	70	100
Ratio of canvassed to whole population rate (whole population rate=1.00)	.87	.16	.47	2.41	.72	.45	.43	1.52	.94	.80	.57
Influenza or pneumonia was sole, primary, or contributory cause: [2]											
Canvassed population	96	7	51	225	79	54	43	279	103	56	63
Whole population	126	78	71	87	105	129	126	197	141	88	142
Ratio of canvassed to whole population rate (whole population rate=1.00)	.76	.09	.72	2.59	.75	.42	.34	1.42	.73	.64	.44
	Number of deaths in canvassed population										
Influenza or pneumonia was sole or primary cause	113	1	3	16	6	8	5	41	17	6	16
Influenza or pneumonia was sole, primary, or contributory cause [2]	128	1	6	22	8	8	5	44	17	6	11

[1] Period varied from 9 to 14 weeks in the different cities, with an average of about 11 weeks.
[2] Exclusive of pneumonia deaths secondary to the acute communicable diseases of childhood.

Mortality data for whole population based on records copied from city health departments at time of survey.

It will be noted that with respect to deaths primarily [2] due to influenza or pneumonia, the death rate in the canvassed population of the 10 cities was 87 percent of the rate in the total population of these cities. In 8 of the cities the rate was less in the canvassed group than in the total population, while in the other 2 cities it was greater. In San Francisco the mortality in the canvassed population was only 16 percent of that in the city as a whole, and in Des Moines the death rate in the canvassed group was 241 percent of that in the whole city. Considering not only deaths due primarily to influenza and pneumonia but all deaths in which influenza or pneumonia was a primary or a complicating cause (except pneumonia deaths that were secondary to the acute communicable diseases of childhood), the mortality in the canvassed population of the 10 cities was 76 percent of that in the total population. It should be noted in connection with these wide differences between the canvassed and total population that the numbers of deaths in the canvassed population of a given city were frequently very small and subject to rather wide chance fluctuation. Moreover, inmates of institutions of various kinds would not be included in the survey data, but would probably contribute unduly to the death rate in the city as a whole. Nonresident deaths would also increase the city rate, but not the rate in the surveyed group.

TABLE 5.—*Age specific death rates from influenza and pneumonia in the canvassed population and in the whole population of the 10 surveyed cities for the period* [1] *for which cases were recorded*

	All ages	Under 5	5–14	15–24	25–29	30–34	35–39	40–44	45–49	50–59	60–69	70 and over
	Death rates per 100,000 population (actual basis)											
Influenza or pneumonia was sole or primary cause:												
Canvassed population	85	145	13	18	28	55	81	50	62	131	245	813
Whole population	98	253	15	28	40	49	61	84	80	117	241	774
Ratio of canvassed to whole population rate (whole population rate=1.00)	.87	.57	.87	.64	.70	1.12	1.33	.60	.78	1.12	1.02	1.05
Influenza or pneumonia was sole or primary or contributary cause: [2]												
Canvassed population	96	155	13	26	28	73	90	50	62	139	302	925
Whole population	126	276	19	32	47	60	72	101	103	158	347	1,102
Ratio of canvassed to whole population rate (whole population rate=1.00)	.76	.56	.68	.81	.60	1.22	1.25	.50	.60	.88	.87	.84
	Number of deaths in canvassed population											
Influenza or pneumonia was sole or primary cause	113	16	3	4	3	6	9	5	5	16	17	29
Influenza or pneumonia was sole, primary, or contributory cause [2]	128	17	3	6	3	8	10	5	5	17	21	33

[1] Average length of period about 11 weeks.
[2] Exclusive of pneumonia deaths secondary to the acute communicable diseases of childhood.

Mortality data for whole population based on records copied from city health departments at time of survey.

[3] In determining which of the causes was primary and which contributory, the rules set forth in the Manual of Joint Causes prepared by the Mortality Division, Bureau of the Census, were rigidly followed in order to make these data comparable with official mortality statistics.

One further comparison might be made of the mortality from influenza and pneumonia in the canvassed population with that in the whole population. Table 5 shows influenza and pneumonia death rates by age in the canvassed and in the whole population of all 10 cities combined. The age curves are compared graphically in figure 3. Although there is some difference between the rates in the two groups, it appears that the death rates due primarily to influenza or pneumonia are very similar. There is somewhat more difference between the death rates in the two groups when both primary and secondary causes are taken into account, but insofar as mortality is used in this study it will refer chiefly to the deaths due primarily to influenza or pneumonia.

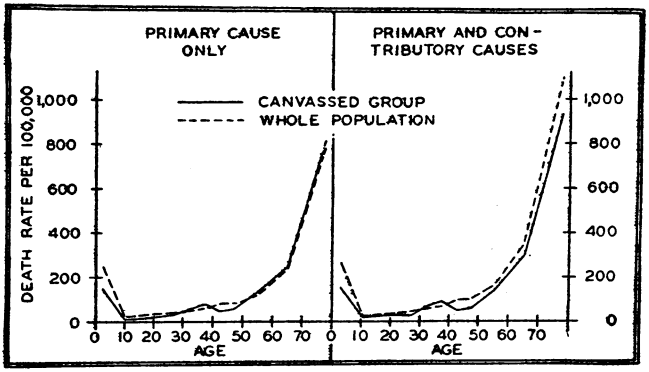

FIGURE 3.—Mortality from influenza and pneumonia at various ages in the canvassed and in the whole population of the 10 surveyed cities, epidemic of 1928–29.

Because of the small number of deaths in the canvassed population of each city, it is impossible to obtain reliable age curves for such populations. Inasmuch as the mortality in the whole city is similar to that in the canvassed group, it is expected in further data presented in this study to use the death rate in the total population as a substitute for the death rate in the canvassed portion of that population on the assumption that the death rate in the total population is fairly representative of what the real rate, apart from chance variation, would be in the canvassed groups.

As bearing on the second question of the representativeness of these 10 cities, table 6 shows death rates from influenza and pneumonia during the 12 weeks ending February 16, 1929, in the whole population of these 10 cities, in 95 cities (3) scattered throughout the United States and in 35 large cities (4). The table includes four measures of the extent of influenza and pneumonia mortality during this period: (*a*) The total influenza and pneumonia mortality during the 12 weeks, (*b*) the maximum weekly rate, (*c*) the total excess mortality from influenza and pneumonia during the 12 weeks, and (*d*) the maximum weekly

excess rate. All four of these measures indicate that the mortality of these 10 cities was considerably above that in the larger group of 95 cities, which itself was somewhat greater than in the 35 large cities. The best measure of the mortality attributable to the epidemic is the excess over what would normally be expected during these 12 weeks. The total excess in the 10 cities (58.1 per 100,000) was 31 percent greater than in the group of 95 cities (44.4 per 100,000). The relative disparity between the mortality in the 10 cities and that in the 95 cities is not so great when based on the total influenza and pneumonia death rate instead of the excess (21 percent), but the percentage difference between the maximum weekly rates (44 percent) and between the maximum weekly excess rates (64 percent) in the two groups of cities is even greater than that for the total excess rate. The indications are, therefore, that the mortality in these 10 cities is considerably higher than the average mortality in the urban part of the United States. The 10 cities include Pittsburgh, which, except for Birmingham, had the highest excess mortality of any of the larger cities in the United States during the 1928–29 epidemic (4). The excess mortality in Des Moines, New Orleans, and Cincinnati was also considerably above the average for the larger cities of the country. Whether the sickness rates in these 10 cities are as much above the average for the urban portion of the United States as are the death rates cannot be determined as there are no sickness data for any large group of cities. It is probably true, however, that the percentage excess in the sickness rates in these 10 cities, as compared with larger groups of cities, is much less than the percentages quoted for mortality.

TABLE 6.—*Comparison of the death rate from influenza and pneumonia in the whole population of the 10 surveyed cities with that of two larger groups of cities in the United States during the 12 weeks from November 25, 1928, to February 16, 1929*

	Rates per 100,000			Ratio of 10-city rate to 95-city rate (95-city rate=1.00)	Ratio of 10-city rate to 35-city rate (35-city rate=1.00)
	10 surveyed cities	95 cities	35 large cities		
Total influenza and pneumonia death rate per 100,000 in the 12 weeks	108	89	86	1.21	1.26
Maximum weekly influenza and pneumonia death rate per 100,000	17.9	12.4	11.1	1.44	1.61
Total excess [1] influenza and pneumonia death rate per 100,000 in the 12 weeks	58.1	44.4	40.8	1.31	1.42
Maximum weekly excess [1] influenza and pneumonia death rate per 100,000	13.8	8.4	7.1	1.64	1.94
Maximum rate occurred in the week ending	Jan. 5	Jan. 12	Jan. 12		

[1] Excess over an expected or normal rate based on the median rate for the same weeks during the 7-year period 1921–27.

Data for all three groups of cities based on current weekly reports published in the Public Health Reports.

CASE INCIDENCE OF INFLUENZA, GRIPPE, AND COLDS

The surveys in the different communities recorded illnesses during the period that the sickness and death rates seemed to be distinctly above normal. Reference to figure 1, showing the weekly incidence of influenzal conditions, will indicate that for the most part the surveys included only the weeks in which the sickness rates were distinctly high. However, there are normally so many cases of grippe and severe colds that it is hardly justifiable to compute case rates for periods of varying lengths in the different localities as representing the epidemic in that community unless there is some way to subtract from the total the expected incidence of influenza and grippe and obtain only the excess above the normal expectancy. As there are no data whatever upon which to base an expected sickness rate in these cities, it seemed that the fairest way to compare the actual incidence of respiratory conditions in the different communities was to pick out equal length periods representing the time of highest incidence of respiratory cases.[4] An examination of figure 1 indicates that a period of 10 weeks usually covers the time when the incidence of respiratory conditions was distinctly high. Likewise, a period of 10 weeks covers the time when the mortality from influenza and pneumonia was distinctly above normal, although the period when the mortality was above normal usually ends one to three weeks later than the period of the high incidence of respiratory cases. Table 7 gives incidence rates during the highest 10 weeks in each locality, the date of the 10-week period varying with the different communities in accordance with the indications afforded in figure 1. The first column in the table shows for this 10-week period the incidence of cases reported as influenza, grippe, pneumonia, and colds that caused the patient to go to bed.[5] The second column gives the incidence of influenza, grippe, and pneumonia, exclusive of all cases that were designated as colds.

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[4] Even this method leaves a seasonal factor in that part of the rate that represents the normal incidence and therefore overstates the extent of the epidemic in communities in which it occurred in January and February as compared with communities in which it occurred in November and December.

[5] For the 14 localities as a whole, 87 percent of the cases reported as influenza and 85 percent of the cases reported as grippe caused the patient to go to bed for one day or longer. Because of the varying terminology, it seemed that the comparison between the different communities would be more valid if the severe colds causing the patient to go to bed (35 percent of the cases reported as colds) were included with the other influenzal conditions. Of the cases reported as influenza, 96 percent were disabling (caused loss of time from the patient's usual occupation), as compared with 97 percent for grippe and 66 percent for all colds. Of the influenzas, 59 percent were attended by a doctor as compared with 65 percent for grippe, 39 percent for colds in bed, 11 percent for colds not in bed, and 21 percent for all colds.

TABLE 7.—*Incidence of respiratory conditions among canvassed families for the 10 consecutive weeks [1] with the highest respiratory case rates during the epidemic of 1928–29*

Locality	Case rates [2] per 1,000 persons canvassed						Number of persons canvassed	Date of beginning and end of 10-week period
	Influenza, grippe, pneumonia, and colds in bed	Influenza, grippe, and pneumonia	Influenza	Grippe	Colds in bed	Colds not in bed		
San Francisco	110	93	90.0	0.9	17.4	38.7	14,981	Oct. 14–Dec. 22, 1928.
Seattle	211	171	159.0	8.8	40.4	72.5	11,704	Nov. 18–Jan. 26, 1929.
Des Moines	298	265	246.1	12.4	33.1	122.4	9,774	Nov. 25–Feb. 2, 1929.
Kansas City, Mo	190	150	127.0	16.5	39.9	69.4	10,146	Nov. 18–Jan. 26, 1929.
Farmington, Mo	221	151	147.9	.8	70.3	111.1	1,224	Dec. 2–Feb. 9, 1929.
New Orleans	189	139	107.4	26.8	19.5	59.1	14,898	Nov. 25–Feb. 2, 1929.
Cincinnati	161	125	70.0	50.8	36.5	82.5	11,565	Dec. 2–Feb. 9, 1929.
Pittsburgh	179	136	84.9	43.3	43.5	62.9	15,785	Do.
Baltimore	130	108	24.5	78.8	22.1	10.9	16,445	Dec. 9–Feb. 16, 1929.
Syracuse	173	124	87.1	33.2	48.8	75.7	10,692	Dec. 2–Feb. 9, 1929.
Cattaraugus County	311	265	147.2	109.9	46.3	57.2	4,041	Dec. 23–Mar. 2, 1929.
Minor New York towns	282	252	201.6	44.8	30.2	47.0	2,322	Dec. 16–Feb. 23, 1929.
Boston	148	96	26.2	65.0	52.0	56.1	17,477	Do.
Minor Massachusetts towns.	174	134	34.0	96.3	40.2	49.3	10,139	Dec. 23–Mar. 2, 1929.
Great Barrington	212	156	62.4	88.5	56.1	74.6	2,532	Do.
Palmer	180	140	22.4	115.2	39.2	43.9	2,551	Do.
Saugus	157	126	19.3	102.1	30.8	39.0	2,536	Dec. 30–Mar. 9, 1929.
Nantucket	149	114	29.4	83.3	34.5	44.1	2,520	Dec. 23–Mar. 2, 1929.
All 10 cities [3]	169	135	95.1	35.7	34.4	61.1	133,467	
All localities [3]	175	141	94.1	42.0	35.4	60.3	151,193	

[1] Cases with unknown date of onset are excluded, but very few cases were of unknown onset except for colds *not* in bed.

[2] Rates in this table are summations of 10 weekly rates; at the beginning and end of the survey, four or more days of a calendar week were used as a week, the data being raised to a full 7-day basis. In several places the total period covered was about 10 weeks and the sum of the 10 weekly rates is about the same or fractionally greater than the whole period rate shown elsewhere. In the case of Cincinnati and Pittsburgh, only 9 weeks' data were collected, and the last week, ending Feb. 2, was counted twice to put these two cities on a 10-week basis.

[3] Weighted average of the rates for the localities included, the weights being proportional to the numbers of persons canvassed.

Considering only the 10 large cities with about 10,000 to 15,000 surveyed population, the case rate for the total influenza, grippe, pneumonia, and colds in bed for the 10 highest weeks varied from 110 per 1,000 persons canvassed in San Francisco, where there was little evidence of any sharp epidemic, to 298 per 1,000 in Des Moines, Iowa. The cases designated as influenza, grippe, or pneumonia varied from 93 per 1,000 in San Francisco to 265 per 1,000 in Des Moines. Although the highest and the lowest cities remain the same in these two categories, there is considerable difference in the order of the other cities; in other words, colds in bed also varied considerably in the different cities.

In general, the small towns and rural communities had higher case rates than the cities. The number of persons surveyed in these places was not large, and, of perhaps more importance, the surveyed rural places are not in the same sections of the country as the surveyed cities. For these reasons a comparison of the urban and rural rates does not seem justifiable. It might be noted, however, that the rate in Boston is somewhat below the rate in a group of

four minor towns in Massachusetts. This is true of the various categories in which the diseases are tabulated, except that the pneumonia rate and also the total death rate from influenza and pneumonia was higher in Boston than in the minor towns.

Considering the 10 cities combined, many more conditions were reported as influenza than as grippe. This might have been expected, since the instructions of the enumerators were to record a case as grippe only if the informant stated that she did not mean the same as influenza. In spite of these instructions, a large proportion of the cases are reported as grippe in several of the eastern cities, whereas in the West and Middle West very few cases are so designated. In San Francisco the grippe rate was less than 1 per 1,000, as against 90 per 1,000 for influenza, but in Baltimore the grippe rate was 79 per 1,000 as against 24 per 1,000 for influenza. In Boston the rate was 65 for grippe and 26 for influenza, and in each of the four minor towns of Massachusetts more cases were reported as grippe than as influenza. In all localities except Baltimore, Boston, and these Massachusetts towns, more cases were reported as influenza than as grippe. In a former article (1) data presented on the age curves of cases reported as grippe and as influenza indicated that with respect to age incidence the two diagnoses were identical. It will be remembered in connection with figure 2 that, with respect to chronology, influenza and grippe were also identical. It appears that so far as epidemiological evidence is concerned, cases designated as grippe were identical with those designated as influenza, and in the remainder of this study the two diagnoses will be considered as a unit.

Rates are also shown in table 7 for colds that caused the patient to go to bed and the minor colds that did not cause the patient to go to bed. In spite of the fact that the latter are more numerous than the colds in bed, a comparison with other studies of respiratory diseases (5) indicates that by no means all of the minor colds could be included in this figure—in fact, a single canvass in which illness was recorded for a period of 10 or more weeks would obviously miss a large proportion of the mild colds because the informant would have forgotten them. The weekly rates as shown in figure 2 indicate that, although there is a peak in the colds that did not cause the patient to go to bed which corresponds to the influenza peak, the rate in general is much higher in the last few weeks of the study period than in the earlier weeks. This suggests that a larger proportion of the recent colds were remembered and reported than was true of those occurring earlier. Quite a large part of the colds not in bed that were reported as occurring within the period of the survey were unknown as to the exact week of onset and are automatically excluded from the weekly tabulation and from the tabulation covering the 10 highest weeks. In the

instances of influenza, grippe, pneumonia, and even of colds in bed, the numbers of cases of unknown week of onset were negligible. Even if the colds not in bed with unknown date of onset be included, the incidence for the period of approximately 10 weeks would still be far below the expected incidence as indicated by reports (5) secured at more frequent intervals. Because of the incompleteness of colds not in bed, they are omitted from any further consideration in this study, which, by reason of the method of collecting the data, pertains primarily to the conditions of sufficient severity to have been remembered by the housewife for a period of one or two months.

AGE

Before proceeding to the consideration of the age curves in the different localities, it might be well to review the nature of the age

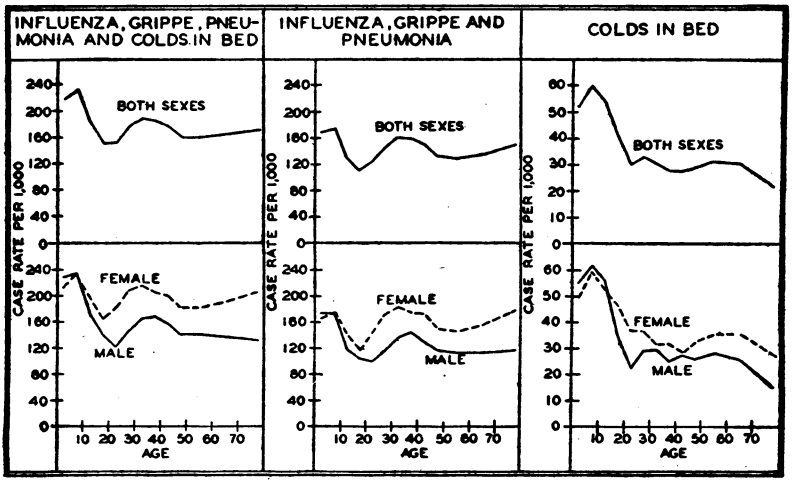

FIGURE 4.—Age and sex incidence of certain respiratory conditions in the 10 surveyed cities during the epidemic of 1928–29.

curve in the 10 cities as a whole. Table 8 and figure 4 show by age and sex the incidence of the total cases of influenza, grippe, pneumonia, and colds in bed; of influenza, grippe, and pneumonia only; and of colds in bed. Although the age curve of colds in bed is quite different from that of the cases designated as influenza and grippe, colds in bed do not represent a large proportion of the total and do not materially change the total curve from that of influenza, grippe, and pneumonia only.

TABLE 8.—*Age and sex incidence of certain respiratory conditions in the canvassed families in the 10 surveyed cities during the epidemic of 1928–29*

Age	Case rate per 1,000 persons canvassed									Number of persons canvassed		
	Influenza, grippe, pneumonia, and colds in bed			Influenza, grippe, and pneumonia			Colds in bed					
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages [1]	181	163	197	143	128	157	37.7	35.5	39.8	133,467	63,594	69,867
Under 5	222	229	215	169	173	165	52.3	55.1	49.5	11,001	5,540	5,459
5 to 9	234	234	234	174	173	175	60.5	61.7	59.4	12,044	5,978	6,066
10 to 14	184	172	195	129	117	142	54.5	55.6	53.5	11,391	5,651	5,740
15 to 19	152	139	164	111	104	117	41.1	34.7	46.9	11,195	5,307	5,888
20 to 24	154	121	181	124	98	144	30.6	22.6	37.0	11,489	5,134	6,355
25 to 29	179	145	207	146	116	170	33.4	29.3	36.7	10,735	4,841	5,894
30 to 34	191	164	215	161	135	183	30.7	29.5	31.8	10,932	5,083	5,848
35 to 39	187	168	206	159	143	174	28.4	25.0	31.7	11,110	5,393	5,717
40 to 44	178	157	199	150	130	170	28.3	27.6	28.9	9,981	4,998	4,983
45 to 49	162	142	182	133	116	149	29.5	26.0	32.7	8,076	3,883	4,192
50 to 59	161	141	181	129	112	145	32.0	28.2	35.5	12,238	5,948	6,290
60 to 69	166	137	190	135	112	154	31.1	25.7	35.7	6,952	3,197	3,755
70 and over	173	131	204	151	116	176	22.7	15.3	28.1	3,568	1,502	2,064

[1] All ages includes some of unknown age.

Table 9 and figure 5 show age curves for each surveyed locality. Because of the variation in the actual rates in the different communities, the data have been put on a ratio basis, being expressed as the ratio of the rate at each age to the rate for all ages. There is considerable variation from city to city in the nature of the age curve, but there are certain characteristics that persist in all of the cities. In general, the incidence is slightly less for children under 5 than it is for those from 5 to 9 years of age. In some of the cities the rate is as high under 5 years as it is from 5 to 9 years, or higher, but in all cities the rate in the whole group under 10 is higher than at later ages. After 10 years there is a rather sharp decrease to a minimum at about 15–24 years, with a second rise to a maximum at about 30–39 years, followed by another decline. The second peak at 30-39 years shows up fairly definitely in every city and town and seems to be the most characteristic part of the influenza age curve. In this respect the curve is considerably different from that of cases designated merely as colds. Considering the 10 cities as a whole, as shown in figure 4, there is a rise in the respiratory rate in the older ages, particularly among women; but the old age rise does not show up in every city in the curve for both sexes.

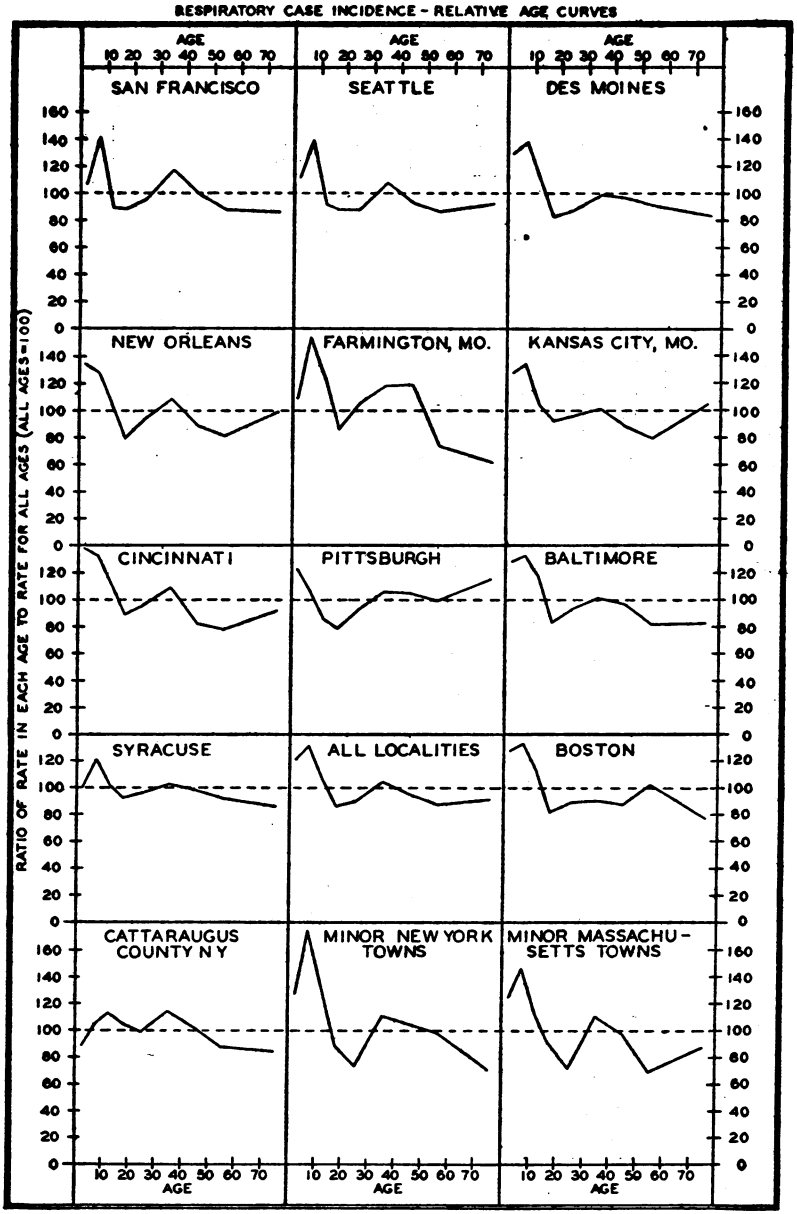

FIGURE 5.—Relative age incidence of respiratory cases in each surveyed locality during the epidemic of 1928-29. Respiratory cases include influenza, grippe, pneumonia, and colds in bed.

TABLE 9.—*Age and sex incidence of respiratory diseases during the epidemic of 1928–29 in canvassed families in certain localities in the United States*

[Case rates per 1,000 persons canvassed]

Age	Influenza, grippe, pneumonia, and colds in bed			Both sexes			Influenza, grippe, pneumonia, and colds in bed			Both sexes		
	Both sexes	Male	Female	Influenza, grippe, and pneumonia	Colds in bed	Number of persons canvassed	Both sexes	Male	Female	Influenza, grippe, and pneumonia	Colds in bed	Number of persons canvassed
	All surveyed localities						All 10 cities					
All ages	189	172	205	149	39.6	151,193	181	163	197	143	37.7	133,467
Under 5	229	237	221	175	53.7	12,565	222	229	215	169	52.3	11,001
5 to 9	248	245	252	184	64.1	13,798	234	234	234	174	60.5	12,044
10 to 14	200	186	213	140	59.7	13,197	184	172	195	129	54.5	11,391
15 to 19	163	151	175	119	43.8	12,780	152	139	164	111	41.1	11,195
20 to 29	170	139	195	137	33.0	24,508	166	133	193	134	31.9	22,224
30 to 39	198	174	220	167	30.5	24,491	189	166	211	160	29.6	22,042
40 to 49	180	158	201	149	30.6	20,193	171	150	191	142	28.8	18,057
50 to 59	167	148	184	135	32.1	14,020	161	141	181	129	31.9	12,238
60 and over	174	146	197	145	29.3	12,784	168	135	195	140	28.2	10,520
	San Francisco						Seattle					
All ages	161	150	171	126	34.5	14,981	222	200	242	179	42.5	11,704
Under 5	173	195	154	131	41.7	1,102	248	255	241	192	56.0	911
5 to 9	229	230	229	155	73.9	1,178	308	335	281	229	78.5	1,134
10 to 14	145	122	167	101	44.2	1,041	204	178	229	136	67.8	1,062
15 to 19	144	125	160	99	45.1	1,132	195	151	236	148	46.7	963
20 to 29	154	123	179	128	25.6	2,498	196	162	221	163	33.3	1,620
30 to 39	189	175	202	160	29.0	2,549	239	212	261	208	31.2	2,022
40 to 49	159	155	163	134	25.5	2,118	206	189	223	174	32.2	1,866
50 to 59	141	136	146	112	28.5	1,403	193	160	227	159	33.7	1,126
60 and over	140	112	165	108	31.7	1,169	207	154	258	182	24.9	965
	Des Moines						Kansas City, Mo.					
All ages	304	289	318	271	32.5	9,774	188	176	199	149	39.5	10,146
Under 5	394	367	421	351	43.5	804	241	247	234	180	60.6	742
5 to 9	418	412	423	363	55.4	830	254	243	265	189	65.4	764
10 to 14	325	314	335	277	48.4	806	195	185	204	135	60.1	766
15 to 19	251	244	258	209	42.1	784	174	166	181	124	50.4	754
20 to 29	266	232	291	234	32.2	1,555	180	151	202	148	32.3	1,609
30 to 39	305	289	321	283	21.8	1,606	191	190	192	158	33.3	1,923
40 to 49	295	284	306	273	21.9	1,415	165	153	178	136	29.3	1,469
50 to 59	278	292	264	247	30.9	1,002	150	131	169	117	32.7	1,009
60 and over	255	221	285	236	18.5	972	198	173	219	169	28.7	870
	Farmington, Mo.						New Orleans					
All ages	230	202	255	158	71.9	1,224	181	162	196	157	24.0	14,898
Under 5	250	245	256	187	62.5	96	242	257	227	211	30.7	1,336
5 to 9	355	302	426	228	127.3	110	231	243	220	193	38.2	1,389
10 to 14	283	230	346	168	115.0	113	188	176	201	154	33.6	1,222
15 to 19	198	208	191	132	66.1	121	143	128	155	118	25.5	1,253
20 to 29	242	258	233	175	66.7	165	169	132	195	150	18.8	2,879
30 to 39	271	226	308	192	78.6	140	196	164	223	175	21.0	2,335
40 to 49	273	190	343	203	70.3	128	159	131	185	141	18.1	1,769
50 to 59	169	143	195	111	58.4	154	147	101	188	136	10.5	1,051
60 and over	141	91	175	98	42.9	163	179	165	191	156	23.2	775

TABLE 9.—*Age and sex incidence of respiratory diseases during the epidemic of 1928–29 in canvassed families in certain localities in the United States*—Con.

Age	Influenza, grippe, pneumonia, and colds in bed			Both sexes			Influenza, grippe, pneumonia, and colds in bed			Both sexes		
	Both sexes	Male	Female	Influenza, grippe, and pneumonia	Colds in bed	Number of persons canvassed	Both sexes	Male	Female	Influenza, grippe, and pneumonia	Colds in bed	Number of persons canvassed
	Cincinnati						Pittsburgh					
All ages	159	138	179	124	35.1	11,565	181	158	202	139	42.3	15,785
Under 5	218	219	218	167	51.3	839	220	233	204	159	61.3	1,289
5 to 9	210	208	212	164	46.4	927	192	191	192	139	52.8	1,440
10 to 14	176	167	186	121	55.2	979	153	155	151	101	51.9	1,485
15 to 19	141	127	153	98	42.7	960	143	123	161	102	41.3	1,404
20 to 29	153	127	173	119	34.2	1,841	167	132	196	131	36.3	2,756
30 to 39	173	131	210	146	27.2	1,986	190	162	217	156	34.2	2,602
40 to 49	130	112	148	107	22.7	1,589	188	148	229	151	36.6	2,051
50 to 59	124	86	158	99	25.3	1,185	180	150	209	133	47.1	1,487
60 and over	146	119	165	113	33.5	1,193	209	151	253	177	32.1	1,183
	Baltimore						Syracuse					
All ages	138	118	157	113	24.6	16,445	177	164	190	126	50.8	10,692
Under 5	177	174	180	136	41.3	1,306	179	194	164	112	67.3	891
5 to 9	184	175	192	152	31.9	1,475	214	223	206	135	78.6	1,031
10 to 14	162	145	177	126	36.0	1,332	181	170	193	117	64.3	948
15 to 19	115	100	129	94	21.5	1,398	165	164	166	108	56.8	862
20 to 29	129	90	164	108	20.9	2,818	172	149	193	128	43.7	1,702
30 to 39	139	112	162	120	19.0	2,470	183	160	207	141	42.1	1,899
40 to 49	134	120	146	110	23.8	2,186	173	144	203	136	37.5	1,439
50 to 59	113	100	123	99	14.1	1,561	163	155	170	118	44.5	989
60 and over	115	77	144	94	20.9	1,434	152	131	169	111	40.9	831
	Cattaraugus Co.						Minor New York towns					
All ages	348	325	372	294	54.4	4,041	290	286	294	253	37.0	2,322
Under 5	306	326	284	254	52.3	363	368	388	347	335	32.9	152
5 to 9	362	335	389	275	87.1	459	506	484	533	446	60.2	166
10 to 14	389	308	464	276	113.3	512	378	349	404	308	70.3	185
15 to 19	362	314	413	295	67.0	373	254	262	246	203	50.7	217
20 to 29	341	328	357	291	50.3	457	212	201	225	177	35.3	312
30 to 39	394	361	422	367	27.1	553	320	359	280	297	23.4	256
40 to 49	353	358	347	323	29.9	502	302	248	340	273	29.1	275
50 to 59	303	309	297	265	37.9	396	285	276	293	242	43.3	277
60 and over	290	275	309	266	24.4	410	203	199	207	182	20.7	482
	Boston						Minor Massachusetts towns					
All ages	154	138	169	99	54.5	17,477	208	195	219	155	52.9	10,139
Under 5	197	204	189	126	70.7	1,781	257	272	242	189	68.2	953
5 to 9	205	198	212	118	86.9	1,876	303	271	335	220	83.4	1,019
10 to 14	173	170	175	94	79.4	1,750	236	242	230	155	81.3	996
15 to 19	126	130	122	74	51.6	1,685	188	175	198	129	59.5	874
20 to 29	137	103	167	89	48.2	2,886	148	136	160	109	38.5	1,350
30 to 39	140	118	160	103	37.4	2,650	228	195	257	186	42.0	1,500
40 to 49	136	107	163	97	39.4	2,155	201	165	232	151	50.4	1,231
50 to 59	158	119	195	107	51.2	1,425	144	143	144	121	23.0	955
60 and over	122	93	144	93	29.3	1,128	180	171	186	138	42.2	1,209

TABLE 9.—*Age and sex incidence of respiratory diseases during the epidemic of 1928–29 in canvassed families in certain localities in the United States*—Con.

Age	Influenza, grippe, pneumonia, and colds in bed			Both sexes			Influenza, grippe, pneumonia, and colds in bed			Both sexes		
	Both sexes	Male	Female	Influenza, grippe, and pneumonia	Colds in bed	Number of persons canvassed	Both sexes	Male	Female	Influenza, grippe, and pneumonia	Colds in bed	Number of persons canvassed
	Great Barrington, Mass.						Palmer, Mass.					
All ages	220	213	226	161	59.5	2,532	211	202	220	161	49.8	2,551
Under 5	289	299	280	196	92.8	194	279	287	270	206	73.0	233
5 to 9	321	266	376	233	88.4	249	324	327	321	236	88.0	284
10 to 14	231	217	248	144	86.8	242	192	231	155	145	47.1	276
15 to 19	165	174	159	108	56.5	230	236	227	243	168	68.0	250
20 to 29	179	187	173	118	60.8	296	145	133	157	118	26.9	372
30 to 39	238	214	260	207	31.4	382	235	174	285	198	36.7	354
40 to 49	233	199	263	181	52.3	287	215	184	244	142	72.8	316
50 to 59	156	152	159	125	31.1	257	101	112	91	83	18.4	217
60 and over	199	227	181	146	52.5	362	175	152	194	155	20.3	246
	Saugus, Mass.						Nantucket, Mass.					
All ages [1]	215	198	232	164	51.3	2,536	184	166	200	132	52.0	2,520
Under 5	277	295	255	245	32.1	249	199	214	185	120	79.4	277
5 to 9	325	258	400	242	83.3	252	235	214	252	162	72.6	234
10 to 14	313	302	326	211	101.9	265	202	210	194	108	93.9	213
15 to 19	198	171	223	129	69.0	232	130	107	149	93	37.0	162
20 to 29	118	105	131	91	27.3	330	153	129	178	110	42.6	352
30 to 39	230	217	242	179	50.6	395	209	172	243	160	48.8	369
40 to 49	170	135	201	131	39.4	330	188	147	222	151	36.9	298
50 to 59	134	153	114	125	8.6	232	177	150	199	145	32.1	249
60 and over	188	146	222	135	53.1	245	157	154	160	118	39.3	356

[1] All ages includes some of unknown age.

SEX

Figure 4 and table 8 show incidence rates by sex for the different categories of respiratory disease. It will be noted that, with the exception of the younger age groups, the rates for females are uniformly higher than those for males. The informant in the household was usually a woman and the record consists of respiratory conditions usually of a rather mild character that were remembered over a period of 2 to 3 months. Because of these facts the sex differences should be discounted somewhat as the informant would probably remember her own minor illnesses better than those of other members of the family.

Table 10 shows for each surveyed locality the case rates for males and females of all ages and the ratio of the rate for females to that for males. Considering the 10 surveyed cities, the differences in this sex ratio vary from 1.33 in Baltimore to 1.10 in Des Moines, Iowa. In other words, in Baltimore the female rate for influenza, grippe, pneumonia, and colds in bed is 33 percent higher than the rate for males, and in Des Moines the female rate is 10 percent higher than

the male rate, the other localities falling between these limits. If colds in bed are excluded from the total and we consider only influenza, grippe, and pneumonia, the result is not greatly different, the range in the ratios being from 1.35 in Cincinnati to 1.09 in Des Moines.

TABLE 10.—*Incidence of respiratory conditions among males and females in canvassed families during whole period* [1] *covered by the survey, epidemic of 1928–29*

Locality	Influenza, grippe, pneumonia, and colds in bed			Influenza, grippe, and pneumonia			Colds in bed			No. of persons canvassed		Number of weeks [1] covered by the sickness records
	Case rate per 1,000		Ratio of female to male rate (male rate = 1.00)	Case rate per 1,000		Ratio of female to male rate (male rate = 1.00)	Case rate per 1,000		Ratio of female to male rate (male rate = 1.00)			
	Male	Female		Male	Female		Male	Female		Male	Female	
San Francisco	150	171	1.14	117	136	1.16	33.8	35.1	1.04	7,150	7,827	14.0
Seattle	200	242	1.21	160	197	1.23	39.9	44.9	1.13	5,619	6,085	10.7
Des Moines	289	318	1.10	259	283	1.09	30.3	34.6	1.14	4,624	5,149	11.0
Kansas City, Mo	176	199	1.13	138	158	1.15	38.2	40.7	1.07	4,919	5,227	9.9
Farmington, Mo	202	255	1.26	141	174	1.23	61.5	80.9	1.32	569	655	10.3
New Orleans	162	196	1.21	138	172	1.25	24.0	24.0	1.00	6,866	8,031	13.9
Cincinnati	138	179	1.30	105	142	1.35	33.1	36.9	1.11	5,385	6,180	9.3
Pittsburgh	158	202	1.28	120	157	1.31	38.6	45.6	1.18	7,612	8,173	9.3
Baltimore	118	157	1.33	98	128	1.31	20.1	28.5	1.42	7,695	8,750	11.6
Syracuse	164	190	1.16	113	139	1.23	50.4	51.2	1.02	5,278	5,414	10.3
Cattaraugus County	325	372	1.14	280	308	1.10	45.0	64.1	1.42	2,044	1,997	13.0
Minor New York towns	286	294	1.03	255	250	.98	30.4	43.3	1.42	1,120	1,202	12.6
Boston	138	169	1.22	88	110	1.25	49.3	59.4	1.20	8,446	9,031	10.4
Minor Massachusetts towns	195	219	1.12	141	168	1.19	53.9	51.9	.96	4,820	5,319	12.9
Great Barrington	213	226	1.06	150	171	1.14	62.2	55.3	.89	1,157	1,375	11.3
Palmer	202	220	1.09	159	173	1.15	52.1	47.6	.91	1,228	1,323	12.3
Sauguss	198	232	1.17	150	178	1.19	48.2	54.2	1.12	1,245	1,291	14.6
Nantucket	166	200	1.20	111	149	1.34	53.8	50.4	.94	1,190	1,330	13.4
All 10 cities	163	197	1.21	128	157	1.23	35.5	39.8	1.12	63,594	69,867	11.1
All localities	172	205	1.19	135	163	1.21	37.3	41.8	1.12	72,147	79,040	11.3

[1] In each city the period for which sickness records were made included the weeks during which respiratory conditions appeared to be definitely above normal in that particular locality.

COLOR

In 6 of the surveyed localities the canvassed population included more than 500 colored people, and in 4 of the 6 the number of colored persons surveyed was above 1,000. Table 11 shows case rates for white and colored and the ratio of the colored to the white rate. Considering all 6 places together, the rate among colored for the total of influenza, grippe, pneumonia, and colds in bed was only 59 percent of the rate among whites. Considering only influenza, grippe, and pneumonia, the ratio was slightly higher, 64 percent. In every one of the six cities the rates as reported by the colored families were less than those reported by the white. It is probable, however, that some of the difference is due to less complete reporting

of respiratory attacks by the colored families. The canvassers were white, and with no experience in obtaining information from colored people they might have failed to get as complete a record of minor illnesses among the colored as among the white families. This assumption is somewhat strengthened by the fact, as will be seen in later sections, that the difference in white and colored rates is much less for pneumonia incidence and for influenza and pneumonia mortality than is true of the minor respiratory cases. On the other hand, it may be that minor respiratory cases actually occurred less frequently among the colored, but their severity as indicated by pneumonia complications and case fatality was greater.

TABLE 11.—*Incidence of respiratory conditions among white and colored canvassed families during the whole period* [1] *covered by the survey, epidemic of 1928–29*

City	Influenza, grippe, pneumonia, and colds in bed			Influenza, grippe, and pneumonia			Colds in bed			Number of persons canvassed		Number of weeks covered by the sickness records
	Case rate per 1,000		Ratio of colored to white rate (white rate=1.00)	Case rate per 1,000		Ratio of colored to white rate (white rate=1.00)	Case rate per 1,000		Ratio of colored to white rate (white rate=1.00)	White	Colored	
	White	Colored		White	Colored		White	Colored				
All 6 cities	174	103	0.59	134	86	0.64	39.9	16.6	0.42	75,403	10,913	10.9
New Orleans	205	123	.60	177	108	.61	28.0	14.5	.52	10,496	4,402	13.9
Baltimore	155	64	.41	127	55	.43	28.0	9.3	.33	13,440	3,005	11.6
Boston	157	103	.65	101	72	.71	56.1	30.7	.55	16,370	1,107	10.4
Pittsburgh	188	90	.48	144	75	.52	44.3	14.8	.33	14,705	1,080	9.4
Kansas City, Mo	191	156	.81	151	122	.81	40.0	33.6	.84	9,342	804	9.9
Cincinnati	162	107	.66	126	84	.66	35.7	23.3	.65	11,050	515	9.3

[1] In each city the period for which sickness records were made included the weeks during which respiratory conditions appeared to be definitely above normal in that particular locality.

THE FREQUENCY OF PNEUMONIA AS A COMPLICATION

Pneumonia occurred rather infrequently during the epidemic of 1928–29. However, its importance is so great that it cannot be overlooked. It can perhaps be assumed that the number of cases of pneumonia is rather complete, since the informant would hardly forget a case that occurred within the preceding 3 months. There were occasional reports of deaths from influenza in which pneumonia was not mentioned, but in the tabulations such severe cases have been considered as pneumonia. The best medical opinion seems to be that pneumonia probably intervenes in all influenza cases before death occurs.

TABLE 12.—*Incidence of pneumonia among canvassed families for the 10 consecutive weeks [1] with the highest respiratory case rates during the epidemic of 1928–29*

Locality	Pneumonia case rate[1] per 1,000	Percent of respiratory cases[2] complicated by pneumonia	Locality	Pneumonia case rate[1] per 1,000	Percent of respiratory cases[2] complicated by pneumonia
San Francisco	1.80	1.64	Cattaraugus County	7.91	2.54
Seattle	3.18	1.50	Minor New York towns	5.16	1.83
Des Moines	6.46	2.17	Boston	4.74	3.20
Kansas City, Mo	6.02	3.35	Minor Massachusetts towns	3.44	1.98
Farmington, Mo	2.46	1.11	Great Barrington	5.12	2.41
New Orleans	3.15	1.98	Palmer	2.73	1.52
Cincinnati	3.91	2.42	Saugus	4.72	3.01
Pittsburgh	7.80	3.23	Nantucket	1.59	1.07
Baltimore	4.55	3.50	All ten cities [3]	4.31	2.55
Syracuse	4.20	2.42	All localities [3]	4.56	2.60

[1] Rates in this table are summations of 10 weekly rates. (See notes to table 7 for details of computation.)
[2] Respiratory cases referred to include influenza, grippe, pneumonia, and colds in bed.
[3] Weighted average of the rates for the highest 10 weeks for each locality included, the weights being proportional to the numbers of persons canvassed.

As in the instance of influenza and grippe cases, there are no data for preceding years that can serve as any indication of the normal or expected pneumonia incidence in these cities. In the absence of such

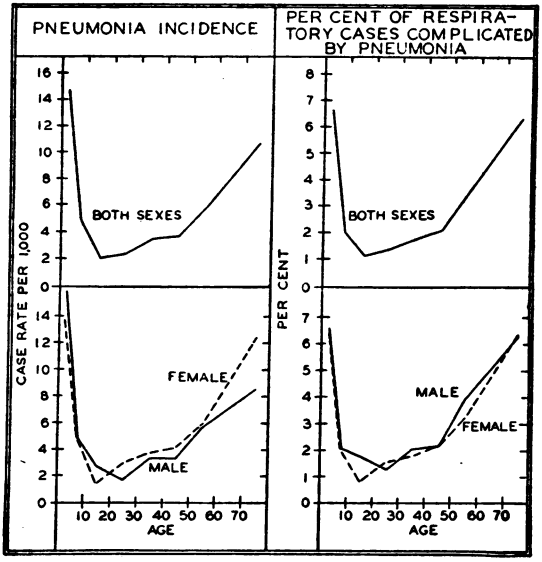

FIGURE 6.—Age and sex incidence of pneumonia in the 10 surveyed cities during the epidemic of 1928–29.

a normal that would enable us to compute an excess rate, the best available index of the extent of pneumonia during the epidemic appears to be the case rate during a period of the same length in each locality. Table 12, which shows the pneumonia rates and the proportion of respiratory cases complicated by pneumonia, is confined

to a 10-week period in each locality, the same as that indicated in table 7 as having the highest respiratory case rates. Considering the 10 cities as a whole the average of the pneumonia case rates for the highest 10 weeks in each city was 4.3 per 1,000 persons canvassed. In the different cities the rate varied from 7.8 in Pittsburgh to 1.8 per 1,000 in San Francisco. For the 10 cities as a whole, 2.6 percent of the respiratory cases with their onset in the 10 epidemic weeks were complicated by pneumonia; in other words, the pneumonia cases constituted 2.6 percent of the respiratory cases. This percentage varied in the 10 cities from 1.5 in Seattle to 3.5 in Baltimore.

AGE

Because of the peculiarly high incidence of pneumonia at young adult ages during the great pandemic of 1918–19, it is always a matter of considerable interest to determine the age curve of pneumonia in the smaller epidemics that have occurred since that time. Table 13 and figure 6 show for the 10 cities combined the incidence of pneumonia per 1,000 canvassed population at different ages and also the percentage of respiratory cases that were complicated by pneumonia. It will be noted that there is, unlike the 1918–19 epidemic, no indication of any young adult peak in the incidence of pneumonia during this epidemic. This comparison with the 1918–19 epidemic has already been considered in some detail in a preceding paper (1).

TABLE 13.—*Pneumonia incidence and mortality from influenza and pneumonia at different ages for each sex in the 10 surveyed cities during the whole period covered by the survey, epidemic of 1928–29*

Age	Pneumonia case rate per 1,000 persons canvassed			Percent of respiratory cases [1] complicated by pneumonia			Influenza and pneumonia death rate per 100,000 whole population		Estimated case fatality [2]: deaths per 100 cases of—				
									Respiratory conditions [1]		Pneumonia		
	Both sexes	Males	Females	Both sexes	Males	Females	Males	Females	Males	Females	Both sexes	Males	Females
All ages	4.88	4.73	5.01	2.70	2.90	2.55	100.6	96.3	0.62	0.49	20.2	21.3	19.2
Under 5	14.73	15.88	13.56	6.65	6.95	6.32	272.8	231.6	1.19	1.08	17.1	17.2	17.1
5 to 9	4.82	4.85	4.78	2.06	2.07	2.04	21.0	12.6	.09	.05	3.5	4.3	2.6
10 to 19	2.04	2.74	1.38	1.21	1.75	.77	18.2	20.2	.12	.11	9.4	6.6	14.6
20 to 29	2.38	1.70	2.94	1.44	1.28	1.52	38.1	33.0	.29	.17	14.9	22.4	11.2
30 to 39	3.54	3.34	3.72	1.87	2.01	1.77	56.9	53.7	.34	.25	15.6	17.0	14.4
40 to 49	3.71	3.27	4.14	2.17	2.17	2.17	88.2	75.6	.50	.40	22.1	27.0	18.3
50 to 59	5.72	5.55	5.88	3.55	3.95	3.25	134.2	99.6	.95	.55	20.5	24.2	16.9
60 and over	10.65	8.51	12.37	6.32	6.29	6.34	397.2	440.9	2.94	2.26	39.5	46.7	35.6

[1] Respiratory cases referred to include influenza, grippe, pneumonia, and colds in bed.
[2] Computed by relating the death rate in the whole population to the case rate in the canvassed population during the same period. Mortality data based on records copied from city health departments at time of survey.

Table 14 and figure 7 show in broad age groups the pneumonia age curve in the different localities surveyed. Because of considerable variation in actual rates, the data have been plotted on a relative basis in the form of the ratio of the rate at each age to

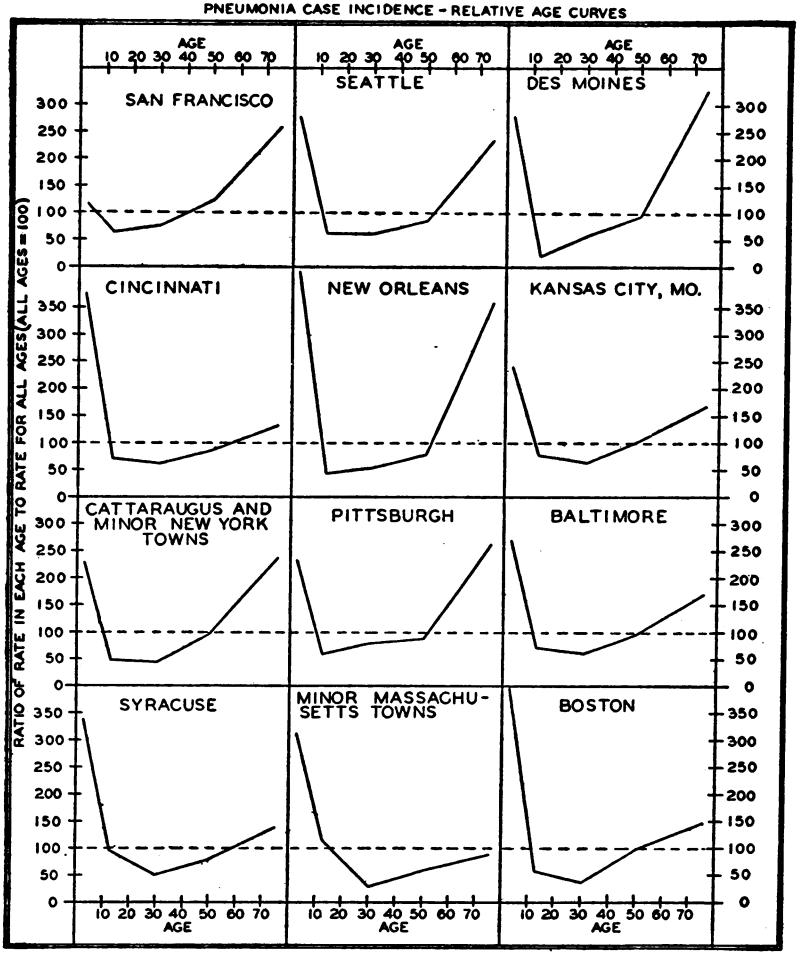

FIGURE 7.—Relative age incidence of pneumonia in each surveyed locality during the epidemic of 1928–29.

the rate for all ages. The numbers of cases of pneumonia are so small in the surveyed population of the individual cities that even in these broad age groups the curves can be taken as only very roughly indicating the nature of the age incidence of the disease. It will be noted, however, that there is no indication of a young adult peak in the pneumonia incidence in any locality.

TABLE 14.—*Age incidence of pneumonia during the epidemic of 1928–29 in canvassed families in certain localities in the United States*

Age	All localities [1]	All 10 cities	San Francisco	Seattle	Des Moines	Kansas City, Mo.	New Orleans	Cincinnati	Pittsburgh	Baltimore	Syracuse	Cattaraugus County and minor towns in New York	Boston	Minor Massachusetts towns
	Case rates per 1,000 persons canvassed													
All ages	5.00	4.88	2.34	3.59	6.75	6.21	3.62	3.80	8.11	4.80	4.30	8.49	5.38	4.73
Under 5	14.80	14.73	2.72	9.88	18.66	14.82	14.97	14.30	18.62	13.02	14.59	19.42	21.34	14.69
5 to 19	3.24	3.00	1.49	2.22	1.24	4.82	1.55	2.79	4.62	3.57	4.22	4.18	3.20	5.54
20 to 39	2.88	2.96	1.78	2.20	3.80	3.96	1.92	2.35	6.35	3.03	2.19	3.80	1.99	1.40
40 to 59	4.56	4.53	2.84	3.01	6.21	6.46	2.84	3.24	7.07	4.80	3.29	8.28	5.31	2.74
60 and over	10.64	10.65	5.99	8.29	21.60	10.34	12.90	5.03	21.13	8.37	6.02	20.18	7.98	4.14
	Number of cases													
All ages [2]	756	651	35	42	66	63	54	44	128	79	46	54	94	48
Under 5	186	162	3	9	15	11	20	12	24	17	13	10	38	14
5 to 19	129	104	5	7	3	11	6	8	20	15	12	8	17	16
20 to 39	141	131	9	8	12	14	10	9	34	16	8	6	11	4
40 to 59	156	137	10	9	15	16	8	9	25	18	8	12	19	6
60 and over	136	112	7	8	21	9	10	6	25	12	5	18	9	5

[1] All localities includes Farmington, Mo. (3 cases), which is not shown separately.
[2] All ages includes some of unknown age.

SEX

Table 13 and figure 6 show by age the pneumonia incidence and the percentage of respiratory cases complicated by pneumonia for the two sexes separately. In these curves for the 10 cities combined it will be noted that there is little difference between the sexes in the incidence of pneumonia; but what slight difference exists is in favor of the males, the rate for females being slightly above that for males in all of the age groups over 20 years. Expressed as a percentage of the respiratory cases, there is practically no difference between the sexes in the proportion of the cases that were complicated by pneumonia.

TABLE 15.—*Incidence of pneumonia among males and females in canvassed families during the whole period [1] covered by the survey, epidemic of 1928–29*

	Pneumonia case rate per 1,000			Percent of respiratory cases [2] complicated by pneumonia			Number of weeks [1] covered by the sickness records
	Male	Female	Ratio of female to male rate (male rate =1.00)	Male	Female	Ratio of female to male rate (male rate =1.00)	
San Francisco	2.80	1.92	0.69	1.86	1.12	0.60	14.0
Seattle	3.92	3.29	.84	1.96	1.36	.69	10.7
Des Moines	6.06	7.38	1.22	2.10	2.32	1.10	11.0
Kansas City, Mo	5.08	7.27	1.43	2.89	3.65	1.26	9.9
Farmington, Mo	1.76	3.05	1.73	.87	1.20	1.38	10.3
New Orleans	4.22	3.11	.74	2.60	1.59	.61	13.9
Cincinnati	3.71	3.88	1.05	2.70	2.17	.80	9.3
Pittsburgh	7.09	9.05	1.28	4.48	4.48	1.00	9.3
Baltimore	4.68	4.91	1.05	3.98	3.14	.79	11.6
Syracuse	3.98	4.62	1.16	2.43	2.43	1.00	10.3
Cattaraugus County	10.27	10.52	1.02	3.16	2.83	.90	13.0
Minor New York towns	7.14	3.33	.47	2.50	1.13	.45	12.6
Boston	5.45	5.32	.98	3.96	3.14	.80	10.4
Minor Massachusetts towns	4.56	4.89	1.07	2.35	2.23	.95	12.9
Great Barrington	5.19	5.09	.98	2.44	2.25	.92	11.3
Palmer	3.26	4.54	1.39	1.61	2.06	1.28	12.3
Saugus	6.43	7.75	1.21	3.24	3.34	1.03	14.6
Nantucket	3.36	2.26	.67	2.03	1.13	.56	13.4
All 10 cities	4.73	5.01	1.06	2.90	2.55	.88	11.1
All localities	4.89	5.10	1.04	2.84	2.49	.88	11.3

[1] In each city the period for which sickness records were made included the weeks during which respiratory conditions appeared to be definitely above normal in that particular locality.
[2] Respiratory cases referred to include influenza, grippe, pneumonia and colds in bed.

Table 15 shows pneumonia rates for each surveyed locality for males and females of all ages and the ratio of the rate among females to that among males. Considering the 10 cities, these sex ratios vary from 1.43 for Kansas City to 0.69 for San Francisco, with an average for all 10 cities of 1.06. Similarly, in the percentage of respiratory cases complicated by pneumonia, the indications are that there is little or no difference between the sexes.

COLOR

Table 16 shows for the six cities in which 500 or more colored persons were surveyed the pneumonia rates for white and colored and the percentage of cases that were complicated by pneumonia. Considering all six of these cities together, the colored case rate was 5.5 per 1,000, as compared with 5.3 for the white, an incidence that was practically identical in the two races. In New Orleans, where the largest number of colored persons was surveyed, the pneumonia incidence among the colored was 40 percent in excess of the white rate; but in Baltimore, the other city with a large colored population, the

rate was only 5 percent in excess of the white rate. The large excess of the white respiratory rate over the colored has already been considered. When the pneumonia cases that occurred with about an equal frequency in the two races are related to the respiratory cases, the result indicates that the proportion of respiratory cases that were complicated by pneumonia is much greater among the colored than among the white. Among the white in these six cities the pneumonia cases constituted 3.1 percent of the respiratory cases, as compared with 5.3 percent among colored persons, an excess of 75 percent for the colored race. This may be a real difference indicating a greater probability of a minor respiratory condition progressing into pneumonia among the colored, or it may be merely an indication of the incompleteness with which minor respiratory conditions were reported among the colored race.

TABLE 16.—*Incidence of pneumonia among white and colored canvassed families during the whole period [1] covered by the survey, epidemic of 1928–29*

	Pneumonia case rate per 1,000			Percent of respiratory cases [2] complicated by pneumonia			Number of weeks covered by the sickness records
	White	Colored	Ratio of colored to white rate (white rate = 1.00)	White	Colored	Ratio of colored to white rate (white rate = 1.00)	
All 6 cities	5.33	5.50	1.03	3.06	5.34	1.75	10.9
New Orleans	3.24	4.54	1.40	1.58	3.70	2.34	13.9
Baltimore	4.76	4.99	1.05	3.07	7.77	2.53	11.6
Boston	5.38	5.42	1.01	3.42	5.26	1.54	10.4
Pittsburgh	8.16	7.41	.91	4.35	8.25	1.90	9.4
Kansas City, Mo	5.78	11.19	1.93	3.03	7.20	2.38	9.9
Cincinnati	3.80	3.88	1.02	2.35	3.63	1.54	9.3

[1] In each city the period for which sickness records were made included the weeks during which respiratory conditions appeared to be definitely above normal in that particular locality.
[2] Respiratory cases referred to include influenza, grippe, pneumonia, and colds in bed.

MORTALITY AND CASE FATALITY

Table 17 shows the mortality from influenza and pneumonia in the whole population of the 10 surveyed cities during the 10 consecutive weeks with the highest excess death rates from those causes. The table also shows the excess over the expected mortality during this 10-week period, the expected, or normal, being based on the median rates in the given city for the same season of the year during the 7 years 1921–1927.

TABLE 17.—*Mortality from influenza and pneumonia in the whole populations of surveyed cities during the 10 consecutive weeks with the highest excess influenza-pneumonia death rates during the epidemic of 1928–29*

City	Death rate per 100,000 from influenza and pneumonia		Date of beginning and end of 10-week period	City	Death rate per 100,000 from influenza and pneumonia		Date of beginning and end of 10-week period
	Total	Excess [1]			Total	Excess [1]	
			1928–29				1928–29
San Francisco	39.4	20.8	Oct. 28–Jan. 5	Pittsburgh	199.8	145.5	Dec. 9–Feb. 16.
Seattle	56.2	37.8	Nov. 25–Feb. 2	Baltimore	104.5	44.5	Dec. 23–Mar. 2.
Des Moines	98.5	78.6	Dec. 2–Feb. 9	Syracuse	74.1	43.9	Dec. 16–Feb. 23.
Kansas City, Mo.	84.4	49.9	do	Boston	98.3	55.2	Dec. 30–Mar. 9.
New Orleans	131.4	84.2	Nov. 25–Feb. 2	All 10 cities [2]	103.5	64.7	
Cincinnati	119.8	77.3	Dec. 16–Feb. 23				

[1] Excess over a normal or expected rate based on the median for the same season during the years 1921–27. See footnote to table 2 for further details. Because the actual weekly rates both before and after the epidemic period were below the expected weekly rates (see table 2), the following corrections in the expected weekly mortality were made in computing the total excess mortality: San Francisco, 0.50; Des Moines, 1.00; Kansas City, 0.50; Pittsburgh, 2.00. In other words, the excess mortality for each week was measured from an expected rate that was less, by the amount of the correction, than the median for the corresponding week for the period 1921–27.

[2] Weighted average of the rates for the 10 cities, weights being proportional to the size of the canvassed population of the city. Since these are averages of rates for the *highest* 10 weeks in each city, they give a higher total than a cumulation of weekly rates for the cities as a whole, as in table 6, where the same calendar weeks are used for every city. Moreover, for certain cities a correction (see note above) was made in the median mortality used as an expected rate; but in the data for the 10 cities as a unit, no correction was necessary. This correction changes the excess, but not the total, rate.

The data in this table are summarized from table 2, which is based on current weekly reports published in the Public Health Reports and in the Weekly Health Index of the Bureau of the Census. A comparison of these provisional deaths with more final tabulations based on records copied from the city health departments at the time of the survey indicates some discrepancies between the two sets of data. Comparing the provisional weekly reports with deaths credited *primarily* to influenza or pneumonia for the whole period of the survey, in 5 of the 10 cities the provisional weekly reports exceeded the other figures by 8 to 36 percent. In the other 5 cities the provisional results were within 5 percent above or below the more final figures. The provisional results for the 10 cities combined were 7 percent above the other figures. The discrepancies appear to be largely due to reporting pneumonias that in the final tabulations are not classed as *primary* causes of death.

Mortality rates in table 18 are for the whole period for which illness was recorded, but for the reasons given above are generally lower than those in this table.

The total influenza and pneumonia mortality in these 10 cities during the 10 weeks varied from 39 per 100,000 in San Francisco to 200 per 100,000 in Pittsburgh. The excess varied from 21 per 100,000 in San Francisco to 146 per 100,000 in Pittsburgh. The fact that the mortality in these 10 cities is considerably above the average in larger groups of cities has been discussed in a preceding section.

For the 10 cities as a whole the indications are that about one half of 1 percent of the cases were fatal (0.54). This figure varied in the different cities from 0.22 in Des Moines to 0.94 percent in Pittsburgh.

AGE

Table 18 shows for each city the mortality rates by age in the whole population and an estimated case fatality rate by age which was obtained by relating the mortality in the whole city to the case incidence in the canvassed portion of the same city. Figure 8 shows for the 10 cities combined these mortality and case fatality rates and also the case fatality of pneumonia obtained by a similar method.

Figures 9 and 10 show similar rates for each of the 10 surveyed cities, figure 9 referring to mortality rates and figure 10 to the estimated case fatality of respiratory conditions. In both figures the

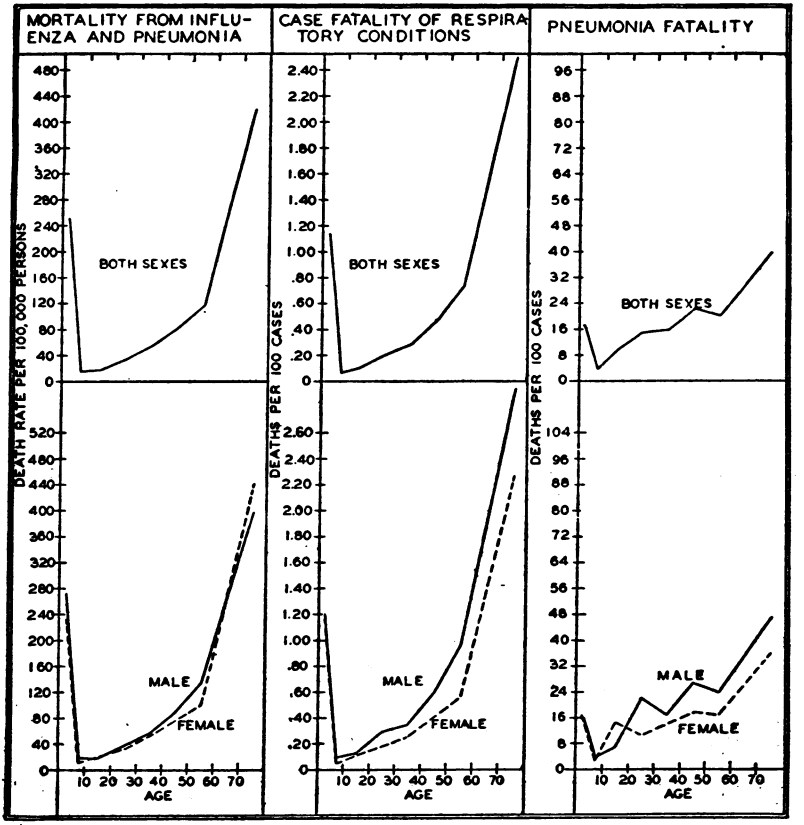

FIGURE 8.—Mortality and case fatality of influenza and pneumonia for various age and sex groups in the 10 surveyed cities during the epidemic of 1928–29. (See tables 13 and 18 for details of computation. Vertical scales arranged so that rate for all ages plots at same height from base line on each chart.)

data are plotted on a relative basis in the form of the ratio of the rate at each age to the rate for all ages. As noted in connection with pneumonia incidence, there is in none of these curves any indication of high rates in the young adult ages.

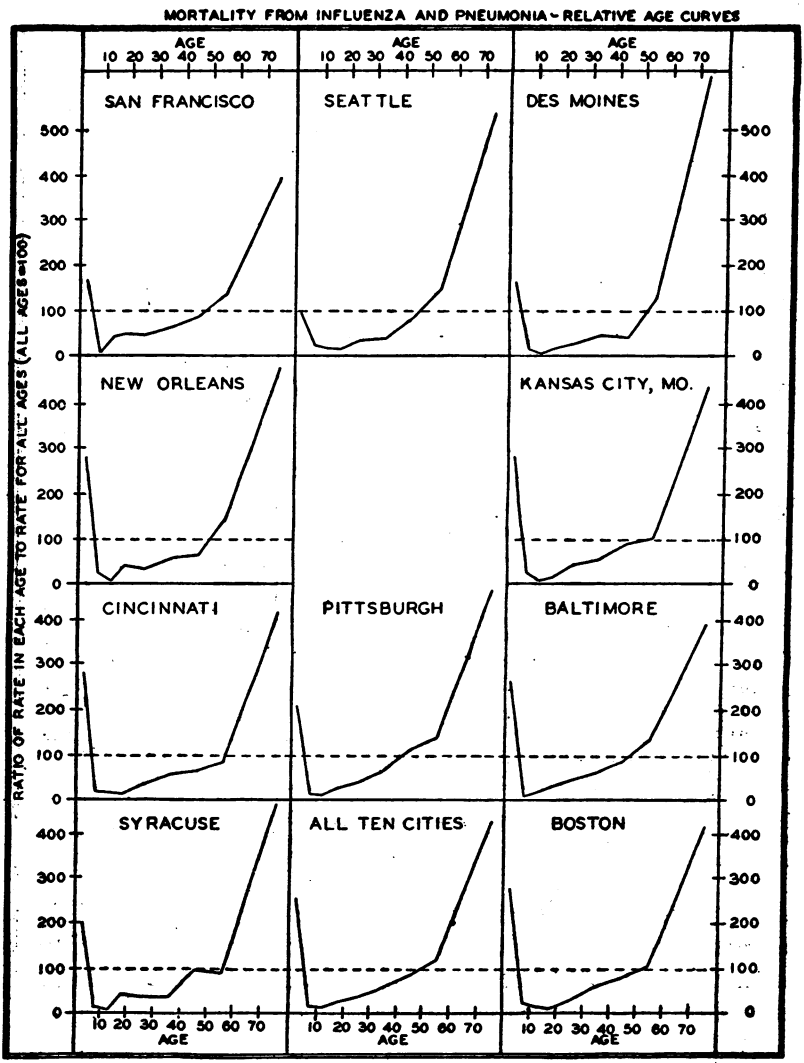

FIGURE 9.—Relative mortality from influenza and pneumonia at various ages in the whole population of each surveyed city during the epidemic of 1928–29.

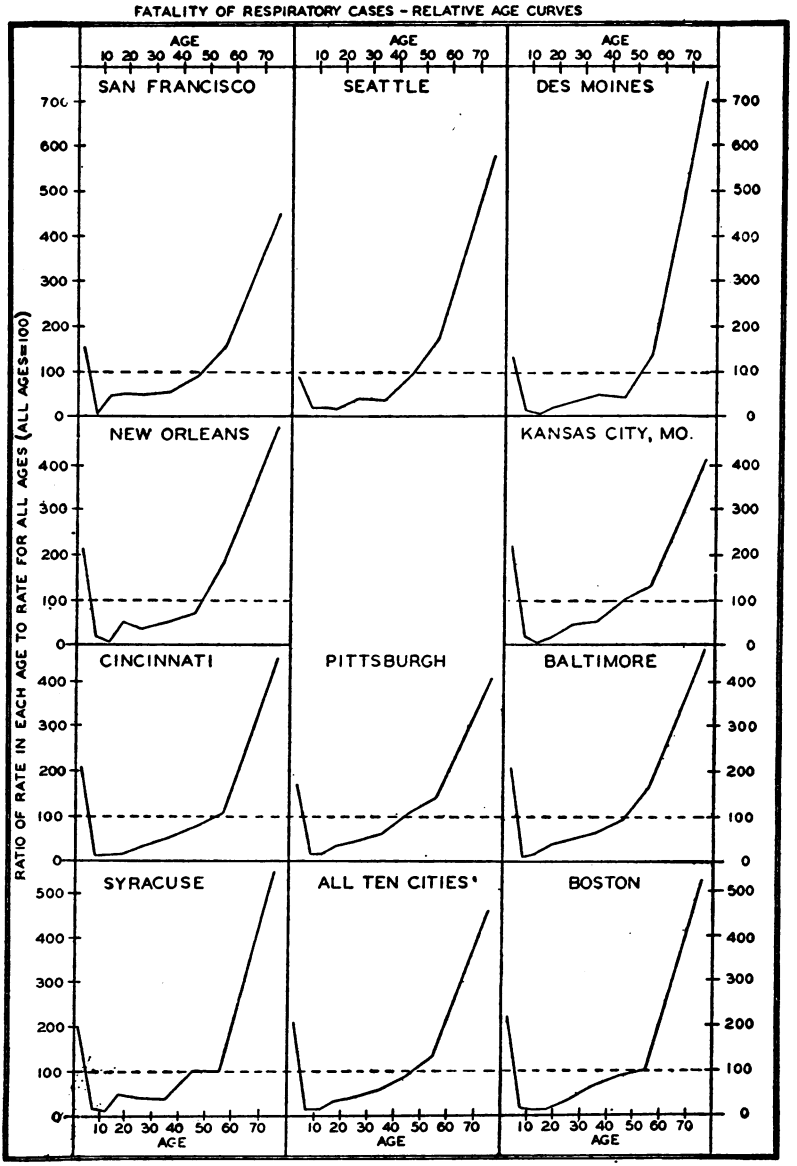

FIGURE 10.—Relative fatality of respiratory conditions at various ages in each surveyed city during the epidemic of 1928–29. (See table 18 for details of computation.)

TABLE 18.—*Mortality and estimated case fatality from influenza at different ages in each of the 10 surveyed cities during the epidemic of 1928–29*

Age	All 10 cities	San Francisco	Seattle	Des Moines	Kansas City, Mo.	New Orleans	Cincinnati	Pittsburgh	Baltimore	Syracuse	Boston
	Estimated case fatality : deaths per 100 respiratory cases [1]										
All ages	0.544	0.258	0.246	0.222	0.436	0.658	0.630	0.943	0.788	0.393	0.652
Under 5	1.137	.398	.207	.279	.958	1.375	1.310	1.606	1.632	.778	1.437
5 to 9	.072	.012	.038	.020	.083	.122	.084	.118	.045	.053	.118
10 to 14	.073	.116	.088	-------	.020	.044	.089	.128	.109	.031	.080
15 to 19	.163	.132	.036	.034	.059	.335	.102	.305	.272	.183	.085
20 to 29	.214	.121	.088	.060	.181	.236	.215	.383	.364	.151	.212
30 to 39	.293	.136	.082	.096	.224	.342	.327	.556	.478	.141	.428
40 to 49	.480	.225	.219	.090	.443	.470	.490	1.020	.708	.385	.567
50 to 59	.727	.392	.414	.296	.556	1.188	.673	1.309	1.297	.385	.661
60 and over	2.503	1.156	1.409	1.635	1.799	3.193	2.841	3.804	3.696	2.143	3.430
	Estimated pneumonia fatality : deaths per 100 pneumonia cases [2]										
All ages	20.2	17.7	15.2	10.0	13.2	32.9	26.4	21.0	22.7	16.2	18.7
	Influenza and pneumonia death rate per 100,000 [3]										
All ages	98.4	41.5	54.5	67.6	81.9	119.1	100.2	170.7	108.8	69.5	100.4
Under 5	252.5	68.9	51.2	110.0	230.9	332.7	285.6	353.3	288.9	139.3	283.2
5 to 9	16.8	2.7	11.6	8.2	21.1	28.2	17.6	22.7	8.3	11.4	24.2
10 to 14	13.5	16.8	7.8	-------	3.8	8.2	15.7	19.6	17.6	5.7	13.9
15 to 19	24.7	19.1	7.1	8.6	10.3	48.0	14.4	43.7	31.2	30.1	10.7
20 to 29	35.5	18.7	17.2	15.9	32.6	39.9	32.9	64.0	46.9	25.9	29.0
30 to 39	55.3	25.8	19.7	29.3	42.7	67.1	56.6	105.6	66.4	25.7	60.0
40 to 49	82.1	35.8	45.2	26.4	71.6	74.7	63.7	191.8	94.9	66.5	77.2
50 to 59	117.1	55.2	79.9	82.1	83.4	174.7	83.5	235.7	146.6	62.8	104.4
60 and over	420.4	161.8	291.6	416.8	356.1	571.6	414.9	795.1	425.0	325.8	418.5
	Number of deaths from influenza and pneumonia [3]										
All ages [4]	4,772	257	196	95	320	536	446	1,133	866	143	780
Under 5	906	22	11	12	59	126	93	200	185	22	176
5 to 9	67	1	3	1	6	12	6	14	6	2	16
10 to 14	51	6	2	-------	1	3	5	12	12	1	9
15 to 19	98	8	2	1	3	19	5	27	21	5	7
20 to 29	319	23	11	4	25	36	27	76	68	9	40
30 to 39	470	32	13	7	32	52	43	116	90	9	76
40 to 49	557	36	25	5	41	43	40	167	99	19	82
50 to 59	551	38	32	11	32	64	38	138	104	13	81
60 and over	1,750	90	96	54	121	180	189	383	281	63	293

[1] Percentage that death rate in the whole population is of the case rate for influenza, grippe, pneumonia, and colds in bed in the canvassed population during the same period. The length and date of the period varied in different localities. (See tables 1 and 10 for dates and lengths of periods.) Deaths refer to those occurring within this period regardless of the onset of the case causing death.

[2] Percentage that death rate in the whole population is of the pneumonia case rate in the canvassed population during the same period.

[3] In the whole population of the city, including only deaths due primarily to influenza or pneumonia. Mortality data based on records copied from city health departments at time of survey.

[4] All ages includes a few of unknown age.

SEX

Table 13 and figure 8 contain, for the 10 cities combined, mortality and case fatality rates by age and sex. Apparently there is very little difference between the sexes with respect to mortality from influenza and pneumonia. Although the rates in these 10 cities are slightly higher for males from 20 to 60 years of age, the rate for females above

60 is slightly above that for males. When the deaths are related to the respiratory cases, it appears that for all ages above 5 years the percentages of cases that are fatal are slightly greater for males than for females. It has already been mentioned that the informants were usually women and they may have remembered their own minor illnesses better than those of others in the household. The excess in the case fatality for males may be an expression of the greater completeness of minor respiratory cases for the females rather than any real difference in the percentage of cases that terminated fatally in the two sexes. Considering pneumonia fatality, however, the same error would not seem to be present, since it probably can be assumed that pneumonia was rather completely reported to the canvassers. It will be noted that for all ages above 20 years pneumonia fatality was slightly higher for males than for females.

TABLE 19.—*Mortality from influenza and pneumonia among males and females in the whole populations of surveyed cities during the whole period [1] for which illness was recorded, epidemic of 1928–29*

City	Death rate per 100,000 from influenza and pneumonia			Estimated case fatality; [2] deaths per 100 respiratory cases			Estimated pneumonia fatality: deaths per 100 pneumonia cases			Number of weeks [1] covered by the sickness and mortality records
	Male	Female	Ratio of female to male rate (male rate =1.00)	Male	Female	Ratio of female to male rate (male rate =1.00)	Male	Female	Ratio of female to male rate (male rate =1.00)	
San Francisco	45.2	37.4	0.83	0.30	0.22	0.73	16.1	19.5	1.21	14.0
Seattle	62.9	46.0	.73	.31	.19	.61	16.0	14.0	.85	10.7
Des Moines	72.6	63.0	.87	.25	.20	.80	12.0	8.5	.71	11.0
Kansas City, Mo	81.6	82.3	1.01	.46	.41	.89	16.1	11.3	.70	9.9
New Orleans	120.4	117.9	.98	.74	.60	.81	28.5	37.9	1.33	13.9
Cincinnati	95.4	104.8	1.10	.69	.59	.86	25.7	27.0	1.05	9.3
Pittsburgh	171.1	170.2	.99	1.08	.84	.78	24.1	18.8	.78	9.3
Baltimore	118.5	99.4	.84	1.00	.63	.63	25.3	20.2	.80	11.6
Syracuse	72.6	66.5	.92	.44	.35	.80	18.2	14.4	.79	10.3
Boston	100.7	100.1	.99	.73	.59	.81	18.5	18.8	1.02	10.4
All 10 cities	100.6	96.3	.96	.62	.49	.79	21.3	19.2	.90	11.1

[1] In each city the period for which sickness records were made included the weeks during which respiratory conditions appeared to be definitely above normal in that particular locality.
[2] Computed by relating the death rate in the whole population to the case rate in the canvassed population of the city. Respiratory cases include influenza, grippe, pneumonia, and colds in bed.

Mortality data based on records copied from city health departments at time of survey.

Table 19 shows for all ages combined the death rate from influenza and pneumonia among males and females and the case fatality estimated by the method already described. For the 10 cities combined the influenza and pneumonia mortality for females was 96 percent of that for males, this female-male ratio ranging in the different cities from 73 percent in Seattle to 110 percent in Cincinnati. The case fatality of respiratory conditions for females was 79 percent of that for males, with a range in this female-male ratio from 61 percent in Seattle to 89 percent in Kansas City. The case fatality of pneumonia in the 10 cities combined was for females 90 percent of that for males, with a range in this female-male ratio from 70 percent in Kansas City to 133 percent in New Orleans.

COLOR

Table 20 compares white and colored persons with respect to mortality and case fatality in six cities with 500 or more colored persons in the surveyed population. Considering the whole population of the six cities combined, the colored death rate from influenza and pneumonia during the period of the epidemic was 56 percent higher than the white rate. In every one of these six cities the colored death rate was higher than the white, the excess for colored ranging from 26 percent in Boston to 101 percent in Kansas City. As regards the proportion of respiratory cases that were fatal, the indications are that in the six cities combined, 2.7 times as many cases were fatal among colored as among white patients, the ratio varying in the different cities from 1.9 in Boston to 4.2 in Baltimore. Mention has already been made of the possibility that the minor respiratory cases were less completely reported to the canvassers by the colored families than by the white, and, if such was the case, a part or all of this large excess in the indicated case fatality would be due to the incompleteness of respiratory cases. However, the indications are that pneumonia, which was presumably well reported by both races, was also considerably more fatal to colored than to white patients. Considering the six cities combined, the estimated pneumonia fatality of colored patients is indicated as 51 percent in excess of the fatality of white patients. In every one of these cities the colored pneumonia fatality is in excess of that of the whites, the relative excess ranging from 4 percent in Kansas City to 68 percent in Baltimore. In New Orleans, where, like Baltimore, the number of surveyed Negroes was large, the excess was only 12 percent.

TABLE 20.—*Mortality from influenza and pneumonia among white and colored in the whole populations of surveyed cities during the whole period [1] for which illness was recorded, epidemic of 1928–29*

City	Death rate per 100,000 from influenza and pneumonia			Estimated case fatality [2]: deaths per 100 respiratory cases			Estimated pneumonia fatality: deaths per 100 pneumonia cases			Number of weeks [1] covered by sickness and mortality records
	White	Colored	Ratio of colored to white rate (white rate =1.00)	White	Colored	Ratio of colored to white rate (white rate =1.00)	White	Colored	Ratio of colored to white rate (white rate =1.00)	
All 6 cities	108.4	168.8	1.56	0.62	1.64	2.65	20.3	30.7	1.51	10.9
New Orleans	102.3	161.0	1.57	.50	1.31	2.62	31.6	35.5	1.12	13.9
Baltimore	95.9	168.6	1.76	.62	2.63	4.24	20.1	33.8	1.68	11.6
Boston	99.6	125.5	1.26	.63	1.22	1.94	18.5	23.1	1.25	10.4
Pittsburgh	164.9	234.5	1.42	.88	2.61	2.97	20.2	31.6	1.56	9.4
Kansas City, Mo	74.1	148.6	2.01	.39	.96	2.46	12.8	13.3	1.04	9.9
Cincinnati	94.0	151.9	1.62	.58	1.42	2.45	24.7	39.1	1.58	9.3

[1] In each city the period for which sickness records were made included the weeks during which respiratory conditions appeared to be definitely above normal in that particular locality.

[2] Computed by relating the death rate in the whole population to the case rate in the canvassed population of the city. Respiratory cases include influenza, grippe, pneumonia, and colds in bed.

Mortality data based on records copied from city health departments at time of survey.

SUMMARY

This paper summarizes the extent and severity of the morbidity and mortality from influenza and related conditions for different age, sex, and color groups in each of 14 localities surveyed immediately after the epidemic of 1928–29. From 10,000 to 15,000 persons were included in each of the 10 cities surveyed and the total population covered was more than 150,000.

Chronologically, the high incidence of respiratory conditions was paralleled in every community by an excess mortality from influenza and pneumonia with its peak 1 to 2 weeks after the morbidity peak. A high morbidity peak, however, did not necessarily indicate a high mortality peak for the same community. In one surveyed city, San Francisco, neither the morbidity nor mortality showed any definite peak (fig. 1).

Considering the different diagnoses as reported by the households, the chronological variations in the incidence of influenza, grippe, pneumonia, and colds in bed were all similar, with peaks in the same week (fig. 2). In the eastern cities the diagnosis of grippe was more frequent than in the west, where the designation of influenza was more common.

For the 10 highest weeks of the epidemic the case rate for influenza and related conditions varied in the different cities from 110 to 298 per 1,000.

There is considerable variation in the age curve of influenzal conditions in the different localities, but nearly all places show a double peak in the curve, the first at 5–9 and the second at 30–39 years of age (fig. 5).

The case rate for influenzal conditions for females was 19 percent above that for males. The female rate was consistently higher in the different localities. Under 10 years of age the rates for males and females were approximately the same. Part of the difference in the adult ages may be due to more complete reporting of their own minor illnesses by the adult women, who were usually the informants.

The case rate for influenzal conditions for colored persons was 41 percent less than for whites in the same cities. The lower colored rate was consistently true in the various cities. How much if any of the difference was due to poorer reporting to the canvasser on the part of the colored families cannot be determined.

For the 10 highest weeks of the epidemic the pneumonia case rate varied in the 10 cities from 1.8 to 7.8 per 1,000 persons canvassed. The proportion of respiratory cases complicated by pneumonia varied in the 10 cities from 1.5 to 3.5 percent.

Pneumonia showed no peak at the young adult ages. The highest rates were for the youngest and oldest age groups (fig. 7).

There was little difference between the sexes in pneumonia incidence, the female rate being 6 percent above the male rate. In the adult ages the rate for females was slightly higher than for males, but the reverse was true under 20 years of age (fig. 6).

There was little difference in the pneumonia incidence among white and colored persons, the colored rate being 3 percent above the white in the same cities.

The mortality from influenza and pneumonia during the 10 highest weeks of the epidemic varied in the different cities from 39 to 200 per 100,000. The ratio of the highest to the lowest city of more than 5 to 1 may be contrasted with the ratio of less than 3 to 1 for respiratory cases. In pneumonia incidence, however, the ratio was 4.3 to 1, or nearly the same as for mortality.

The indicated case fatality for respiratory conditions varied from 0.22 to 0.94 percent, and the pneumonia fatality varied from 10 to 33 percent in the different cities.

Neither the mortality nor the estimated case fatality showed any peak at the young adult ages. The highest rates came at the oldest ages and the next highest at the youngest ages (figs. 9 and 10).

Mortality from influenza and pneumonia for males and females was about the same.

The mortality rate for the colored population was 56 percent higher than for the white population of the same cities. The colored excess over the white rate was large in each city.

ACKNOWLEDGMENTS

This study was made as one of a series of studies of influenza under the general direction of the United States Public Health Service Board for the Study of Respiratory Diseases, consisting of Consultant W. H. Frost, Principal Statistician Edgar Sydenstricker, and Senior Statistician Selwyn D. Collins. In the preparation of the study the author has had the advice and assistance of the other members of this board and of the statistical staff of the Office of Statistical Investigations and associated offices of the Public Health Service.

The collection of the data for 1928–29 was done under the general direction of Surg. M. V. Veldee. In each city surveyed, a medical officer of the United States Public Health Service already stationed in or near that city was designated to take charge of the collection of the data in his locality. All forms and instructions for enumerators and others engaged in the work were prepared in Washington and forwarded to the officers in charge, and so the procedure followed was reasonably uniform.

The following Public Health Service officers conducted the surveys in the respective cities: San Francisco, Medical Director R. H. Creel;

Seattle, Medical Director L. D. Fricks, assisted by Passed Asst. Surg. F. S. Fellows; Kansas City and Farmington, Passed Asst. Surg. E. R. Coffey; Des Moines, Passed Asst. Surg. A. S. Rumreich; New Orleans, Surg. William C. Rucker, assisted by Surg. W. Y. Hollingsworth; Cincinnati, Senior Surg. R. Olesen; Pittsburgh, Passed Asst. Surg. R. R. Jones; Syracuse, Surg. M. V. Veldee; Baltimore, Consultant W. H. Frost; Boston, Medical Director J. W. Schereschewsky. Surgeon Veldee also assisted in the surveys in Pittsburgh, Baltimore, and Boston. The surveys in the rural and small town communities of New York and Massachusetts were conducted by the State and local health departments of those States. In all cities the local health department gave full cooperation in the study.

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Age and sex incidence of influenza and pneumonia morbidity and mortality in the epidemic of 1928–29, with comparative data for the epidemic of 1918–19. By Selwyn D. Collins. Pub. Health Rep., Aug. 14, 1931. (Reprint 1500.)

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DEATHS DURING WEEK ENDED DEC. 16, 1933

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

	Week ended Dec. 16, 1933	Corresponding week 1932
Data from 85 large cities of the United States:		
Total deaths	8,500	8,861
Deaths per 1,000 population, annual basis	11.9	12.6
Deaths under 1 year of age	591	649
Deaths under 1 year of age per 1,000 estimated live births (81 cities)	51	53
Deaths per 1,000 population, annual basis, first 50 weeks of year	10.9	11.1
Data from industrial insurance companies:		
Policies in force	67,329,101	69,459,495
Number of death claims	14,271	13,709
Death claims per 1,000 policies in force, annual rate	11.1	10.4
Death claims per 1,000 policies, first 50 weeks of year, annual rate	9.8	9.5

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for Weeks Ended Dec. 23, 1933, and Dec. 24, 1932

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 23, 1933, and Dec. 24, 1932

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932
New England States:								
Maine	2	-	9	2	2	2	0	0
New Hampshire	-	-	2	-	174	-	0	1
Vermont	-	1	-	-	55	1	0	0
Massachusetts	16	37	-	8	511	140	2	2
Rhode Island	3	2	-	2	-	-	0	0
Connecticut	2	15	5	24	5	18	3	1
Middle Atlantic States:								
New York	51	52	[1] 9	[1] 177	467	441	2	5
New Jersey	19	29	29	50	32	170	0	1
Pennsylvania	67	113	-	-	171	261	1	3
East North Central States:								
Ohio	38	30	16	47	80	341	1	0
Indiana	34	59	49	1,454	39	13	1	5
Illinois	49	73	10	336	43	42	3	14
Michigan	17	25	3	74	29	271	2	0
Wisconsin	12	7	32	492	155	409	0	0
West North Central States:								
Minnesota	5	9	-	45	20	271	1	1
Iowa [2]	9	25	4	8	10	-	2	0
Missouri	41	15	7	384	108	-	1	3
North Dakota	2	6	-	-	19	131	0	1
South Dakota	2	3	-	208	310	-	0	0
Nebraska	5	16	-	941	5	18	0	1
Kansas	34	21	-	-	25	9	0	2
South Atlantic States:								
Delaware	-	-	1	3	2	1	0	0
Maryland [2]	18	18	27	353	33	3	0	0
District of Columbia	15	3	4	54	15	2	2	0
Virginia	42	11	-	-	73	92	0	3
West Virginia	38	24	63	517	20	150	3	0
North Carolina [3]	71	22	19	340	649	62	2	1
South Carolina	19	5	433	1,060	97	43	0	0
Georgia [3]	25	11	-	2,429	524	-	0	1
Florida	15	-	-	53	-	1	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 23, 1933, and Dec. 24, 1932—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932
East South Central States:								
Kentucky	49	29	4	1,004	14	----	0	7
Tennessee [3]	44	22	54	2,945	173	6	2	6
Alabama [3]	28	22	27	3,965	48	1	0	1
Mississippi [3]	18	9	----	----	----	----	0	1
West South Central States:								
Arkansas	17	12	8	9,795	123	4	0	1
Louisiana [3]	23	23	4	9,162	3	----	0	1
Oklahoma [4]	26	11	29	2,203	13	----	4	0
Texas [3]	163	84	145	2,838	140	361	0	0
Mountain States:								
Montana [5]	1	1	15	4,200	----	191	0	0
Idaho	----	3	----	2	4	2	0	0
Wyoming	----	----	----	243	20	----	0	0
Colorado	6	10	37	263	4	7	0	0
New Mexico	10	10	1	11	51	----	3	0
Arizona	5	1	12	33	5	----	0	0
Utah [3]	----	1	----	47	260	1	0	1
Pacific States:								
Washington	3	7	----	232	219	3	0	1
Oregon	----	----	13	1,552	14	39	0	0
California	30	39	34	1,068	209	48	0	4
Total	1,074	916	1,105	48,624	4,973	3,555	35	62

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932
New England States:								
Maine	1	1	6	31	0	0	0	4
New Hampshire	0	0	22	16	0	0	0	0
Vermont	0	0	5	2	0	0	0	0
Massachusetts	1	0	200	309	0	0	2	6
Rhode Island	0	0	4	11	0	0	2	0
Connecticut	0	1	50	83	0	13	0	2
Middle Atlantic States:								
New York	2	0	456	470	0	3	11	7
New Jersey	0	0	121	182	0	0	3	2
Pennsylvania	2	5	452	596	0	0	20	21
East North Central States:								
Ohio	4	1	383	236	0	17	5	2
Indiana	0	0	142	84	3	4	2	5
Illinois	4	1	387	390	1	1	4	4
Michigan	0	0	345	337	1	1	4	8
Wisconsin	2	0	116	76	29	3	2	0
West North Central States:								
Minnesota	0	0	49	70	1	0	2	0
Iowa [3]	0	0	81	40	0	19	0	1
Missouri	0	0	71	24	7	0	4	2
North Dakota	0	0	20	7	0	5	0	0
South Dakota	0	0	4	14	0	2	0	0
Nebraska	1	1	18	40	1	2	0	0
Kansas	2	4	132	73	4	2	3	5
South Atlantic States:								
Delaware	1	0	6	10	0	0	1	0
Maryland [3]	0	0	70	94	0	0	4	7
District of Columbia	1	0	17	10	0	0	3	0
Virginia	0	0	79	52	0	1	3	6
West Virginia	2	0	115	61	3	0	10	7
North Carolina [3]	0	0	111	60	0	1	3	2
South Carolina	1	0	11	5	1	0	1	0
Georgia [3]	0	1	20	9	0	0	10	3
Florida	0	0	7	6	0	0	2	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 23, 1933, and Dec. 24, 1932—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932	Week ended Dec. 23, 1933	Week ended Dec. 24, 1932
East South Central States:								
Kentucky	0	1	92	23	0	2	5	10
Tennessee [2]	0	0	76	26	1	1	2	4
Alabama [3]	0	0	24	28	1	1	5	0
Mississippi [2]	0	0	17	7	0	0	0	1
West South Central States:								
Arkansas	0	0	17	11	2	0	2	2
Louisiana [2]	2	0	26	7	3	8	6	3
Oklahoma [4]	0	0	20	26	0	3	2	0
Texas [3]	0	0	123	78	2	6	24	2
Mountain States:								
Montana [5]	0	1	7	8	1	0	4	1
Idaho	2	1	5	2	2	2	0	1
Wyoming	0	0	5	3	0	0	0	0
Colorado	0	0	26	28	6	0	9	0
New Mexico	1	0	38	11	0	0	4	1
Arizona	3	0	15	3	0	0	1	0
Utah [2]	0	0	14	19	3	0	0	0
Pacific States:								
Washington	0	2	32	37	3	6	3	3
Oregon	0	0	32	16	13	0	4	1
California	1	2	157	134	4	4	33	6
Total	33	22	4,226	3,865	92	107	205	130

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Dec. 23, 1933, 42 cases, as follows: North Carolina, 1; Georgia, 13; Alabama, 22; Louisiana, 1; Texas, 5.
[4] Exclusive of Oklahoma City and Tulsa.
[5] Rocky Mountain spotted fever, week ended Dec. 23, 1933, Montana 1 case.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November 1933										
Alabama	2	258	124	395	41	21	3	213	1	46
Arizona		26	130	3	74	1	4	87	1	7
Florida		65	6	135	6	3		20	0	5
Idaho	1	1	2		30		3	21	16	3
Illinois	28	184	92	21	85	1	5	1,592		63
Iowa	4	81			11		4	358	40	4
Louisiana	2	209	40	672	23	8	1	126	5	70
Maryland	2	107	42		17		7	408	0	50
New York	10	190		15	1,262		39	1,407	0	67
Oklahoma [1]	3	297	127	119	139	8	1	171	10	94
Pennsylvania	13	307		1	716		33	1,778	0	121
Rhode Island		13	1		4		0	68	0	1
South Carolina	2	297	1,442	939	245	106	4	53	1	39
Virginia		438	236	11	140	5	2	641	1	47
West Virginia	7	296	186		29		6	603	6	55

[1] Exclusive of Oklahoma City and Tulsa.

November 1933

	Cases
Actinomycosis:	
Iowa	1
Anthrax:	
Louisiana	1
Pennsylvania	1
Chicken pox:	
Alabama	33
Arizona	33
Florida	13
Idaho	90
Illinois	1,575
Iowa	325
Louisiana	21
Maryland	317
New York	2,180
Oklahoma [1]	25
Pennsylvania	2,792
Rhode Island	44
South Carolina	39
Virginia	231
West Virginia	195
Conjunctivitis:	
Arizona	16
Dengue:	
Florida	3
Louisiana	2
South Carolina	3
Diarrhea:	
Maryland	8
South Carolina	315
Diarrhea and dysentery:	
Virginia	88
Dysentery:	
Alabama (amœbic)	1
Arizona	42
Florida	3
Illinois (amœbic)	129
Illinois (bacillary)	10
Iowa	4
Louisiana	11
Maryland	28
New York	18
New York (amœbic)	29
Oklahoma [1]	9
Pennsylvania	6
Rhode Island (amœbic)	2
Rhode Island (bacillary)	1
Food poisoning:	
Illinois	18
German measles:	
Arizona	5
Illinois	25
Maryland	4
New York	38
Pennsylvania	37
Rhode Island	3
South Carolina	1
Hookworm disease:	
Louisiana	24
Impetigo contagiosa:	
Arizona	22
Maryland	65
Oklahoma [1]	4
Lead poisoning:	
Illinois	4
Leprosy:	
Alabama	1
Lethargic encephalitis:	
Alabama	3
Illinois	13
Iowa	6
Louisiana	3
New York	21
Oklahoma [1]	2
Pennsylvania	14
South Carolina	3
Virginia	3
West Virginia	1
Mumps:	
Alabama	9
Arizona	10
Idaho	1
Illinois	328
Iowa	22
Louisiana	7
Maryland	66
Oklahoma [1]	33
Pennsylvania	651
Rhode Island	1
South Carolina	24
Virginia	29
West Virginia	2
Ophthalmia neonatorum:	
Alabama	1
Arizona	1
Illinois	7
Maryland	3
New York	1
Oklahoma [1]	1
Pennsylvania	6
South Carolina	11
Virginia	1
Paratyphoid fever:	
Illinois	2
New York	10
Rhode Island	1
South Carolina	5
Virginia	1
Psittacosis:	
Virginia	1
Puerperal septicemia:	
Illinois	1
Rabies in animals:	
Illinois	17
Louisiana	21
South Carolina	16
Rabies in man:	
Oklahoma [1]	1
Scabies:	
Maryland	4
Oklahoma [1]	2
Septic sore throat:	
Illinois	20
Iowa	3
Maryland	12
Septic sore throat—Con.	
New York	21
Oklahoma [1]	36
Rhode Island	1
Virginia	5
Tetanus:	
Alabama	8
Illinois	5
Louisiana	4
Maryland	2
New York	6
Trachoma:	
Arizona	120
Oklahoma [1]	7
Trichinosis:	
New York	12
Pennsylvania	1
Tularaemia:	
Alabama	1
Illinois	15
Iowa	1
Louisiana	3
Maryland	3
Pennsylvania	2
Virginia	6
Typhus fever:	
Alabama	92
Florida	4
Louisiana	2
Maryland	2
New York	4
Rhode Island	2
South Carolina	1
Undulant fever:	
Idaho	2
Illinois	11
Iowa	10
Louisiana	1
Maryland	4
New York	19
Oklahoma [1]	1
Pennsylvania	2
Rhode Island	1
Virginia	1
Vincent's infection:	
Illinois	34
Maryland	25
New York [2]	48
Oklahoma [1]	5
Whooping cough:	
Alabama	41
Arizona	50
Florida	15
Idaho	1
Illinois	687
Iowa	71
Louisiana	28
Maryland	321
New York	1,527
Oklahoma [1]	31
Pennsylvania	1,603
Rhode Island	163
South Carolina	171
Virginia	130
West Virginia	134

[1] Exclusive of Oklahoma City and Tulsa.

[2] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 16, 1933

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	5	0	0	0	0	5	20
New Hampshire:											
Concord	0	------	0	0	2	0	0	0	1	0	10
Manchester	0	------	0	3	2	1	0	1	0	0	13
Nashua	0	------	0	0	0	5	0	0	0	4	--------
Vermont:											
Barre	1	------	0	28	0	0	0	0	0	0	4
Burlington	0	------	0	0	0	3	0	0	2	9	9
Massachusetts:											
Boston	2	------	1	153	31	48	0	10	0	27	241
Fall River	1	------	0	0	4	2	0	1	0	1	31
Springfield	0	------	0	1	1	7	0	2	0	20	33
Worcester	1	------	0	206	6	5	0	4	0	28	78
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	17
Providence	1	------	0	1	4	13	0	0	1	19	61
Connecticut:											
Bridgeport	0	1	2	2	3	8	0	1	0	4	38
Hartford	2	------	0	0	4	4	0	0	0	2	44
New Haven	0	2	0	1	2	1	0	0	0	2	40
New York:											
Buffalo	1	------	2	131	22	18	0	9	0	31	148
New York	43	28	8	25	185	167	0	89	4	109	1,523
Rochester	1	------	1	1	7	7	0	0	0	5	55
Syracuse	0	------	0	0	5	4	0	1	1	39	50
New Jersey:											
Camden	1	------	0	2	4	13	0	1	1	0	29
Newark	0	4	1	3	11	17	0	6	1	12	110
Trenton	0	------	0	0	3	9	0	4	0	2	40
Pennsylvania:											
Philadelphia	4	13	10	215	52	62	0	26	1	59	565
Pittsburgh	16	2	3	2	18	37	0	8	1	27	151
Reading	0	------	0	4	2	8	0	0	0	2	26
Scranton	0	------	0	3	0	3	0	0	0	10	--------
Ohio:											
Cincinnati	6	------	2	98	9	22	0	5	0	12	122
Cleveland	14	40	1	2	20	74	0	5	0	54	201
Columbus	3	2	2	2	7	24	0	2	0	6	68
Toledo	0	2	1	23	10	24	0	5	0	8	65
Indiana:											
Fort Wayne	2	------	0	0	3	8	0	0	0	0	17
Indianapolis	6	------	0	4	7	15	0	2	0	20	--------
South Bend	0	------	0	0	3	3	0	2	0	0	17
Terre Haute	0	------	0	20	3	2	1	0	0	0	18
Illinois:											
Chicago	1	4	5	7	85	176	0	42	2	75	728
Springfield	2	------	0	0	0	4	1	0	1	1	21
Michigan:											
Detroit	9	3	2	8	31	61	0	15	0	71	262
Flint	0	------	0	2	7	29	0	0	0	5	28
Grand Rapids	0	------	0	1	0	9	0	3	0	0	38
Wisconsin:											
Kenosha	0	------	0	1	1	14	0	0	0	3	7
Madison	0	------	--------	0	--------	1	0	--------	0	20	26
Milwaukee	7	------	0	1	9	20	0	3	0	33	90
Racine	0	------	0	0	0	10	0	0	0	6	18
Superior	0	------	0	0	0	0	0	0	0	0	6
Minnesota:											
Duluth	0	------	0	0	3	0	0	0	1	0	22
Minneapolis	6	------	1	0	9	15	0	2	0	10	103
St. Paul	0	------	0	0	4	23	0	1	1	8	58
Iowa:											
Des Moines	0	------	--------	0	--------	12	0	--------	0	0	30
Sioux City	1	------	--------	0	--------	1	0	--------	0	2	--------
Waterloo	0	------	--------	1	--------	1	0	--------	0	1	--------
Missouri:											
Kansas City	5	------	0	2	16	24	0	1	0	1	106
St. Joseph	9	------	0	2	6	2	0	2	0	0	58
St. Louis	15	1	--------	97	17	16	0	13	0	11	176
North Dakota:											
Fargo	1	------	0	9	1	1	0	0	1	1	9
Grand Forks	0	------	0	0	0	0	0	0	0	0	0

City reports for week ended Dec. 16, 1933—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
South Dakota:											
Aberdeen	0		0	0	0	0	0	0	0	0	0
Nebraska:											
Omaha	2		0	5	5	8	0	1	0	7	50
Kansas:											
Topeka	0		0	0	2	5	0	0	0	6	19
Wichita	1		0	1	0	1	0	0	1	2	20
Delaware:											
Wilmington	1		0	0	4	3	0	1	0	3	30
Maryland:											
Baltimore	7	13	5	3	26	24	0	12	4	66	233
Cumberland	1		0	1	1	2	0	1	0	0	18
Frederick	0		0	0	0	0	0	0	1	0	2
District of Columbia:											
Washington	10	1	0	25	28	14	0	8	1	9	177
Virginia:											
Lynchburg	4		0	0	3	3	0	0	0	0	12
Norfolk	1	47	0	0	0	7	0	0	1		34
Richmond	1		0	1	8	7	0	0	2	0	50
Roanoke	5		0	3	0	5	0	0	0	5	11
West Virginia:											
Charleston	1	1	0	0	0	6	0	0	0	0	12
Huntington	2		0	0	0	25	0	0	0	0	
Wheeling	0		0	1	1	7	0	2	0	1	25
North Carolina:											
Raleigh	0		0	0	0	4	0	0	0	2	5
Wilmington	0		0	1	1	0	0	0	0	2	6
Winston-Salem	1		0	96	1	7	0	0	0	0	18
South Carolina:											
Charleston	0	23	1	0	3	2	0	1	0	5	20
Columbia											
Greenville	0		0	0	2	0	0	0	0	1	10
Georgia:											
Atlanta	4	20	1	4	13	6	0	2	0	3	84
Brunswick	1		0	1	1	0	0	0	0	0	4
Savannah	3	55	3	2	3	2	0	2	1	0	34
Florida:											
Miami	0	1	0	0	1	0	0	3	0	0	32
Tampa	1		0	0	3	1	0	0	0	0	22
Kentucky:											
Ashland	0			1		2	0		0	0	
Lexington	2		0	0	0	0	0	2	0	3	18
Louisville	10		0	0	11	19	0	4	0	5	80
Tennessee:											
Memphis	6		4	9	4	9	0	4	2	0	94
Nashville	2		2	17	4	10	0	0	0	0	45
Alabama:											
Birmingham	7	1	1	0	9	9	0	6	1	1	62
Mobile	1		0	0	0	0	0	1	0	0	22
Montgomery	2			0		3	0	0	0	0	
Arkansas:											
Fort Smith											
Little Rock	1		0	9	4	1	0	1	1	0	6
Louisiana:											
New Orleans	9	4	0	0	13	4	0	12	0	1	156
Shreveport	2		0	1	3	3	0	2	0	0	38
Texas:											
Dallas	17		0	0	5	0	0	2	3	8	54
Fort Worth	6		1	0	3	13	0	0	1	2	33
Galveston	2		0	0	3	1	0	0	0	0	18
Houston	12		0	0	8	7	1	7	1	0	99
San Antonio	2		0	0	7	4	0	8	0	0	75
Montana:											
Billings	0		0	0	0	0	0	0	0	1	3
Great Falls	0		0	0	0	0	0	0	0	3	5
Helena	0		0	0	0	0	0	0	0	0	3
Missoula	0		0	0	0	0	0	0	1	0	2
Idaho:											
Boise	1		0	0	2	0	0	0	0	0	4
Colorado:											
Denver	2	29	0	2	4	11	2	4	0	30	67
Pueblo											
New Mexico:											
Albuquerque	1		0	0	0	1	0	3	0	0	12

City reports for week ended Dec. 16, 1933—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Utah:											
Salt Lake City	0	-----	0	125	2	7	0	1	0	14	28
Nevada:											
Reno	0	1	0	0	0	0	0	0	0	0	7
Washington:											
Seattle	5	-----	-----	0	-----	10	0	-----	1	54	-----
Spokane	0	-----	-----	208	2	2	0	0	0	0	31
Tacoma	0	-----	0	0	5	2	0	1	0	4	28
Oregon:											
Portland	1	1	1	2	3	17	1	2	2	3	69
Salem	0	1	0	0	0	0	0	0	0	5	0
California:											
Los Angeles	23	27	2	5	15	58	0	16	6	39	326
Sacramento	0	1	0	2	5	3	0	4	0	1	40
San Francisco	1	4	1	4	6	7	0	4	1	31	158

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Rhode Island:				District of Columbia:			
Providence	1	0	0	Washington	1	0	0
New York:				West Virginia:			
New York	2	2	2	Wheeling	0	1	1
Pennsylvania:				North Carolina:			
Pittsburgh	1	0	1	Winston-Salem	0	1	0
Ohio:				Georgia:			
Cleveland	1	1	0	Atlanta	1	0	0
Indiana:				Montana:			
Indianapolis	1	0	1	Missoula	1	1	0
Illinois:				Utah:			
Chicago	4	1	0	Salt Lake City	1	0	0
Michigan:				Washington:			
Detroit	2	0	0	Seattle	0	-----	1
Minnesota:				California:			
Minneapolis	1	0	0	Los Angeles	2	0	2
Missouri:							
Kansas City	1	1	0				

Lethargic encephalitis.—Cases: New York, 1; Detroit, 1; Minneapolis, 1; Kansas City, Mo., 1; St. Louis, 2; Houston, Tex., 1.

Typhus fever.—Cases: Charleston, S.C., 1; Atlanta, 1; Mobile, 2; San Antonio, Tex. ,1.

Pellagra.—Cases: Savannah, 1.

FOREIGN AND INSULAR

CANADA

Quebec Province—Communicable diseases—Two weeks ended December 16, 1933.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the 2 weeks ended December 16, 1933, as follows:

Disease	Cases	Disease	Cases
Chicken pox	397	Poliomyelitis	3
Diphtheria	61	Puerperal septicemia	2
Erysipelas	5	Scarlet fever	302
German measles	4	Tuberculosis	80
Influenza	19	Typhoid fever	26
Measles	52	Undulant fever	1
Ophthalmia neonatorum	1	Whooping cough	273

CUBA

Habana—Communicable diseases—Four weeks ended December 2, 1933.—During the 4 weeks ended December 2, 1933, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	1		Scarlet fever	2	
Diphtheria	17	2	Tuberculosis	35	3
Malaria	170	2	Typhoid fever	21	4
Measles	24				

ITALY

Communicable diseases—Four weeks ended June 25, 1933.—During the 4 weeks ended June 25, 1933, cases of certain communicable diseases were reported in Italy as follows:

Disease	May 29–June 4		June 5–11		June 12–18		June 19–25	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	16	13	19	17	20	18	22	19
Cerebrospinal meningitis	8	8	16	15	9	8	12	12
Chicken pox	465	157	337	137	426	171	337	140
Diphtheria and croup	539	280	398	223	366	200	367	191
Dysentery	6	6	8	6	6	5	7	7
Lethargic encephalitis	4	4	2	2	4	4	1	1
Measles	2,505	317	1,931	289	1,554	274	1,330	262
Poliomyelitis	10	10	11	11	6	6	7	6
Scarlet fever	516	188	434	146	443	160	407	162
Typhoid fever	352	200	333	202	274	170	313	186

POLAND

Communicable diseases—1928–30.—Cases of certain communicable diseases, with deaths, as reported in Poland during the years 1928, 1929, and 1930, are shown in the following table:

Disease	1928		1929		1930	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Anthrax	81	11	58	6	60	8
Diphtheria	10,460	863	11,977	733	17,074	963
Dysentery	1,784	206	2,750	197	1,910	306
Erysipelas	4,564	207	4,328	222	5,090	245
Leprosy	1				1	
Lethargic encephalitis	38	19	25	8	21	5
Malaria	745	3	315	1	199	1
Measles	37,063	493	25,481	249	59,567	584
Meningitis	715	223	869	259	607	176
Puerperal septicemia	1,189	438	1,309	365	1,564	350
Scarlet fever	28,898	2,159	20,909	1,164	29,991	1,135
Smallpox	21	2	12	1	21	
Trachoma	13,941		14,028		24,689	
Trichinosis	83	2	118		67	1
Typhoid fever	14,080	1,169	15,429	1,052	11,962	910
Typhus fever	2,401	161	1,988	146	1,640	112
Whooping cough	11,865	666	9,082	488	10,206	458

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

(NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for Dec. 29, 1933, pp. 1571–1583. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued Jan. 26, 1934, and thereafter, at least for the time being, in the issue published on the last Friday of each month.)

Cholera

Philippine Islands.—During the week ended December 23, 1933, cholera was reported in the Phillipine Islands, as follows: Bohol Province—Loon, 4 cases, 4 deaths; Tubigon, 7 cases, 6 deaths. Cebu Province—Argao, 1 case, 1 death; Carcar, 5 cases, 2 deaths. Oriental Negros Province—Tanjay, 1 case, 1 death.

Plague

China—Manchuria.—A report dated November 13, 1933, states that plague had been reported in certain provinces of Manchuria, as follows:

Place	Cases	Deaths	Place	Cases	Deaths
Fengtien Province:			Jehol Province:		
Tungliao hsien	188	179	Erhtaokou	80	80
Kaitung hsien	29	29	Kailu hsien	1	1
Chanyu hsien	23	23	Kirin Province:		
Taonan hsien	9	9	Changling hsien	31	25
Hsingan Province—Kaolipan	200	200	Fuju hsien	4	4
			Nungan hsien	444	444

Hawaii Territory—Hamakua District—Paauilo.—On December 11, 1933, 2 plague-infected rats were reported in Paauilo, Hamakua District, island of Hawaii.

India—Calcutta.—On December 14, 1933, 1 case of plague with 1 death was reported in Calcutta, India.

Yellow Fever

Brazil—Ceara State—St. Matthew.—On August 13, 1933, 1 case of yellow fever with 1 death was reported in St. Matthew, Ceara State, Brazil.

French West Africa—Togo.—On December 14, 1933, 1 case of yellow fever was reported in Togo, French West Africa.