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PROVISIONAL MORTALITY RATES FOR THE FIRST QUARTER OF 1938

The mortality rates in this report are based upon preliminary data for 37 States, the District of Columbia, Alaska, and Hawaii for the first three months of 1938. Comparative data for 33 States and the District of Columbia are presented for the corresponding period of 1937.

This report is made possible through a cooperative arrangement with the respective States, which voluntarily furnish provisional quarterly and annual tabulations of current birth and death records. These reports are compiled and published by the United States Public Health Service.

Because of lack of uniformity in the method of classifying deaths according to cause, and because a certain number of certificates were not filed in time to be included, these data are preliminary and may differ in some instances from the final figures subsequently published by the Bureau of the Census.

In the past, these preliminary reports have provided an early and accurate index of the trend in mortality for the country as a whole. Some deviation from the final figures for individual States is to be expected, because of the provisional nature of the information. It is believed, however, that the trend of mortality within each State is correctly represented. Comparisons of specific causes of death among different States are subject to error because of differences in tabulation procedure and completeness of reporting. Comparisons of this nature should be made only from the final figures published by the Bureau of the Census.

With the exception of a severe outbreak of measles, the health record for the first quarter of 1938 has been one of the most favorable in recent years. Mortality from all causes, 11.2 per 1,000 estimated population, during this quarter was 12 percent below that for the corresponding period of 1937 and is the lowest recorded for this period since these reports were begun in 1930. Each of the 33 States and the District of Columbia reported a lower death rate than last year for this quarter.

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Although the low death rate cannot be attributed to any one cause, the small amount of fatal respiratory illness was undoubtedly a major factor. Mortality due to pneumonia was nearly one-third less than during the first quarter of 1937, while deaths from influenza were about 70 percent less frequent than last year.

Two of the principal diseases of childhood, measles and whooping cough, were more prevalent than in 1937. Aside from these, which are not important causes of death, only cancer and poliomyelitis took relatively more lives during the first quarter of 1938 than during 1937.

Especially favorable was the continued decline in the infant and maternal mortality rate and in the tuberculosis death rate. The infant mortality rate dropped below 50 per 1,000 live births, which represents a 25 percent decline from the rate for the corresponding period in 1937. Although prevention of death from the diseases of pregnancy and childbirth was not quite so great, nevertheless a substantial decline in maternal mortality (19 percent) was reported. In place of a slight increase in the mortality from tuberculosis which was reported during the first quarter of 1937, the current rate, 48 per 100,000 population, is the lowest on record and represents a decrease of 12 percent since last year.

Accidents, which have been becoming increasingly important as a cause of death in recent years, took relatively fewer lives than last year. The mortality rate from automobile accidents was about 18 percent lower than the corresponding rate for 1937.

An increased birth rate was reported by 28 of the 33 States. For the entire group of States the rate for the first quarter of 1938 was 5 percent greater than that for the same period in 1937.

Provisional mortality from certain causes in the first 3 months of 1938, with comparative provisional data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																		
			Total infant mortality	Maternal mortality	Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and poliencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (13)	Tuberculosis, all forms (23-32)	Cancer, all forms (45-53)	Diabetes (53)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130-132)	All accidents (176-195, 201-214)[1]	Automobile accidents (206, 208, 210)[1]
34 States:[3]																								
1938	11.2	16.4	48	4.4	0.6	4.0	1.8	3.4	2.0	21.4	0.3	0.6	1.2	48.0	114.3	25.8	90.0	282.9	103.7	55.6	4.0	81.8	63.7	20.2
1937	12.7	15.6	63	5.4	.8	.7	2.6	2.9	2.1	72.9	.2	.8	2.6	54.5	110.9	27.6	96.0	294.3	149.9	59.6	4.5	85.8	72.0	24.7
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over:[3]																								
1938	8.5	-----	-----	-----	.8	2.9	1.9	1.7	2.2	13.4	-----	-----	-----	47.7	94.9	26.9	64.1	[4] 169.4	78.6	-----	[5] 5.6	[6] 58.2	46.7	18.0
1937	9.8	-----	-----	-----	.5	1.0	2.5	3.2	2.2	46.8	-----	-----	-----	56.9	95.9	30.2	66.8	185.4	122.0	-----	[5] 5.2	[6] 62.2	51.4	20.4
Alabama:																								
1938	11.5	21.9	66	6.7	.7	7.1	1.1	4.4	3.8	55.6	.3	.6	4.0	56.2	57.2	15.4	75.7	176.4	129.9	51.1	5.4	83.6	63.3	20.0
1937	12.2	21.4	78	5.6	1.1	(7)	(7)	5.3	2.7	114.7	.4	.3	5.3	65.0	59.3	12.7	74.1	165.4	146.8	50.0	6.6	85.3	73.3	20.3
1936	12.8	22.4	76	6.8	.8	.8	.4	2.7	4.1	113.5	.4	(7)	1.4	71.2	54.5	14.6	74.4	158.0	192.2	50.1	7.9	87.1	-----	-----
Alaska:																								
1938	30.9	40.4	[8]	[8]	(7)	6.4	6.4	173.8	(7)	77.2	(7)	(7)	(7)	740.3	109.4	(7)	225.3	302.6	366.9	64.4	(7)	19.3	315.4	(7)
Colorado:																								
1938	12.4	18.6	59	5.3	1.1	4.9	1.5	1.9	5.3	23.4	1.1	.4	1.1	64.1	117.0	17.4	98.5	219.0	144.1	75.4	6.0	87.9	75.4	22.6
1937	16.4	17.9	79	7.2	.8	(7)	3.0	8.3	3.8	153.7	1.5	.8	2.6	75.0	121.6	18.9	95.8	253.7	351.4	81.0	6.8	86.0	70.0	21.6

[1] Data not compiled for these causes prior to 1937.
[2] Includes all States with data for the 3-month period of 1937 and 1938. Estimated population July 1, 1938: 87,744,000.
[3] These data are taken from the Monthly Statistical Bulletin published by the Metropolitan Life Insurance Co. The figures for 1937 and 1938 are subject to correction, since they are based on provisional estimates of lives exposed to risk (17,700,000 persons in 1938). Data does not include all diseases reported to the Public Health Service.
[4] Excludes pericarditis, acute endocarditis, acute myocarditis, coronary artery diseases, and angina pectoris.
[5] Classified as diarrhea and enteritis, age not specified.
[6] Chronic nephritis (Bright's disease) only.
[7] No deaths reported.

Provisional mortality from certain causes in the first 3 months of 1938, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																	
			Total infant mortality	Maternal mortality	Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90–93)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130–132)	All accidents (176–195, 201–214)	Automobile accidents (206, 208, 210)
Connecticut:																								
1938	11.2	13.3	35	2.8	(?)	(?)	0.7	0.5	1.4	7.7	(?)	0.2	0.5	37.6	141.3	32.5	93.0	276.3	89.5	52.8	4.0	91.8	62.0	17.4
1937	11.9	12.0	50	3.8	0.5	1.6	1.4	2.8	.9	35.7	(?)	.5	1.2	37.5	134.8	39.4	97.0	265.9	127.2	54.9	2.8	92.9	64.4	21.3
1936	11.8	12.4	47	4.8	(?)	.5	1.2	2.1	.7	20.9	0.2	.7	.9	41.3	135.7	35.5	(?)	269.3	132.4	(?)	3.5	100.	2.----	-----
Delaware:																								
1938	13.2	15.9	61	3.9	1.5	3.1	(?)	10.8	1.5	27.9	(?)	(?)	1.5	38.7	123.8	34.1	142.4	400.9	114.5	34.1	(?)	108.4	68.1	21.7
1937	16.0	16.3	80	3.8	3.1	4.7	(?)	6.2	1.5	66.8	(?)	(?)	3.1	48.2	97.9	35.7	116.5	453.7	166.3	54.4	10.9	132.1	82.4	34.2
District of Columbia:																								
1938	13.7	20.3	52	4.4	(?)	.6	1.9	.6	1.9	8.9	(?)	1.3	2.6	69.6	131.6	24.9	93.9	355.1	152.0	70.2	5.1	118.2	67.1	21.1
1937	17.2	19.5	76	6.0	.6	2.6	1.3	5.8	5.2	52.4	(?)	.6	7.8	102.2	146.8	17.5	116.4	381.6	249.7	75.0	5.2	106.7	88.6	33.0
1936	17.1	19.2	68	6.4	3.2	(?)	1.3	2.6	6.5	21.4	.6	.6	14.3	122.8	136.4	33.8	126.1	395.7	220.3	82.5	5.8	105.3	-----	-----
Georgia:																								
1938	10.4	18.1	68	7.3	.5	6.9	.6	4.4	1.7	47.4	.4	.5	.9	51.6	54.8	13.4	83.2	166.8	124.2	50.0	5.1	104.6	58.9	22.8
1937	10.7	17.7	69	7.5	1.7	.3	.4	2.4	2.6	94.8	.5	.4	1.8	47.6	50.0	11.6	83.7	157.6	120.2	47.3	4.6	94.9	63.5	25.1
1936	12.3	17.9	76	7.9	2.4	.1	.7	2.1	3.4	136.3	.3	.3	3.3	52.4	47.8	13.5	80.3	174.5	190.6	49.3	3.5	104.0	-----	-----
Hawaii:																								
1938	7.2	19.9	56	3.1	1.8	(?)	.9	8.0	.9	5.3	1.8	(?)	.9	59.3	63.8	11.5	50.5	116.9	71.7	61.1	17.7	68.2	39.0	9.7
1937	9.5	20.4	82	5.3	3.6	102.3	(?)	.9	1.8	9.1	(?)	(?)	.9	79.7	62.5	19.0	47.1	124.9	109.5	75.1	19.0	65.2	53.4	16.3
1936	8.0	20.5	75	5.0	3.7	(?)	(?)	1.8	1.8	21.2	(?)	.9	4.6	70.9	63.5	10.1	40.5	142.7	75.5	67.2	19.3	65.3	-----	-----
Idaho:																								
1938	9.4	20.9	45	5.0	2.4	1.6	.8	3.2	(?)	21.9	(?)	1.6	1.6	21.9	67.3	5.7	68.1	181.7	118.4	60.0	1.6	39.7	62.4	24.3
1937	12.0	20.3	57	3.6	.8	6.6	2.5	1.6	(?)	118.4	(?)	.8	2.5	28.0	93.0	11.5	78.1	188.4	128.3	67.4	5.8	37.0	65.8	20.6
1936	11.5	20.2	48	2.9	.8	1.6	17.4	1.6	.8	27.4	(?)	(?)	12.4	28.2	82.1	10.8	76.3	209.0	161.7	58.0	.8	26.5	-----	-----
Illinois:																								
1938	11.5	14.3	44	3.6	.3	7.1	3.2	.6	1.6	10.5	.2	.4	.4	46.1	132.6	31.0	78.6	341.5	92.8	61.6	3.0	100.0	62.3	22.6
1937	12.7	13.2	57	5.1	.2	.1	3.7	2.6	2.5	51.5	.4	.5	2.5	52.4	127.1	31.8	80.4	355.3	123.8	71.5	2.8	110.3	57.1	29.2
1936	12.6	13.2	53	4.3	.2	.2	5.1	2.2	2.8	22.9	.1	.2	3.2	51.8	127.6	33.9	89.3	351.8	118.1	66.2	3.4	115.1	-----	-----

Indiana:																									
1938	11.6	15.8	44	4.6	.2	6.3	3.0	2.0	3.1	22.8	.5	.9	1.2	42.7	114.0	17.3	129.8	256.6	103.8	(8)	3.0	64.7	65.1	26.3
1937	13.2	14.5	64	3.4	.1	.4	5.6	5.0	1.0	90.6	.5	.5	2.8	54.9	103.4	18.8	127.5	288.7	181.9	(8)	3.9	70.0	73.3	32.7
1936	12.8	14.6	56	5.3	.5	.3	5.1	1.4	5.7	43.4	.1	1.2	1.6	51.3	102.9	20.2	140.7	283.5	157.3	(8)	3.6	88.0	81.8	25.5
Iowa:																									
1938	10.4	(8)	(8)	(8)	.5	1.1	4.1	3.8	1.0	23.4	.3	.6	.8	21.4	117.2	23.8	112.6	257.0	100.1	59.1	3.3	66.1	62.1	15.7
1937	11.4	14.7	54	6.7	(7)	.2	7.0	1.7	.3	96.5	.6	1.3	1.1	22.1	124.1	25.9	117.0	244.9	110.9	52.8	3.0	68.8	69.1	15.7
1936	11.0	17.3	47	5.2	1.3	.3	6.2	2.1	1.9	23.6	(7)	(7)	3.5	22.9	124.2	29.4	120.2	267.3	113.2	57.9	2.7	74.5	-----	-----
Kansas:																									
1938	10.8	15.3	48	4.4	.2	2.8	3.1	3.3	.6	25.3	(7)	.4	.6	27.9	119.6	26.4	94.5	252.3	95.8	58.2	2.6	109.2	93.9	22.2
1937	12.4	14.4	53	5.1	(7)	(7)	8.9	2.2	2.0	95.0	.4	1.3	2.2	29.8	110.9	25.7	119.6	274.5	125.1	60.2	2.6	94.0	99.0	20.0
1936	13.3	14.9	61	6.6	1.5	(7)	6.2	.6	4.7	84.4	.6	.9	1.5	35.0	112.4	26.9	116.6	283.2	158.9	64.8	4.9	114.9	-----	-----
Kentucky:																									
1938	9.4	20.4	52	4.6	1.2	5.2	1.5	8.4	3.2	43.6	.8	.3	3.3	62.6	58.2	13.4	89.5	166.6	104.6	34.6	4.1	65.3	49.1	17.2
1937	10.6	18.3	53	4.0	2.6	1.2	1.0	5.8	5.4	123.2	.3	.7	5.0	65.6	57.1	11.8	81.7	184.4	156.6	43.8	4.6	58.9	64.3	19.0
Maine:																									
1938	12.9	17.9	50	4.5	1.9	3.8	(7)	3.8	1.4	23.6	.5	(7)	(7)	33.1	145.1	27.9	122.4	345.5	105.9	56.7	7.1	96.0	58.6	14.7
1937	14.4	16.7	69	6.5	1.4	.5	.5	1.9	.5	100.9	(7)	(7)	1.4	30.3	146.9	23.7	126.5	393.7	161.1	58.3	4.7	101.9	46.4	12.3
Maryland:																									
1938	13.4	17.7	56	2.9	.2	.7	1.2	4.6	1.0	16.1	(7)	1.9	1.2	81.4	129.8	32.8	101.9	366.8	135.1	56.1	3.6	139.0	67.4	21.9
1937	15.4	16.6	72	4.4	.7	4.3	1.2	7.0	2.4	47.8	.5	2.2	5.1	84.8	127.8	30.2	128.3	366.9	194.4	57.2	6.0	163.5	84.5	31.9
1936	15.1	16.9	65	5.2	1.2	2.9	.7	3.6	2.2	23.5	(7)	1.4	13.2	84.8	133.5	33.4	132.6	355.6	184.8	54.3	3.8	166.3	-----	-----
Michigan:																									
1938	10.9	18.6	48	3.8	.9	3.1	3.6	1.5	1.1	11.7	(7)	.5	.5	39.1	116.6	28.5	96.0	306.9	80.6	59.1	5.3	59.9	62.2	21.1
1937	12.4	17.4	61	4.1	.2	(7)	5.5	3.7	1.2	50.2	(7)	.2	1.2	44.2	116.7	28.8	95.2	307.4	136.4	64.8	4.1	65.8	73.5	29.4
1936	12.0	18.0	56	6.0	.4	.4	3.7	2.4	.7	19.8	.3	.8	1.5	44.1	113.4	28.8	99.6	302.8	130.0	71.1	6.1	71.5	-----	-----
Minnesota:																									
1938	10.0	17.7	40	4.0	.3	.3	2.3	2.6	.3	14.3	.4	.3	.4	29.3	139.4	26.9	90.5	255.9	93.2	52.8	1.7	44.1	57.0	18.6
1937	11.5	17.0	53	4.3	.3	.3	3.2	1.8	.6	76.5	(7)	.9	1.4	34.2	140.4	26.6	99.2	249.4	127.2	56.3	1.5	47.7	62.4	16.7
1936	11.0	17.1	49	5.1	.8	1.5	8.8	1.1	.3	16.9	.2	.4	2.4	35.1	128.1	27.8	94.3	256.6	111.3	58.9	4.7	50.1	-----	-----
Missouri:																									
1938	12.3	15.9	57	4.5	2.0	9.6	4.2	7.2	4.6	30.0	.7	.4	.8	51.8	122.6	24.9	91.9	287.8	141.2	57.3	4.2	107.1	72.5	26.0
1937	14.1	12.3	83	8.0	3.7	(7)	3.7	3.2	3.0	90.7	.4	.9	2.0	61.9	121.4	26.5	101.8	291.5	210.8	60.7	5.1	114.2	86.0	31.1
Montana:																									
1938	10.7	19.3	45	5.0	.7	1.5	2.2	5.2	1.5	33.5	(7)	(7)	1.5	46.1	84.8	24.6	93.8	224.7	116.8	55.8	3.7	36.5	77.4	19.3
1937	14.1	18.5	69	3.7	3.0	.8	6.8	1.5	3.8	181.3	(7)	1.5	3.0	45.1	101.6	21.1	113.6	218.2	205.4	60.9	.8	72.2	79.0	15.0
1936	12.8	18.9	53	6.8	1.5	.8	15.1	4.5	3.0	32.6	(7)	(7)	3.0	44.7	100.0	18.2	93.2	221.9	192.4	75.0	4.5	65.9	-----	-----
Nevada:																									
1938	12.2	17.0	56	4.7	4.0	(7)	(7)	(7)	4.0	4.0	(7)	(7)	(7)	87.5	99.4	15.9	71.6	302.2	163.0	51.7	(7)	27.81	07.4	36.8
1937	14.5	12.2	75	3.2	(7)	(7)	4.0	(7)	(7)	28.1	(7)	(7)	(7)	72.2	100.4	4.0	100.4	273.0	212.8	44.2	8.0	40.21	36.5	36.1
New Jersey:																									
1938	10.7	12.9	43	3.3	.1	1.2	.4	1.3	1.3	8.1	.1	.7	1.0	45.6	122.7	30.8	85.0	343.6	89.8	57.8	3.4	80.1	51.2	18.5
1937	11.7	12.2	51	4.4	.3	1.8	.4	1.7	.8	26.3	.1	.8	2.0	50.7	119.1	35.1	82.9	362.3	119.7	54.6	3.4	80.0	63.3	25.9
1936	11.4	12.5	49	4.8	.5	.2	1.3	1.7	.6	15.2	.5	.6	2.4	53.8	123.5	37.6	90.4	340.0	114.4	54.1	3.2	83.0	-----	-----
New Mexico:																									
1938	13.6	32.6	94	4.7	3.8	23.1	(7)	26.9	4.8	32.7	1.0	(7)	1.4	94.2	59.6	3.8	55.7	156.6	148.0	72.1	14.4	58.6	87.5	34.6

[7] No deaths reported.
[8] Data not available.

Provisional mortality from certain causes in the first 3 months of 1938, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23-32)	Cancer, all forms (45-53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130-132)	All accidents (176-195, 201-214)[1]	Automobile accidents (206, 208, 210)[1]
New York:																								
1938	12.3	14.4	45	4.0	0.2	0.2	0.7	1.2	0.5	6.9	0.1	0.7	1.1	52.3	156.8	38.7	72.4	399.8	99.1	61.7	5.2	81.3	61.4	17.3
1937	13.9	14.2	54	4.4	.3	.5	1.4	1.5	.9	29.1	(9)	.7	2.1	64.5	154.1	44.3	87.0	413.8	160.5	71.9	6.4	86.4	68.4	20.3
1936	13.5	14.2	52	5.6	.7	1.6	2.5	1.0	.3	12.6	(9)	.8	3.5	62.1	147.0	40.4	89.9	401.9	153.7	70.4	5.7	92.1	-----	-----
North Carolina:																								
1938	10.3	22.4	63	6.3	.7	10.0	.6	4.7	6.3	29.4	.2	.7	1.6	54.0	54.2	11.6	86.5	174.1	128.0	49.9	6.0	95.6	62.3	21.3
1937	10.4	22.2	70	5.8	1.0	.9	.6	2.6	4.9	58.0	.3	.9	1.2	61.8	52.4	11.4	81.5	168.3	131.0	44.6	5.3	88.3	69.1	26.1
1936	11.8	22.8	72	6.3	.8	.2	.7	1.2	4.8	75.0	.3	.3	1.5	58.3	53.3	13.7	(8)	(8)	186.0	(8)	6.2	(8)	-----	-----
North Dakota:																								
1938	7.3	19.0	44	1.2	(7)	1.2	1.7	12.0	.6	10.3	(7)	(7)	1.2	20.6	84.2	23.0	59.2	146.6	66.4	49.8	5.2	46.4	42.4	10.9
1937	9.6	19.5	69	6.2	(7)	(7)	1.7	(7)	1.7	68.9	(7)	.6	4.0	30.4	90.8	24.7	87.3	181.5	113.7	53.4	12.1	41.4	53.4	9.8
Ohio:																								
1938	12.0	16.1	49	3.5	.4	5.1	2.1	2.0	1.6	20.2	.2	.4	1.1	48.8	127.6	28.2	112.0	300.7	96.0	57.3	3.5	83.1	79.8	23.3
1937	13.8	14.8	61	6.0	.6	.7	3.1	4.0	1.9	78.6	.2	1.1	2.2	55.6	112.2	32.4	124.0	325.3	148.0	62.5	4.3	88.5	94.7	37.8
1936	13.2	14.7	52	5.1	.6	.8	3.6	2.2	1.8	30.7	.2	1.1	3.5	55.4	127.7	31.8	129.5	317.4	131.2	68.7	3.7	98.2	-----	-----
Oklahoma:																								
1938	9.0	18.5	49	4.7	2.2	1.1	1.4	9.8	7.0	34.6	1.7	.2	1.7	54.1	75.4	14.4	75.4	126.8	96.1	50.8	6.0	66.6	64.4	17.4
1937	10.6	16.1	72	7.2	1.9	1.0	2.1	1.6	3.3	121.6	1.0	.3	4.5	55.7	70.8	15.1	73.5	153.3	150.1	53.0	2.2	71.1	61.9	22.6
Oregon:																								
1938	12.2	15.7	38	3.8	(7)	(7)	1.6	1.6	1.2	16.5	.8	2.7	1.2	28.2	131.3	25.1	107.4	299.0	81.9	45.5	1.2	120.3	70.9	17.6
1937	14.5	14.8	49	4.3	.8	.4	2.4	3.2	.4	98.7	(7)	.8	.8	39.5	126.8	28.4	114.9	351.5	122.4	63.6	.4	126.8	74.6	24.1
Pennsylvania:[10]																								
1938	12.0	16.3	52	3.6	.5	4.9	2.0	1.6	1.8	20.4	(7)	.8	.9	42.1	118.1	37.4	89.6	347.4	98.0	55.5	4.5	85.3	60.6	16.8
1937	13.7	15.5	62	5.3	.4	.4	2.7	3.8	1.8	92.5	.1	.9	2.2	54.2	114.0	37.9	87.9	360.1	148.9	55.7	4.0	98.3	61.9	19.4
1936	12.6	15.9	53	5.5	.6	.5	1.9	1.3	1.7	24.0	.1	.4	1.6	46.6	115.0	35.5	101.7	341.6	123.2	56.2	5.5	95.6	-----	-----
Rhode Island:[10]																								
1938	13.4	15.2	46	1.0	.9	(7)	.9	1.8	(7)	11.8	(7)	1.8	1.8	50.0	162.6	43.6	100.8	396.1	159.0	59.0	2.7	122.6	61.8	14.5
1937	15.6	14.9	62	4.9	(7)	(7)	2.7	.9	.9	44.5	(7)	(7)	4.5	57.2	170.8	54.5	109.9	463.3	190.8	60.9	2.7	138.1	52.7	17.3
1936	13.8	15.0	49	2.4	(7)	1.8	3.6	.9	.9	24.2	(7)	1.8	5.4	44.8	132.6	39.4	117.3	412.9	189.9	60.0	4.5	125.4	-----	-----

South Carolina:[10]																								
1938	9.8	16.4	86	7.4	1.6	7.2	1.6	8.5	1.3	68.6	.3	.3	1.0	36.8	43.3	11.5	82.4	173.0	121.4	12.1	.3	85.0	50.2	21.3
1937	8.9	14.6	107	9.9	1.6	1.0	(7)	1.0	4.9	65.4	(7)	.6	1.6	37.8	40.4	9.2	80.2	150.6	110.8	11.8	3.9	69.1	42.4	21.4
1936	10.7	15.6	105	9.4	2.0	.6	.6	2.3	3.3	82.0	.3	(7)	3.6	49.2	41.3	12.1	95.1	165.3	172.8	18.4	1.6	75.1	-----	-----
South Dakota:																								
1938	8.3	16.5	55	2.5	1.8	.6	1.8	15.2	.6	18.2	(7)	(7)	(7)	38.7	93.2	21.7	66.8	179.9	77.4	41.6	1.8	42.8	45.1	10.0
1937	10.4	17.1	68	5.1	.6	(7)	5.9	.6	(7)	127.2	(7)	.6	2.9	37.5	83.8	28.7	71.5	182.3	128.9	44.5	2.3	58.0	41.0	8.8
1936	9.4	18.5	49	4.7	1.7	.6	4.1	1.2	1.2	23.8	(7)	.6	(7)	39.5	91.8	20.9	86.0	177.3	100.5	48.2	5.2	75.6	-----	-----
Tennessee:																								
1938	9.5	14.7	63	6.9	.7	10.7	.6	6.2	3.5	46.9	.7	.6	2.5	74.4	64.0	10.8	79.7	152.6	121.0	47.2	2.6	59.7	57.4	19.4
1937	11.2	14.2	78	9.2	1.1	1.1	1.0	3.8	4.9	117.2	.3	.7	4.0	85.5	61.7	12.9	81.6	164.9	164.7	47.8	2.6	60.6	63.5	22.6
1936	12.1	14.9	75	7.9	1.1	.7	2.0	3.2	4.6	107.0	.6	.4	6.6	90.8	62.1	12.8	79.5	172.3	204.6	54.2	3.7	67.3	-----	-----
Utah:																								
1938	9.5	24.3	52	3.2	(7)	3.1	3.1	4.7	(7)	21.0	(7)	(7)	4.7	21.0	84.2	22.6	50.7	245.7	88.9	60.0	3.9	56.9	81.9	34.3
1937	10.9	21.7	45	5.0	(7)	.8	3.1	3.9	.8	67.2	.8	1.6	3.1	21.9	93.0	22.7	67.5	275.8	96.1	73.4	3.1	57.0	74.2	27.4
Vermont:																								
1938	12.3	14.8	55	3.5	(7)	10.5	(7)	4.2	(7)	24.2	(7)	(7)	(7)	45.2	121.9	30.5	120.0	339.4	134.5	65.1	2.1	87.2	49.4	12.6
1937	13.5	11.8	58	15.2	2.1	(7)	(7)	2.1	2.1	93.2	(7)	(7)	1.0	54.0	136.6	19.1	119.6	349.4	151.4	60.4	5.3	74.1	70.9	16.9
Virginia:																								
1938	11.2	17.5	73	5.6	1.2	6.2	.3	7.7	3.3	36.5	(7)	.1	2.2	68.9	71.7	18.7	94.1	245.2	112.6	40.9	3.6	85.7	59.1	21.2
1937	12.7	17.5	81	5.5	.9	2.8	.6	6.6	3.1	107.0	.6	.9	7.2	67.1	69.5	18.1	99.7	244.6	191.2	39.3	2.4	96.5	59.0	21.9
1936	13.4	19.2	70	6.7	1.3	1.1	.9	4.4	4.7	83.1	.5	.5	10.0	71.0	70.0	20.2	108.7	262.2	172.3	44.1	3.9	106.6	-----	-----
Washington:																								
1938	11.6	14.1	43	4.0	.5	.5	.5	3.2	.7	22.1	.2	2.2	1.2	44.7	137.4	27.4	114.6	293.8	92.5	56.6	.5	75.3	69.9	24.0
1937	13.1	12.6	56	5.2	1.0	2.0	2.2	.2	1.2	75.1	.2	2.0	1.5	45.0	126.2	28.9	114.6	321.4	121.3	57.0	1.0	88.5	80.0	23.0
1936	13.5	13.8	48	4.6	.5	4.2	3.2	.7	.5	56.5	.7	2.4	2.9	58.0	128.3	29.1	116.5	323.9	124.8	66.6	1.0	87.6	-----	-----
Wisconsin:																								
1938	10.8	17.2	47	2.5	.3	1.4	1.6	1.6	.7	10.9	.3	.4	.1	30.6	136.4	32.8	100.2	307.1	84.5	(8)	2.9	69.5	54.3	13.0
1937	12.8	16.3	56	4.6	.3	.1	4.7	1.0	1.0	73.3	(7)	.3	1.1	39.4	130.7	34.8	103.0	318.5	114.9	(8)	3.9	81.8	64.0	19.0
1936	11.7	16.3	55	4.4	.4	.7	7.6	2.1	.1	25.4	(7)	.3	1.9	39.3	132.6	29.2	106.8	310.6	103.2	(8)	4.4	77.0	-----	-----
Wyoming:																								
1938	9.3	16.9	60	7.1	(7)	(7)	(7)	29.1	1.7	27.4	(7)	(7)	1.7	18.8	97.5	15.4	61.6	215.6	104.4	71.9	8.6	47.9	85.6	34.2
1937	12.6	17.9	71	8.7	1.7	1.7	12.1	3.5	(7)	158.8	1.7	1.7	5.2	15.6	57.0	6.9	65.6	253.7	201.9	70.8	13.8	22.4	89.7	20.7

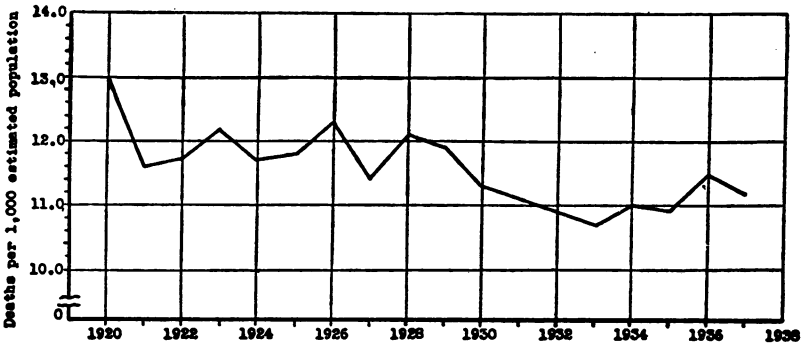
[7] No deaths reported.
[8] Data not available.
[9] Less than 0.1 of 1 per 100,000 population.
[10] January and February only.

PROVISIONAL BIRTH, DEATH, AND INFANT MORTALITY RATES FOR 1937

Preliminary figures on births, deaths, and infant mortality in the United States in 1937 show improvement over conditions in 1936—the general death rate was slightly lower, the infant mortality rate was the lowest in the history of the birth registration area, and the birth rate was higher than in either 1935 or 1936.

PROVISIONAL MORTALITY STATISTICS

According to provisional tabulations [1] of the Bureau of the Census, Department of Commerce, there were 1,450,715 registered deaths in the United States in 1937, a decrease of 28,513 from the 1,479,228 reported for 1936. This figure gives a provisional crude death rate of 11.2 per 1,000 population for 1937, a decrease from the rate of 11.5 for 1936. Although the 1937 rate shows a decrease from the 1936 rate, it is still appreciably higher than the lowest death rate recorded



Fluctuations of the death rate in the United States death registration area, 1920-1937

for the United States registration area, 10.7 per 1,000 population in 1933. The accompanying table, giving the crude rate for each year beginning with 1900, is presented for comparison with earlier years.

Death rate (number per 1,000 population) for the United States,[1] by years, 1900–37

Year	Death rate	Year	Death rate	Year	Death rate	Year	Death rate
1937	[2] 11.2	1927	11.4	1917	14.3	1907	16.0
1936	11.5	1926	12.3	1916	14.0	1906	15.7
1935	10.9	1925	11.8	1915	13.6	1905	16.0
1934	11.0	1924	11.7	1914	13.6	1904	16.5
1933	10.7	1923	12.2	1913	14.1	1903	16.0
1932	10.9	1922	11.7	1912	13.9	1902	15.9
1931	11.1	1921	11.6	1911	14.2	1901	16.5
1930	11.3	1920	13.0	1910	15.0	1900	17.6
1929	11.9	1919	12.9	1909	14.4		
1928	12.1	1918	18.1	1908	14.8		

[1] The expanding death registration area up to 1933, since (and including) which year the death registration area has included the entire United States.
[2] Provisional rate.

[1] Vital Statistics—Special Reports, Vol. 5, No. 32, p. 113, June 15, 1938.

Thirty-three States and the District of Columbia showed a decrease in the death rate in 1937 as compared with 1936, 6 States showed no change, and 9 States showed an increase. The greatest decreases for 1937 occurred in Nevada, Kansas, Georgia, and Tennessee, but in all of these States the 1936 rates were higher than usual.

The highest death rates are shown for Arizona, 16.8; New Mexico, 15.2; District of Columbia, 13.9; and Maine, 13.4. The lowest rates are for North Dakota, 7.7; Oklahoma, 8.4; South Dakota, 8.6; and Arkansas, 9.0. Differences in crude rates, however, do not necessarily indicate corresponding differences in health conditions. All areas do not have the same age, sex, and racial distributions of the population; and these factors, among others, partly determine the death rate.

All data for the years prior to 1937 are final tabulations. Figures for 1937 are based on hand counts of copies of death certificates received by the Bureau of the Census from State offices of vital statistics. For the States from which the shipment of copies is complete, these provisional figures will agree closely with the final tabulations. In other States it may be expected that a few delayed certificates will be added before final tabulations are completed.

The transcripts for Massachusetts (except Boston, which is complete for the year) have been received through November 1937, and those for New York State (except New York City, which is also complete for the year) through September. In these two States, the 1937 provisional figures are based on the available 1937 data and are estimates.

Death rates (number of deaths per 1,000 estimated population) for the death registration area and for each State, 1928–37

State	[1] 1937	1936	1935	1934	1933	1932	1931	1930	1929	1928
Registration area	11.2	11.5	10.9	11.0	10.7	10.9	11.1	11.3	11.9	12.1
Alabama	10.7	10.9	10.1	10.5	9.8	10.1	10.5	11.4	12.4	12.3
Arizona	16.8	16.1	15.0	13.9	13.4	12.9	14.3	15.4	15.9	15.4
Arkansas	9.0	9.1	8.1	8.5	8.5	8.5	9.4	10.2	10.5	10.9
California	13.0	12.6	12.1	11.5	11.6	11.6	11.7	11.6	11.9	12.5
Colorado	12.9	12.8	12.4	11.8	11.4	12.0	11.9	12.7	12.5	13.8
Connecticut	10.3	10.3	10.3	10.3	10.4	10.2	10.5	10.7	11.5	11.4
Delaware	12.6	12.8	12.5	13.3	13.2	12.9	13.6	13.6	13.2	13.6
District of Columbia	13.9	14.7	14.3	14.8	14.5	15.1	15.2	15.0	15.4	15.1
Florida	12.6	12.8	12.4	12.8	12.0	11.9	12.0	12.4	12.7	13.7
Georgia	11.2	12.2	11.3	11.8	10.4	10.8	11.2	12.1	12.2	12.4
Idaho	9.6	10.3	9.5	9.3	8.7	8.6	8.8	9.3	9.2	9.4
Illinois	11.1	11.8	10.9	11.2	10.6	10.8	11.2	10.9	11.6	12.1
Indiana	11.8	12.3	11.5	12.0	11.3	11.6	11.8	12.1	12.7	12.7
Iowa	10.4	11.2	10.4	10.6	10.2	10.3	10.3	10.6	10.4	10.3
Kansas	10.3	11.5	10.8	10.7	10.5	10.4	9.9	10.4	10.4	11.2
Kentucky	10.6	11.2	10.3	10.7	10.3	10.7	10.8	11.2	12.0	11.8
Louisiana	11.7	12.2	11.2	11.0	10.9	11.0	11.1	11.7	11.9	12.2
Maine	13.4	13.3	13.0	13.1	13.4	13.1	13.0	13.9	14.3	13.9
Maryland	13.2	13.1	12.7	12.6	12.4	12.7	13.2	13.2	13.5	13.6
Massachusetts	11.8	11.8	11.5	11.7	11.8	11.5	11.4	11.6	12.3	12.2

[1] 1937 rates are provisional.

Death rates (number of deaths per 1,000 estimated population) for the death registration area and for each State, 1928–37—Continued

State	[1] 1937	1936	1935	1934	1933	1932	1931	1930	1929	1928
Michigan	11.1	11.5	10.8	10.8	10.3	10.4	10.3	10.7	11.8	11.8
Minnesota	10.1	10.9	10.0	10.1	9.7	9.9	9.8	10.0	10.1	10.3
Mississippi	11.8	12.0	10.6	10.9	10.8	10.1	11.0	12.0	13.0	13.1
Missouri	11.3	12.3	11.0	12.1	11.1	11.6	11.9	11.8	12.3	12.6
Montana	11.4	11.8	11.8	10.6	9.8	9.9	9.9	10.1	10.7	10.7
Nebraska	9.7	10.1	9.7	9.8	9.4	9.4	9.4	9.7	9.8	10.0
Nevada	13.1	14.4	13.4	13.2	12.8	14.1	14.5	12.7	13.3	(•)
New Hampshire	12.8	12.7	13.0	12.9	13.3	13.1	12.5	13.5	14.1	14.0
New Jersey	10.4	10.4	10.1	10.3	10.4	10.3	10.8	10.7	11.6	11.6
New Mexico	15.2	14.8	14.9	14.5	13.8	14.1	14.6	15.6	15.4	(•)
New York	11.9	11.9	11.5	11.6	11.6	11.6	11.7	11.7	12.4	12.4
North Carolina	9.7	10.3	9.8	10.4	9.2	9.5	10.2	11.2	11.8	11.8
North Dakota	7.7	8.0	8.4	8.4	7.9	7.5	7.5	7.9	8.0	8.2
Ohio	11.9	12.1	11.5	11.5	10.9	11.4	11.3	11.5	12.4	12.3
Oklahoma	8.4	9.2	8.4	8.6	8.2	7.9	7.7	8.2	9.0	9.0
Oregon	12.0	12.2	11.3	10.6	10.6	10.5	10.6	11.0	11.3	11.3
Pennsylvania	11.3	11.1	10.8	11.0	10.7	11.1	11.5	11.6	12.3	12.6
Rhode Island	12.2	11.9	11.5	11.3	11.6	11.8	11.6	11.7	13.1	12.5
South Carolina	11.0	11.5	11.1	11.7	10.7	11.1	11.9	12.9	13.3	14.1
South Dakota	8.6	8.9	9.1	9.3	8.8	8.3	8.5	8.5	(•)	(•)
Tennessee	10.5	11.4	10.6	10.9	10.2	10.6	10.7	11.4	12.2	12.2
Texas	10.6	10.8	10.1	9.9	9.8	(•)	(•)	(•)	(•)	(•)
Utah	9.6	9.9	9.8	9.4	8.5	8.6	8.8	9.9	10.1	10.3
Vermont	13.0	13.0	12.7	13.0	12.5	12.9	12.3	13.0	14.7	13.6
Virginia	11.5	12.1	11.5	11.7	11.1	11.5	12.1	12.5	13.0	12.6
Washington	11.5	11.8	11.1	10.8	10.4	10.4	10.4	10.6	10.6	10.9
West Virginia	10.3	10.9	10.1	10.0	9.3	10.1	10.0	10.5	10.6	10.4
Wisconsin	10.9	11.4	10.6	10.5	10.1	10.4	10.3	10.4	10.7	11.0
Wyoming	10.3	10.3	9.8	9.1	8.6	9.0	8.9	9.2	9.0	9.8

• Not in registration area.

PROVISIONAL SUMMARY OF INFANT MORTALITY

According to provisional Nation-wide tabulations of the Bureau of the Census,[2] the infant mortality rate (number of deaths under 1 year of age per 1,000 live births) for the United States in 1937 was 54.4. This figure is the lowest infant mortality rate in the history of the Bureau of the Census birth registration area, and represents the culmination of two decades of general decrease in infant mortality.

Provisional figures indicate that there were 119,760 infant deaths in 1937, as compared with 122,535 in 1936. The corresponding decrease in rate from 57.1 in 1936 to 54.4 in 1937 is consistent with the general trend as shown in the accompanying graph and rate table.

Infant mortality rate (deaths under 1 year per 1,000 live births) for the United States, 1915–37

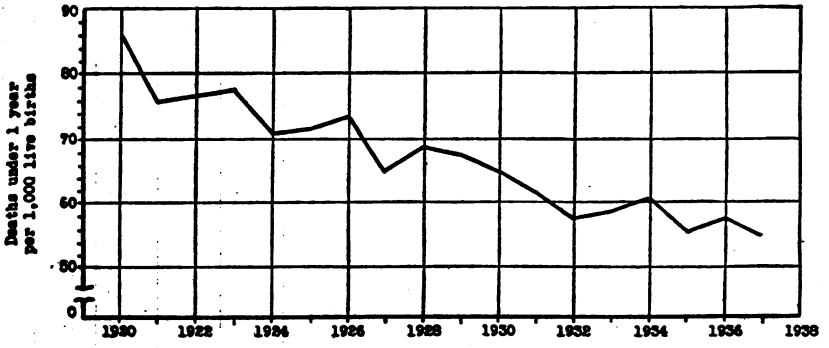
Year	Death rate	Year	Death rate	Year	Death rate	Year	Death rate	Year	Death rate
1937	• 54.4	1932	57.6	1927	64.6	1922	76.2	1917	93.8
1936	57.1	1931	61.6	1926	73.3	1921	75.6	1916	101.0
1935	55.7	1930	64.6	1925	71.7	1920	85.8	1915	99.9
1934	60.1	1929	67.6	1924	70.8	1919	86.6		
1933	58.1	1928	68.7	1923	77.1	1918	100.9		

• Provisional.

[1] Vital Statistics—Special Reports, Vol. 5, No. 33, p. 119, June 15, 1938.

In 1937, 36 States and the District of Columbia showed a decrease in the infant mortality rate from 1936, whereas 13 States showed an increase.

All data for the years prior to 1937 are final tabulations. Figures for 1937 are based on hand counts of copies of death certificates received by the Bureau of the Census from State offices of vital statistics. For



Fluctuations of the infant mortality rate in the United States birth registration area, 1920–1937

the States from which the shipment of copies is complete, these provisional figures will agree closely with the final tabulations. In other States it may be expected that a few delayed certificates will be added before final tabulations are completed.

The transcripts for Massachusetts (except Boston, which is complete for the year) have been received through November 1937, and those for New York State (except New York City, which is also complete for the year) through September. In these two States the 1937 provisional figure is based on the available 1937 data and is an estimate.

While the reduction shown in the infant mortality rate for the country as a whole, from 101.0 per 1,000 births in 1916 to 54.4 in 1937, is a noteworthy achievement in public health, the possibility of further reduction is indicated by some of the rates for large cities. For cities of 100,000 or more population, Rochester, N. Y., is credited with a rate of 27.2, and Long Beach, Calif., with a rate of 28.4. According to a recent report,[3] Adelaide, in South Australia, with a population of over 300,000, had an infant mortality rate of 23 per 1,000 births for the year ended March 31, 1937, as compared with an average for the nine preceding years of 55. This reduction in infant mortality in Adelaide is attributed to such factors as improved milk sanitation, education in health matters, especially maternal and child health, and to the reduction in the numbers of flies as a result of fewer horses and stables.

[3] J. Am. Med. Assoc., June 18, 1938, p. 242B.

Infant death rates (number of deaths under 1 year of age per 1,000 live births) for the birth registration area and for each State, 1928–37

Area	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928
Registration area	[1] 54.4	57.1	55.7	60.1	58.1	57.6	61.6	64.6	67.6	68.7
Alabama	62.9	66.8	62.8	67.8	65.1	60.9	61.4	72.1	73.6	75.0
Arizona	120.1	119.6	111.7	103.5	111.4	95.9	109.6	116.6	133.3	141.5
Arkansas	55.4	50.9	47.1	54.1	54.4	45.3	49.0	51.5	58.1	66.9
California	53.9	53.1	49.6	51.7	53.7	52.7	56.7	58.7	63.2	62.2
Colorado	75.0	74.1	72.7	72.7	68.9	71.5	81.0	94.3	91.4	89.4
Connecticut	40.4	42.0	42.7	48.8	48.4	49.4	53.8	56.0	64.4	58.6
Delaware	67.2	64.5	66.4	61.4	60.4	67.1	81.7	78.5	81.2	78.4
District of Columbia	61.4	72.4	59.4	65.3	67.2	72.9	67.0	70.8	70.7	65.1
Florida	60.0	59.4	61.9	68.2	62.9	61.1	63.9	64.2	65.5	67.1
Georgia	61.9	70.0	68.3	78.9	66.7	64.4	68.3	77.4	76.3	81.6
Idaho	43.8	51.4	51.0	50.3	47.2	43.4	55.9	57.1	55.3	59.0
Illinois	43.2	46.8	45.9	52.8	49.0	52.8	58.6	55.8	61.4	64.2
Indiana	49.7	50.7	50.8	56.5	53.0	54.7	57.6	57.7	63.6	62.5
Iowa	44.2	48.2	47.1	50.6	48.3	47.9	49.0	53.9	52.6	53.0
Kansas	44.4	51.8	50.3	48.5	53.5	48.1	47.9	52.6	57.6	59.0
Kentucky	59.1	66.8	58.7	64.9	58.1	63.3	65.0	65.4	70.9	69.6
Louisiana	65.6	71.9	69.4	69.1	70.1	64.8	65.9	78.2	74.0	78.4
Maine	65.3	64.1	63.0	70.6	66.3	63.1	71.5	75.7	77.4	72.5
Maryland	61.6	69.1	62.0	70.4	65.8	69.0	80.5	75.3	79.9	79.6
Massachusetts	42.3	46.5	48.3	49.0	52.0	52.9	54.5	60.1	61.8	64.3
Michigan	47.8	50.7	47.7	52.0	50.5	54.0	57.0	62.7	66.4	69.4
Minnesota	40.8	44.4	44.7	47.2	47.6	47.2	50.6	52.5	51.2	53.6
Mississippi	59.0	58.2	53.9	64.8	63.6	53.6	55.9	67.7	72.1	73.8
Missouri	57.0	57.9	56.9	63.1	55.4	57.2	62.8	58.6	62.1	65.6
Montana	50.6	57.0	60.0	53.5	51.5	51.4	60.5	58.5	64.0	61.4
Nebraska	41.9	44.1	41.2	45.5	49.3	43.4	48.8	49.4	51.7	52.8
Nevada	40.2	69.8	71.0	59.3	73.2	69.8	74.4	68.3	67.2	[2]
New Hampshire	48.2	46.2	53.9	60.7	55.9	58.9	57.3	61.4	68.2	69.4
New Jersey	39.4	44.3	46.2	49.1	46.3	50.2	56.8	56.5	60.1	65.2
New Mexico	129.3	121.8	129.3	126.3	136.1	119.4	134.4	145.4	145.5	[2]
New York	44.9	47.0	48.0	51.9	53.6	52.8	57.4	58.8	60.8	65.0
North Carolina	63.3	68.9	68.8	77.9	66.0	66.5	72.9	78.6	79.1	85.7
North Dakota	51.9	49.7	59.4	57.3	60.0	55.5	58.8	61.7	67.2	59.5
Ohio	49.4	51.2	50.4	53.7	52.7	58.5	60.0	60.7	68.8	66.1
Oklahoma	56.6	60.0	54.6	60.5	56.4	50.0	51.5	60.7	70.2	69.0
Oregon	41.6	44.3	41.2	39.8	40.3	41.3	43.7	50.0	47.9	46.6
Pennsylvania	50.4	51.2	50.8	55.0	53.4	60.0	66.7	68.0	70.5	72.1
Rhode Island	47.6	48.2	47.2	53.9	55.5	57.2	60.8	61.8	72.0	67.2
South Carolina	76.6	80.8	79.3	83.0	78.2	77.2	81.0	88.7	91.0	96.5
South Dakota	51.0	47.8	52.5	58.0	54.8	50.4	[2]	[2]	[2]	[2]
Tennessee	61.2	68.5	64.0	73.7	69.3	67.6	67.6	75.7	77.1	80.9
Texas	73.8	71.2	71.7	71.9	75.5	[2]	[2]	[2]	[2]	[2]
Utah	41.4	52.7	49.3	49.2	47.6	44.2	51.4	57.4	59.1	58.9
Vermont	49.8	58.0	48.6	52.6	53.0	63.2	59.9	64.8	65.8	65.2
Virginia	69.9	73.9	69.6	72.6	68.5	67.2	76.3	77.3	78.8	75.9
Washington	39.9	45.4	45.2	43.2	38.8	45.2	48.3	48.7	49.0	48.1
West Virginia	62.1	71.2	60.6	67.4	68.2	75.0	77.2	81.0	77.6	70.1
Wisconsin	43.3	47.7	46.0	49.4	48.5	50.4	53.1	55.7	59.6	61.4
Wyoming	55.6	57.6	51.1	53.0	54.7	57.0	66.8	69.3	70.3	67.8

[1] Provisional.
[2] Not added to birth registration area until a later date.

BIRTH RATES

The provisional birth rates for 1937, by States, are presented in the accompanying table, which also includes, for the purpose of convenient comparison, the death and infant mortality rates.

After a 2-year decline, there was a slight increase shown in the birth rate in 1937. The rate for the original birth registration area in 1915, the year in which that area was established, was 25.1, the highest rate for the 23 years to 1937. The birth rate has shown a somewhat regular decline during that period, broken in only 5 years by a slight increase over the preceding year.

The lowest birth rate is that for New Jersey, 12.6; the lowest death rate that for North Dakota, 7.7; while New Jersey is credited with having the lowest infant mortality rate, 39.4. New Mexico had both the highest birth rate and the highest infant mortality rate for 1937, while the highest crude death rate is that for Arizona, 16.8 per 1,000 population. As frequently stated, the relative healthfulness of the various States or the effectiveness of their health organizations should not be judged on the basis of crude death rates, as many determining factors enter into their composition.

As pointed out by students of population, the excess of the crude birth rate over the crude death rate does not give an accurate index of the future natural growth of our population. Both the birth rate and the death rate are affected by the age distribution of the population; and this is undergoing a change, with a shift toward the older age groups. However, it involves only simple arithmetic to demonstrate annual net increases in the population on the basis of such birth rates, death rates, and population composition as obtained in 1937.

Provisional birth, death, and infant mortality rates, 1937 [1]

Area	Rate per 1,000 estimated population		Deaths under 1 year per 1,000 live births	Area	Rate per 1,000 estimated population		Deaths under 1 year per 1,000 live births
	Birth	Death			Birth	Death	
United States	17.0	11.2	54.4	Montana	19.0	11.4	50.6
				Nebraska	16.3	9.7	41.9
Alabama	21.1	10.7	62.9	Nevada	17.2	13.1	40.2
Arizona	25.5	16.8	120.1	New Hampshire	15.0	12.8	48.2
Arkansas	17.0	9.0	55.4	New Jersey	12.6	10.4	39.4
California	15.2	13.0	53.9	New Mexico	31.4	15.2	129.3
Colorado	18.3	12.9	75.0	New York	14.4	11.9	44.9
Connecticut	13.1	10.3	40.4	North Carolina	22.6	9.7	63.3
Delaware	15.8	12.6	67.2	North Dakota	17.9	7.7	51.9
Dist. of Columbia	19.7	13.9	61.4	Ohio	16.0	11.9	49.4
Florida	17.7	12.6	60.0	Oklahoma	16.3	8.4	56.6
Georgia	20.8	11.2	61.9	Oregon	15.0	12.0	41.6
Idaho	21.0	9.6	43.8	Pennsylvania	15.8	11.3	50.4
Illinois	14.6	11.1	43.2	Rhode Island	15.0	12.2	47.6
Indiana	16.1	11.8	49.7	South Carolina	21.7	11.0	76.6
Iowa	16.5	10.4	44.2	South Dakota	17.1	8.6	51.0
Kansas	15.7	10.3	44.4	Tennessee	18.0	10.5	61.2
Kentucky	19.2	10.6	59.1	Texas	18.8	10.6	73.8
Louisiana	21.6	11.7	65.6	Utah	24.5	9.6	41.4
Maine	17.8	13.4	65.3	Vermont	16.5	13.0	49.8
Maryland	16.5	13.2	61.6	Virginia	18.7	11.5	69.9
Massachusetts	14.0	11.8	42.3	Washington	15.1	11.5	39.9
Michigan	19.0	11.1	47.8	West Virginia	22.7	10.3	62.1
Minnesota	18.1	10.1	40.8	Wisconsin	18.3	10.9	43.3
Mississippi	25.8	11.8	59.0	Wyoming	19.3	10.3	55.6
Missouri	14.3	11.3	57.0				

[1] From the Bureau of the Census, Department of Commerce.

DEATH RATES FOR CERTAIN IMPORTANT CAUSES OF DEATH, BY STATES, 1936

The accompanying table, issued recently by the Bureau of the Census, presents the death rates for several important causes of death for 1936, by States.

The gross death rate for all causes for the United States in 1936 was 1,151.8 per 100,000 population (11.5 per 1,000), the highest since 1929, in which year the rate was 1,191.9 per 100,000.

The highest death rate for all causes for individual States is that for Arizona, 1,613.5; while the lowest, 804.3, is for North Dakota. Caution must be observed in interpreting the comparative healthfulness of different States or localities on the basis of a comparison of the gross death rates, as a great many factors enter into the determination of these rates, such, for instance, as the age composition of the population, the tendency for persons suffering from certain diseases to migrate to localities considered to have a more favorable climate, the completeness of reporting deaths, and the adequacy of State and local health departments.

The highest rates for diseases of the heart are shown for the New England States—New Hampshire, 361.6; Massachusetts, 358.7; Vermont, 356.6; Rhode Island, 355.8. New York and the District of Columbia come next, with rates of 351.5 and 348.3, respectively. The lowest rate is that for Arkansas, 117.8, while the Southern States generally have lower rates than the remainder of the country.

The highest death rate for cancers and other malignant tumors, 153.0 per 100,000, is for Massachusetts, and the lowest, 50.0, for Arkansas. For the country as a whole, the highest cancer mortality rates are found generally in the Northern and far Western States and the lowest rates in the South. Probably the most important factor in the difference between the rates for the Northern and those for the Southern States is the Negro population in the South, in whom the cancer death rate is much lower than in white persons, especially with regard to males.

Pneumonia, nephritis, and cerebral hemorrhage apparently show little difference in the geographical distribution of low and high death rates. The highest rates for tuberculosis, as may be expected, are found in those States which, because of the climate, attract tuberculous patients, viz, Arizona and New Mexico, while the rates generally are higher in the Southern States than in the North. The District of Columbia has a rate nearly twice as high as the rate for the country as a whole; but the District is composed principally of a metropolitan area, and approximately 30 percent of the population is colored.

The death rates for motor vehicle accidents are of considerable interest. At first thought, without a consideration of the various

constituent factors involved, one might expect to find the highest rates in the States with large cities and with the highest concentration of population, whereas they actually prevail in the Western States of "wide-open spaces" and with the lowest concentration of population. The highest death rates for this cause are found in Nevada, with a rate of 74.0 per 100,000 population, in Arizona, with a rate of 59.6, and New Mexico, with a rate of 49.1. These rates may be compared with a rate of 21.4 for New York, 31.6 for Illinois, 24.3 for Pennsylvania, 26.1 for New Jersey, and 29.7 for the country as a whole. An analysis of these rates should apparently include a consideration of such factors as the number of automobiles per unit of population, the quality and character of the highways, speed limits and general traffic regulations, the relative mileage of level roads with long, straightaway courses which would naturally encourage speeding, educational activities of official and non-official organizations, and other associated factors.

Death rates (number of deaths per 100,000 population) for leading causes of death, by States, 1936 [1]

Area	Total, all causes	Diseases of the heart (90–95)	Cancers and other malignant tumors (45–53)	Pneumonia (all forms) (107–109)	Nephritis (130–132)	Cerebral hemorrhage and softening (82a, 82c)	Tuberculosis (all forms) (23–32)	Congenital malformations and diseases of early infancy (157–161)	Motor vehicle accidents (206, 208, 210, 211)	Influenza (11)
United States	1,151.8	265.8	111.0	93.0	83.2	81.2	55.7	49.7	29.7	26.3
Alabama	1,087.7	150.3	60.3	94.0	82.7	68.5	64.2	61.2	24.4	51.9
Arizona	1,613.5	215.3	76.1	165.3	67.5	50.7	274.6	87.4	59.6	52.2
Arkansas	912.8	117.8	50.0	102.9	66.3	50.0	55.4	30.8	21.4	56.7
California	1,255.9	334.3	144.0	78.5	79.9	75.3	76.2	40.8	51.5	11.1
Colorado	1,282.7	250.0	116.7	131.3	84.3	79.1	76.3	60.5	36.4	32.5
Connecticut	1,029.9	304.3	129.5	67.6	82.0	73.6	39.3	38.0	26.0	7.2
Delaware	1,280.7	346.3	122.0	84.6	119.3	103.1	49.4	50.2	33.6	10.8
Dist. of Col	1,469.1	348.3	140.2	138.9	95.3	88.7	106.1	75.0	26.7	7.1
Florida	1,276.1	238.4	88.4	85.5	104.4	100.2	54.6	52.9	41.8	53.5
Georgia	1,217.7	179.9	57.9	120.5	110.2	85.8	56.0	59.6	32.5	58.0
Idaho	1,033.8	215.7	92.6	89.3	61.9	67.0	24.7	63.7	38.8	27.6
Illinois	1,183.0	321.3	132.0	78.9	101.7	72.8	51.7	41.1	31.6	14.4
Indiana	1,227.8	290.6	115.4	90.5	112.6	106.4	49.4	46.5	39.7	30.1
Iowa	1,118.0	249.4	131.9	80.8	64.1	110.1	23.8	52.5	22.3	23.1
Kansas	1,149.2	250.7	114.5	83.4	89.5	98.2	28.6	48.1	30.8	43.4
Kentucky	1,123.1	207.1	74.6	104.4	76.2	81.5	71.7	56.1	24.2	43.3
Louisiana	1,224.0	232.0	81.7	118.3	105.4	68.3	73.3	68.6	27.4	49.5
Maine	1,327.7	344.4	151.3	96.4	87.1	117.6	39.7	71.7	25.2	24.9
Maryland	1,311.8	304.5	128.1	109.9	140.1	104.8	85.2	52.5	27.6	12.2
Massachusetts	1,176.3	358.7	153.0	93.9	73.5	87.9	43.8	43.8	20.3	6.7
Michigan	1,145.3	292.8	116.4	85.8	62.5	90.5	44.1	53.5	40.4	11.7
Minnesota	1,086.5	251.2	133.5	90.7	48.1	86.6	36.8	54.0	26.9	13.9
Mississippi	1,201.6	156.7	64.6	92.0	102.4	72.6	63.4	46.1	25.8	71.3
Missouri	1,231.8	260.3	118.0	116.7	115.6	86.3	58.2	42.3	25.8	38.7

Figures in parentheses in column headings are disease title numbers from the International List of the Causes of Death.

Death rates (number of deaths per 100,000 population) for leading causes of death, by States, 1936—Continued

Area	Total, all causes	Diseases of the heart (90-95)	Cancers and other malignant tumors (45-53)	Pneumonia (all forms) (107-109)	Nephritis (130-132)	Cerebral hemorrhage and softening (82a, 82c)	Tuberculosis (all forms) (23-32)	Congenital malformations and diseases of early infancy (157-161)	Motor vehicle accidents (206, 208, 210, 211)	Influenza (11)
Montana	1,178.0	235.0	106.8	118.8	65.3	75.9	41.6	61.2	32.8	19.0
Nebraska	1,008.2	228.7	114.7	73.8	69.1	83.5	18.3	48.8	22.7	19.9
Nevada	1,439.0	290.0	95.0	148.0	84.0	64.0	88.0	56.0	74.0	26.0
New Hampshire	1,267.3	361.6	148.2	96.7	84.6	122.2	33.7	47.4	23.6	25.4
New Jersey	1,038.8	308.6	124.7	67.7	77.4	72.0	49.4	33.6	26.1	7.9
New Mexico	1,480.6	135.8	55.7	144.8	67.1	42.9	122.0	82.9	49.1	34.8
New York	1,187.1	351.5	148.4	89.3	77.8	66.9	59.4	41.4	21.4	6.9
North Carolina	1,030.7	175.1	51.6	95.2	98.1	88.9	60.5	69.0	28.3	34.1
North Dakota	804.3	160.6	83.5	55.6	41.7	63.9	24.9	52.1	19.2	12.7
Ohio	1,205.7	282.8	127.5	87.0	84.4	106.4	52.7	46.9	36.1	20.3
Oklahoma	919.7	136.9	67.6	91.5	58.0	61.9	51.1	46.8	26.1	46.1
Oregon	1,216.0	277.4	135.1	93.3	104.3	98.2	36.5	39.4	36.3	19.8
Pennsylvania	1,112.0	303.2	118.9	89.6	85.1	81.2	46.5	48.0	24.3	16.9
Rhode Island	1,193.2	355.8	145.5	96.0	106.2	87.8	48.0	48.6	16.7	9.1
South Carolina	1,151.9	186.4	50.6	109.7	95.3	86.1	55.3	58.0	31.7	52.2
South Dakota	889.7	165.3	90.9	65.5	50.6	66.5	37.0	50.3	18.6	17.1
Tennessee	1,135.5	163.4	67.9	119.9	69.3	74.3	89.6	47.8	27.4	55.8
Texas	1,075.7	168.0	73.6	100.8	61.7	59.7	71.5	56.4	32.6	53.2
Utah	993.4	218.4	81.2	95.7	58.5	45.2	21.5	73.4	36.2	21.5
Vermont	1,304.5	356.3	137.6	111.8	88.2	106.8	42.6	62.1	26.8	31.1
Virginia	1,205.6	240.5	77.8	105.5	100.3	99.4	71.6	72.4	31.4	41.3
Washington	1,178.1	287.6	133.3	82.6	70.3	93.6	50.0	40.0	38.4	24.3
West Virginia	1,087.9	183.1	71.6	115.6	70.6	70.8	54.5	71.2	28.2	33.4
Wisconsin	1,143.1	294.3	135.0	79.3	71.4	92.9	37.1	53.7	26.9	16.3
Wyoming	1,030.5	207.3	73.8	113.3	53.2	70.0	18.0	65.2	48.9	24.0

[1] Vital Statistics—Special Reports, Vol. 5, No. 30, p. 97, May 27, 1938, issued by the Bureau of the Census, Department of Commerce.

METAL FUME FEVER AND ITS PREVENTION *

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SOURCES

Metal fume fever is an industrial disease of which there are many descriptions in the early literature, that by Thackrah (1831) being perhaps the clearest (*1*). Although cases of such poisoning were reported in connection with other metals, zinc and its alloy, brass, have long been considered the chief sources of it, and the resulting affection is variously known as "zinc fume fever," "brass founders' ague," "spelter shakes," "brass chills," and similar names.

Drinker and Hatch (*2*) described it as a transient, noncumulative malady resulting from breathing rather heavy concentrations of metal fumes like zinc oxide, copper oxide, magnesium oxide, lead, probably

*Presented at the Midwest Safety Conference, Chicago, Ill., in May 1937.

lead oxide, and manganese dioxide. According to Safir (*3*) it is an acute form of illness which results from the superficial action of finely divided heavy metals on body proteins.

According to Koelsch (*4*), the symptoms of brass founders' ague may occur from inhalation of the vapors or fumes of all heavy metals. The most important of these, in addition to zinc and brass, are lead, mercury, and manganese; cases of poisoning from cadmium, arsenic, antimony, copper, and their oxides have also been reported. While it was formerly believed that only the heavy metals would produce this fever, experiments have shown that it may result from inhalation of the fumes from freshly precipitated magnesium oxide, one of the lightest metals (*5*). The untoward effects of inhaling nickel fumes, as well as fumes from sprays of silver and copper, zinc and mercury, iron, cobalt, antimony, and other metals, have been reported in the literature (*4*). Selenium and tellurium are two metals which are now coming into industrial use; their toxicological properties resemble those of arsenic (*6*). Investigations have also been made as to the metal or metals causing the metal fume poisoning in electric arc welding (*7*).

As a descriptive term "fume" has been loosely applied to the emanations from many substances, and even in the technical literature is used interchangeably with "gas," "vapor," or "dust." Various definitions have been given for this term, such as that in Funk and Wagnall's Dictionary (*8*), "Metallic vapor of metallic compounds, as vapor carried by the gases from a smelting furnace, or the solid matter they deposit"; or that by Barreto, Drinker, et al. (*9*), "Fumes signify liquid or solid particles from about 0.2 to 1 micron in diameter, formed by physio-chemical reactions such as distillation, condensation, and combustion." Fumes have also been defined as solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, etc., and often accompanied by a chemical reaction such as oxidation. One of the characteristics of fumes is flocculation.

The metal fumes which produce fever are most commonly met with in industries where metal, such as zinc, is heated in an oxidizing atmosphere to a temperature near its boiling point (zinc 930° C.), for example, in the founding of brass and oxyacetylene welding of galvanized iron (*10*). They may also occur during the melting, stirring, and casting of brass, or in any operation where zinc is heated to temperatures causing volatilization of the metal and consequent liberation of fumes, which oxidize on contact with the air (*11*).

There has recently been some question as to whether the effects attributed to inhalation of zinc fumes are really caused by that metal, Drinker and Fairhall (*12*) being of the opinion that zinc chill, or metal fume fever, is not produced by zinc alone. Investigations

regarding metallic zinc, zinc oxide, etc., and their effect on workmen seem to indicate that so-called chronic zinc poisoning is in all probability due to toxic impurities, such as lead, cadmium, arsenic, and antimony, commonly associated with zinc ores (*13*). The ease with which zinc assumes a physical or physio-chemical state capable of causing fume fever when inhaled is apparently the reason why the condition has been thought due to zinc alone (*12*). Fumes also result from the fusing of manganese in steel manufacture; from cadmium in spelter works, or during the melting of cadmium ingots, as well as from smelting and electrolytic recovery of zinc; from antimony, in the printing trade, and from the vulcanization of rubber.

The metallic oxides commonly given off in the form of fumes or dust in welding processes may originate from several sources—from the materials welded, from the coatings of the surfaces being welded or cut, from the coatings of the electrodes used in arc welding, or from the flux rods. Some of these metallic and mineral substances are as follows: Iron, zinc, lead, brass, bronze, copper, nickel, arsenic, cadmium, aluminum, manganese, phosphorus, selenium, and silicon. The hazard has been reported in the process known as metallization. Here the molten stream of metal is projected by compressed air against the surface to be coated and the metallic vapors may condense and oxidize (*14*) and, if not controlled, may cause untoward symptoms in the worker.

SYMPTOMS AND PATHOLOGY

The symptoms of poisoning associated with zinc and brass most frequently reported in the literature are systemic and temporary. Therefore, metal fume fever is distinct from true or chronic metal poisoning.

It has been stated that there is toxicological agreement as to the anatomical and physiological effects of the heavy metals on the body, and still more striking for metallic vapors. "Generally, the symptoms in poisoning with fumes and vaporized compounds of the heavy metals show more marked similarity than do the symptoms which ensue on absorption of the heavy metals in question by other channels" (*4*).

The symptoms of metal fume fever, according to Collier (*6*) come on some hours after exposure; they are aggravated by chilling of the body and are more marked in winter. After the individual leaves work, a dryness of the throat is first noticed, followed by a dry cough and a feeling of weight in the chest. The temperature then rises and is accompanied by sweating. A leucocytosis will be found at this stage; the pulse rate and, as a rule, the blood pressure are elevated. The symptoms usually pass off in 12 to 24 hours. A diagnosis of influenza or pneumonia is often made. One of the characteristic features of metal fume fever is that "immunity" to these attacks is acquired by the workers. This immunity is rapidly lost. Hence,

cases are commonest on Mondays, after holidays, and amongst new workers. It is supposed that the symptoms are due to "protein shock" which results from the destruction of protein material by the toxic effects of the minutely divided metal oxides.

Industrial poisonings are seldom simple. For instance, workers exposed to lead arsenate usually show the symptoms of lead poisoning long before they develop those of arsenic poisoning; or, again, a lead battery "plate moulder" using a molten lead-antimony alloy to make mouldings rarely exhibits signs of severe lead poisoning, but sometimes complains of "diarrhea," which is attributed to the effect of antimony upon the system (*6*).

Acute symptoms associated with copper in the vaporous state appear to be the same as described for zinc fume fever, and for fumes of other metals. Workmen manipulating hot rolls with rough copper bars, being subjected to a continuous flow of water, are exposed to a cloud containing copper and, as has been reported, arsenic. Metal fume fever may occur in the elaboration of copper by heating processes (*11*).

Although investigations have been made regarding various metals, detailed data on the pathology of metal fume fever are not available. This is due to the transitory nature of the disease and to the fact that laboratory examinations of patients with this disease are seldom made. The symptoms rarely occur while the workman is at his work, but more often after he has reached home, sometimes after he has gone to bed (*1*). No authentic cases of fatal metal fume fever have been reported in the literature.

Drinker (*15*) in pathologic studies on animals, found that exposure to zinc oxide fume causes a heavy outpouring of polymorphonuclear leukocytes—a reaction to which there is a definite latency. In severely exposed animals, especially cats, the irritative process may go on to broncho-pneumonia. It was further found that inhaled zinc oxide, even in large amounts, is rapidly removed from the lungs of animals; and as its concentration there diminishes, the zinc concentrations in the liver, gall-bladder and bile, and kidney, rise.

Men who work with molten zinc are so familiar with the effects of "zinc fume fever" and of "brass founders' ague," that difficulties of diagnosis seldom arise. However, it is not always recognized that other metals may cause what is now known as metal fume fever (*6*). Diagnoses of influenza or pneumonia are often made.

In experiments on cats with cadmium oxide fumes, high concentrations induced the development of edema of the lungs, resulting in death of the animals. Smaller amounts produced generalized pneumonia and broncho-pneumonia, emphysema, and atelectasis (*16*).

TREATMENT

Because of the temporary nature of the disease, and since the patient recovers within a relatively short time, only symptomatic treatment is customary. Rest in bed, with adequate warmth and protection from drafts, is recommended.

No specific treatment has been shown to be universally effective. It is claimed, in the case of zinc fume fever, that warm milk induces precipitation of zinc albuminates and thus rids the system of the cause of the ague, but this theory has not been proved (*17*). It has been reported that a warm bath taken at the onset of the preliminary symptoms may avert a chill (*1*).

All cases of metal fume fever should be seen by a doctor. Transient attacks of grippe and influenza may closely simulate the condition. Exposure causing metal fume fever may also, if continued, permit the accumulation of toxic metals in amounts sufficient later to produce systemic metal poisoning. Thus, the matter of differential diagnosis is important and can be given the attention it merits only through proper examination and observations made by a physician.

PREVENTION

Metal fume fever may be eliminated through the adoption of an adequate medical and engineering program.

Diagnosis of metal fume fever should be established by the physician responsible for the health of the workers through physical examination of the affected worker and a study of the industrial exposure responsible for his illness. Those workers with chronic respiratory conditions, such as chronic bronchitis, bronchiectasis, asthma, and arrested pulmonary tuberculosis, should not be exposed to dusty atmospheres which, under proper conditions, may occasionally cause new workers to develop metal fume fever. The fever and chills might also unfavorably affect a chronic heart condition; and so those with serious heart and circulatory changes, although showing signs of good compensation, should not be subjected to the temporary but occasionally excessive physical strain associated with these attacks.

ENGINEERING CONTROL

(*a*) *Ventilation.*—While good general ventilation may exist in plants, it is not, as a rule, sufficient in metallurgical processes where workers are exposed to fumes of molten metal. In order to control the toxic fumes at their source, operations giving rise to such fumes should be carried on where practicable in air-tight apparatus (*18*), that is, a closed process. The usual method, however, is to employ exhaust ventilation with hoods over the process producing the fume. The mechanical ventilation is generally more reliable and satisfactory.

Hoods should be placed as close to the source of dust or fumes as possible, with due regard to the movements of the operator. Consideration should also be given to the natural movement of the fumes and to the specific gravity of the vapor or fume. In some cases, horizontal or floor outlets may be more effective. Certain fume-producing operations are best carried on by isolating the process in a separate compartment or room having good general ventilation. The compartment or room in which the work is performed should be as small as is consistent with efficacy in doing the work. The ventilating system should be designed so that a current of clean air is drawn past the operator and away from him toward the work (*19*).

(*b*) *Personal protective devices.*—Masks and respirators to be used for workers exposed to metal fumes should be specially constructed and adapted to the material used by such workers. Devices approved by the United States Bureau of Mines should be selected for such purpose.

In the Bureau of Mines list of approved devices (*20*), type A respirators, which are used for protection against pneumoconiosis-producing or nuisance dusts, are not approved for use against metal fumes, and special approval for protection against these forms of particulate matter is required. Type B mechanical filter respirators specify protection against "fumes of metals (usually their chemical compounds, as oxides or carbonates), such as lead, mercury (except mercury vapor), manganese, magnesium, aluminum, antimony, arsenic, copper, chromium, iron, cadmium, and zinc, resulting from sublimation or the condensation of their vapor, or from the chemical reactions between their vapor and gases." However, the Bureau of Mines list of approved devices (*20*) states that no type B mechanical filter respirator "for protection against poisoning by breathing dusts whose main harmful constituents are metals or their compounds" has been submitted for approval.

The hose or positive-pressure masks are useful for work of the nature described, but have their limitations.

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STUDIES ON TRICHINOSIS

VI. Epidemiological Aspects of Trichinosis in the United States as Indicated by an Examination of 1,000 Diaphragms for Trichinae [1]

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In previous papers in this series, Hall and Collins (*1*) reported an incidence of 13.67 percent infestation with trichinae in 300 diaphragms examined, and the same authors (*2*) pointed out some correlations and implications as indicated by available data in regard to the 300 persons involved. Subsequently, our associates, Nolan and Bozicevich (*3*), have continued the original study of incidence to a total of 1,000 diaphragms, including the previous 300, and found an incidence of

[1] Preceding papers in the series are:

I. The incidence of trichinosis as indicated by post-mortem examinations of 300 diaphragms. By Maurice C. Hall and Benjamin J. Collins. Pub. Health Rep., 52: 468 (April 16, 1937). (Reprint No. 1816.)

II. Some correlations and implications in connection with the incidence of trichinae found in 300 diaphragms. By Maurice C. Hall and Benjamin J. Collins. Pub. Health Rep., 52: 512 (April 23, 1937). (Reprint No. 1817.)

III. The complex clinical picture of trichinosis and the diagnosis of the disease. By Maurice C. Hall. Pub. Health Rep., 52: 539 (April 30, 1937). (Reprint No. 1819.)

IV. The role of the garbage-fed hog in the production of human trichinosis. By Maurice C. Hall. Pub. Health Rep., 52: 873 (July 2, 1937). (Reprint No. 1836.)

V. The incidence of trichinosis as indicated by post mortem examinations of 1,000 diaphragms. By M. O. Nolan and John Bozicevich. Pub. Health Rep., 53: 652 (Apr. 29, 1938).

* Died May 1, 1938.

17.4 percent. In the present paper, it is proposed to reexamine the correlations and implications set forth by Hall and Collins (*2*), and to restate our position as developed by the larger and more adequate amount of data in the series of Nolan and Bozicevich. Our previous conclusions were stated as tentative, and even with a larger amount of data they must still be regarded as tentative, but they will serve as material for a future consideration of the epidemiology of trichinosis, a subject which has had very little consideration of any sort. Tentative conclusions serve as points of attack for investigators, and help to expedite research regardless of whether more adequate research sustains or disproves them.

Following the lines of the previous paper by Hall and Collins (*2*), the incidence of trichinae in various population groups is presented in table 1, the table covering some groups not sufficiently well represented in the first 300 cases to warrant inclusion at that time, or not considered for other reasons. The data in the table may be arranged for reference in descending order of incidence as follows: Military (Army-Navy) officers (commissioned, warrant, and higher noncommissioned officers), 26.7 percent; military (Army-Navy) families and relatives, 26.1 percent; merchant marine, 25.6 percent; veterans, 22.2 percent; Army, 21.3 percent; white males, 20.6 percent; persons of high economic-social status, 20.6 percent; groups associated with extensive travel by sea (Navy-merchant marine), 19.7 percent; military (Army-Navy) group as a whole, 18.4 percent; whites, 19.1 percent; mentally sound group, 18.6 percent; males, 17.9 percent; colored females, 17.7 percent; *average of all groups, 17.4 percent;* civilians, 17.2 percent; groups associated with land, 17.2 percent; persons of low economic-social status, 16.8 percent; females, 15.9 percent; military (Army-Navy) enlisted personnel, 13.0 percent; colored males, 12.8 percent; mentally deranged group under prolonged hospitalization, 12.8 percent; white females, 12.6 percent; Navy, 11.4 percent; farmers, 9.1 percent; Civilian Conservation Corps, 8.3 percent.

Table 1 indicates that in our series of 1,000 there are still groups of high and low incidence, as there were in the series of 300. The increase in the mean incidence from 13.67 percent, in the first 300 cases, to 17.4 percent, in the total of 1,000 cases, would indicate, all other things being equal, a more accurate finding on the basis of the much larger series. Since, however, it might represent some increase in the proportion of high-incidence groups, the proportion of each group to the total of its series was inspected in both series, and no material differences were found that would sustain the idea that there was a relative increase in high-incidence groups. Actually, a few groups have shifted their respective positions from high to low, or vice versa.

TABLE 1.—*Incidence of trichinae in various groups as found in 1,000 post-mortem examinations*

Group	Total number in group	Number infested	Percent infested
Males	720	129	17.9
White	471	97	20.6
Colored	243	31	12.8
North American Indians	2	1	
Chinese	2	0	
Filipino	1	0	
Race unknown	1	0	
Females	277	44	15.9
White	111	14	12.6
Colored	164	29	17.7
North American Indian	1	0	
Mexican	1	1	
Sex unknown	3	1	
Whites	582	111	19.1
Negroes	407	60	14.7
Other races	7	2	
Race unkown	4	1	
Military (Army-Navy)	[1] 114	21	18.4
Officers (commissioned, warrant, and higher noncommissioned officers)	45	12	26.7
Enlisted men	[1] 69	9	13.0
Army	[2] 80	17	21.3
Navy	[2] 35	4	11.4
Families and relatives of military men	23	6	26.1
Civil	882	152	17.2
Civilian Conservation Corps (mostly Southern)	24	2	8.3
Farmers	11	1	9.1
Veterans, mostly World War	221	49	22.2
Military-civil status unknown	4	1	
Sea (Navy-Merchant marine)	71	14	19.7
Merchant marine	39	10	25.6
Land	929	160	17.2
Mentally deranged under long hospitalization	203	26	12.8
Mentally sound or not under long hospitalization	797	148	18.6
High economic-social status	214	44	20.6
Low economic-social status	764	128	16.8
Status unknown	22	2	9.1
Total cases	1,000	174	17.4

[1] One case, both soldier and sailor, counted only once.
[2] One case, both soldier and sailor, counted in both groups.

The larger series now shows a tendency to iron out, on a basis of more adequate sampling, the extremes formerly present in groups represented by smaller numbers. Disregarding the farmers and the Civilian Conservation Corps, not considered in the first paper and still represented in numbers too small for statistical significance, the extremes in the present series are 11.4 and 26.7 percent, instead of 4.2 and 33.3 percent as in the previous paper.

The more adequate samples still leave some groups occupying their previous position as high- or low-incidence groups with reference to the mean incidence, but, as noted above, they shift some groups to positions on the other side of the mean incidence. Of 21 comparable groups, 4 have shifted from high incidence to low, and 2 from low to high, the shift ranging from slight to extreme, while 15 groups show no such change.

SEX AND RACE

As regards sex, table 1 shows an incidence of 17.9 percent for males, and 15.9 percent for females, a difference which would not be statistically significant in a representative sample of homogeneous groups of the size of these. Hall and Collins (*2*) found that a similar variation in incidences in their series resulted from component figures for white males with a high incidence and colored males with a low incidence, on one hand, and white females with a low incidence and colored females with a high incidence, on the other hand. Table 1 shows that the same is still true, although the incidence figures have risen for white males and females and for colored males, and have fallen for colored females to a point near the mean incidence. There is still no indicated correlation of incidence with sex *per se*, and no need to recapitulate what has been said on this subject by Hall and Collins.

As regards race, the whites still stand in the high-incidence group, and the Negroes in the low-incidence group, obviously because the former group is still over-weighted with high-incidence males (471 males; 111 females), and the latter with low-incidence males (243 males; 164 females). There is still no correlation with race *per se*.

White males still appear to be a high-incidence group, the incidence being sufficiently above the mean of 17.4 percent for the entire base series of 1,000 to indicate that the difference is statistically significant. Colored males and white females still appear to be low-incidence groups, with incidences sufficiently below the incidence for the base series to indicate a statistically significant difference. Colored females, while still slightly above the mean for the series, have dropped to a point near that of the mean of the base series.

NATIONALITY

As regards nationality, Hall and Collins (*2*) have already discussed the difficulty of concluding anything in regard to nationality in this country and at this time. However, they noted that in the 41 positives in their series of 300 the names were the usual names of Americans of English-Scotch-Irish origin in about 83 percent of cases. In the total series of 300 cases there were 20 cases with names of German, Italian, French, Spanish, Slavic, or Mongolian origin, of which 7, or about one-third, were positive for trichinae, which suggested that the incidence among the group with such names was relatively higher than in the remainder of the population. Treating all Negroes as native Americans regardless of names, there are in the present series of 173 positives of known identity (1 other unidentified) 22 German names,

4 Italian, 2 Swedish, and 1 each of French, Mexican, Slavic, Lithuanian, Jewish, and North American Indian origin, a total of 34 such names, the remainder of the 173, or 139 names, being the usual names of English-Scotch-Irish origin. Among the negatives, excluding 23 cases with names unknown to us, there are 95 names of foreign origin and 708 names of American origin. Of the total of 129 with foreign names, 26.4 percent were infested, whereas of the total of 847 with names of American origin, only 16.4 percent were infested. This lends support to the findings of Hall and Collins, to the effect that although the great majority of positive cases, over 80 percent of our positive series of 173 cases for which names are known to us, are among the native population which makes up the great majority of the total population, the incidence among certain nationalities, such as the German and Italian, is higher than that among the native English-Scotch-Irish stocks, and higher than the mean incidence.

In our series of 1,000, there are 78 cases with names of Teutonic origin, with 22, or 28.2 percent, positive, and 12 cases with Italian names, with 4, or 33 percent, positive; and while the sample for the two combined groups, 90 cases, with 26, or 29 percent, positive, is not large, it does sustain the idea that the incidence among the Teutonic and Italian groups is very high. This idea is supported by the fact that these are the two groups responsible for the development and manufacture of the summer sausages, wienerwurst, mettwurst, blutwurst, salami, pepperoni, coppa, capicola, etc., which figure so largely as responsible for cases of trichinosis. Previous American literature has consistently regarded these groups as the high-incidence groups for the United States.

The combined Latin groups, totaling 24 cases, with 6, or 25.0 percent positive, also appear as a high-incidence group; but the total series is too small for positive conclusions, and further data would be necessary before one could conclude that this mixture is not without an overload on some such high-incidence group as the Italians.

The Slavic groups, including the Yugoslavs and Czechoslavs, have a total of 10 cases, with 2, or 20 percent, positive. The sample is too small to warrant conclusions, but the possibility that this is a high-incidence group should be given further consideration.

Our other positives include two Greeks, one Syrian, two Chinese, two North American Indians, and one Jew. These samples are too small to permit of conclusions on the basis of nationality; but it may be said that the Jewish name here is one of two names of Jewish origin, and that we have data on many more Jews, mostly with the customary names of national origins other than Jewish, which show that the incidence among Jews is very low, as would be expected. These data will form the subject of a separate paper.

MILITARY AND CIVIL GROUPS

With the larger number of cases now available to us, the military groups have been treated here on a basis somewhat different from that of Hall and Collins (*2*). If there is a trichinosis hazard associated with military life, there should be a correlation between the incidence of trichinae and the length of military service, and groups with long service, all other things being equal, should show a higher incidence than groups with only a short association with the conditions of military service. The groups with long service are the commissioned officers, warrant officers, and higher noncommissioned officers, who make the military service a long-time career. The groups with short service are the enlisted men, exclusive of higher noncommissioned officers, of whom the large majority serve one enlistment or a few enlistments, with only a small minority remaining in the military service for many enlistments. Precise information as to length of average enlistment in the Army and Navy is not available to us, but we have been furnished the following data:

As regards the Army, Dr. Charles G. Souder, lieutenant colonel, Medical Corps, United States Army, has very kindly supplied us information to the effect that of 41,630 white enlisted men admitted to hospital in 1935, a total of 12,757, or over 30 percent, had had service of 11 months or less. As regards the Navy, Dr. H. W. Smith, captain, Medical Corps, United States Navy, has very kindly supplied the information that the average period of service for enlisted men in the Navy is approximately 4 years. Obviously, during the relatively short period an enlisted man might serve in the Navy, all, or almost all, the period might be spent in regions of low trichina incidence, as in foreign service or at stations out of the continental portion of the United States.

Another factor which would influence the incidence of trichinae in the groups of officers and enlisted men, respectively, would be the age factor. According to Colonel Souder, the average age of the 12,757 enlisted soldiers to whom he refers was 21.46 years, and, according to Captain Smith, the average age of enlisted men in the Navy, for the past 11 years, was 19.63 years. Since the ages of commissioned, warrant, and higher noncommissioned officers average well above this, it is to be expected that there will be a higher incidence of trichinosis among officers on the basis of age alone, and aside from factors associated with military life. To establish that military life predisposed in some way to a higher incidence of trichinae, it would be necessary to establish the incidence among officers as significantly higher than the general mean, and higher than among comparable civilian groups of the same age.

Actually, on the basis, still too small, of 44 cases, officers have an incidence of 26.7 percent, over 9 percent higher than the average mean incidence; over 4 percent higher than the incidences in the two age decades of highest incidence, 61 to 70, and 71 to 80, as shown in table 2; over 6 percent higher than the incidence for white males or persons of high economic-social status; over 7 percent higher than the incidence for whites in general; and almost 9 percent higher than the incidence for males in general. While it would require a much larger number of cases to establish a statistically significant incidence figure for officers, the evidence still continues to indicate that there is some factor associated with military life that favors a high incidence of trichina infestation. This factor would have to be sought in the pork furnished the Army and Navy, in pork purchased outside of military channels, and in the swine producing the pork.

The Army, as a whole, remains a high-incidence group, whereas the Navy, as a whole, falls from the top position to the bottom of the low-incidence groups. This result apparently follows from the fact that both groups appear to be composite groups with high- and low-incidence components, the older officers with long service, and the younger enlisted men with relatively short average terms of service, respectively. The incidence in such composite groups will shift as the groups are overweighted with either component. The number of officers and of enlisted men for either the Army or Navy is still too small to give valid figures on which to consider these components, but this matter will be considered in later studies.

On a series of cases still too small, 6 positives out of 23 cases, it appears that the families and relatives of military men, those who live with them and follow them from place to place, may share the hazard of trichinosis apparently associated with military life. However, the indicated hazard itself still rests on an inadequate basis, and the sharing of the hazard on a basis definitely too small. These preliminary findings are recorded to bring up the matter for further consideration.

The fact that 221 veterans show an incidence of 22.2 percent would suggest that the military life under war conditions had resulted in an increased incidence of trichinosis. However, these veterans are predominantly enlisted men of the World War, and hence represent a group that was mostly in the decades from 20 to 40 years old at the time of the war, and that is now in the decades from 40 to 60 years old. Table 2 shows that in these decades the incidences from 41 to 50 and 51 to 60 years are 20 and 15.7 percent, respectively, the incidence for the period 41 to 60 years being 18.35 percent. The difference between the age and the veteran incidences falls within the probable error of the differences for either the age or war service figure on the basis of samples of the size involved, so there is as yet

no evidence to support the idea that during the relatively short period of participation in the World War by the United States there was any relative increase in incidence of trichinosis among American civilians temporarily serving as soldiers and sailors. The incidence for males alone in these decades will be considered in connection with veterans in a later paper.

By contrast with the military groups, the civilian group in the city of Washington, as indicated by cases from 6 civilian hospitals, has a total of 372 cases with 65 positives, or an incidence of 17.5 percent, a figure practically identical with the mean incidence for all groups. Apparently, this figure follows from a balance between the high- and low-incidence groups in the civilian population; these civilians are a heterogeneous composite group, not a homogeneous group.

The Civilian Conservation Corps is represented by too few cases to make an incidence figure significant, our figure, 8.3 percent, being based on 2 positives out of 24 cases. According to Fechner (*4*), the ages of the members of the Civilian Conservation Corps are from 17 to 28 years, and our recent information is that, aside from special cases, the limits have been made 17 to 23 years. These special cases, such as skilled laborers, for special jobs, are usually older men. Our series is a heterogeneous sample, with whites and Negroes, old and young, represented. Of the total, 15 were in the second and third decades, from 18 to 26 years old, with an average of 22 years, and 9 were in the fourth, fifth, and sixth decades, from 36 to 55 years old, with an average of 45 years. Both of the positives were men 44 years old. On a mixture such as this, it would require a much larger series to ascertain the approximate incidence for this composite group.

Farmers are still represented to an inadequate extent in our cases, and the finding of 1 positive in 11 cases throws no light on the question of incidence of trichinae in our rural population.

CIVILIAN OCCUPATIONS

Disregarding children and persons in groups covered elsewhere in this paper, the civilians showing trichinae represent the following occupations, one person sometimes having more than one occupation, the number of cases for each being given in parentheses: Barber (1), bartender (1), blacksmith (1), boiler firemen (3), boiler maker (1), butcher (1), cabinet maker (1), carpenter (1), carpet layer (1), cleaner (1), clerks (2), contractor (1), customs guard (1), domestics (17), electrician (1), enamel burner (1), engineers (3), express driver (1), gardener (1), housewives (6), iceman (1), inspector (1), insurance agent (1), janitors (3), junkman (1), laborers (29), laundryman (1), longshoreman (1), metal workers (2), molder (1), musician (1), newspapermen (3), painter (1), peddler (1), physician (1), policeman (1),

preacher (1), printer (1), salesmen (5), seamstresses (2), social worker (1), steamfitter (1), storekeeper (1), students (2), superintendent (1), tailors (2), telegraph operator (1), watchman (1), and wiper (1); no occupation or occupation unknown (28). These cases run the range of unskilled labor, skilled labor, crafts, arts, business, and professions, which indicates that the hazard of trichinosis is something to which persons of almost any occupation or of no occupation may be exposed. It would require many more data than we have available to establish the occupations which might have definitely high incidences.

In our series, colored females have an incidence of 17.7 percent, slightly above the mean incidence of 17.4 percent, and the difference is obviously not statistically significant. Domestics make up a large part of the group of colored females. Taking all female domestics, white or colored, in our series, a total of 86, there are 17 positives, giving an incidence of 19.8 percent, a figure precisely on the upper limit of probable error of the difference between the two rates. Theoretically, the incidence might be relatively high among such groups as butchers, cooks, domestics, housewives, and others who handle meats or foods in general, but our series is not large enough to establish the point or rule it out. The average age of all domestics was 45 years, and that of positives was 43.4 years. The decade with the most cases, among domestics, was that from 21 to 30 years, with 6 positives out of 21 cases examined, or 28.5 percent of a series too small to have statistical significance; in our base series, the mean incidence for all cases in this decade is 15.1 percent. On a larger series of cases, it may be possible to ascertain whether there is any correlation between the occupation of domestic and a relatively high incidence of trichinae, or whether individual food habits dominate such considerations as occupation.

There are 154 cases designated as laborers in our series, with 29, or 18.8 percent, positive for trichinae. This incidence is not statistically significant of any difference from the mean of all groups, 17.4 percent, or from the incidence for the group of low economic-social status, 16.8 percent, and shows no correlation between the occupation of laborer and the incidence of trichinosis. The average age of laborers in our series is 49.7 years. Like many of our groups, laborers are a composite group so far as our constituent cases represent differences in presence or absence of mental derangement, geographic origin within and without the United States, and other things which appear to be correlated with incidence.

SEA AND LAND GROUPS

A consideration of a group associated with the sea, as compared with a group associated with land, still shows a higher incidence of trichinae among the sea group in our series, as Hall and Collins (*2*) found.

However, the larger series does not show the incidence so far above the mean incidence as they found it. In the present series it is 19.7 percent, and hence not statistically significant as regards its variation from the general mean incidence of all groups. However, the group is a composite group, consisting of the Navy and merchant marine, and the drop in incidence can now be seen as a result of the drop of the Navy, as a whole, from a high-incidence status to a low-incidence status, apparently as a result of a relatively large component of young low-incidence enlisted men who are in a low-incidence age group, associated with the Navy for relatively short periods on the average, and who, as already noted, might spend their short time in the Navy in regions with a low trichina incidence. The merchant marine continues to appear as a group of high incidence, 25.6 percent, the base figure still being too small to establish the incidence or the certainty that the group is a high-incidence group.

At this time, the correlation suggested by Hall and Collins (*2*), that a high incidence in the merchant marine would be correlated with a high incidence of trichinae in pork at certain Atlantic and Pacific ports in the United States, and with the swine producing that pork, should be restated. If this correlation proves to be valid, the high-incidence areas are apparently the region from Maine on the north through New Jersey on the south and California. From Delaware to Florida, and from Florida to Texas, there should be less trichina infestation in seamen touching in the United States only at the ports in these regions. This is based on the assumption that the data for trichinosis in man and swine in these regions are approximately correctly indicative of conditions. Evidence in support of this variation in incidence in the merchant marine is offered by Dr. J. G. Pasternack, who informs us that he is finding a low incidence in the merchant marine personnel at New Orleans, La.

For our background in making the above assumptions, we refer to our map (fig. 1). This map is based primarily on the numbers of clinical cases of human trichinosis reported officially or in the literature from the various States. Obviously, all other things being equal, the number of cases is a less satisfactory basis than the percentage of those cases to the total State population. Sawitz (*5*) has already shown the situation on that basis, and his map is in general agreement with ours. His data also have been used in our map. However, there are so many other variables in the picture that percentages alone have only slightly more significance than total cases. A consideration of clinical cases reported and of necropsy studies, published and unpublished, also utilized in the map, indicates that in some States there are now a number of physicians interested in trichinosis and in finding clinical cases, and that in other States physicians have not yet begun to suspect the possibility of trichinosis,

in spite of the fact that necropsy findings may indicate that there are plenty of cases in the State. Sawitz' map has the limitations due to the inadequate number of States reporting and the short time they have been reporting. Our map is given further consideration later in this paper.

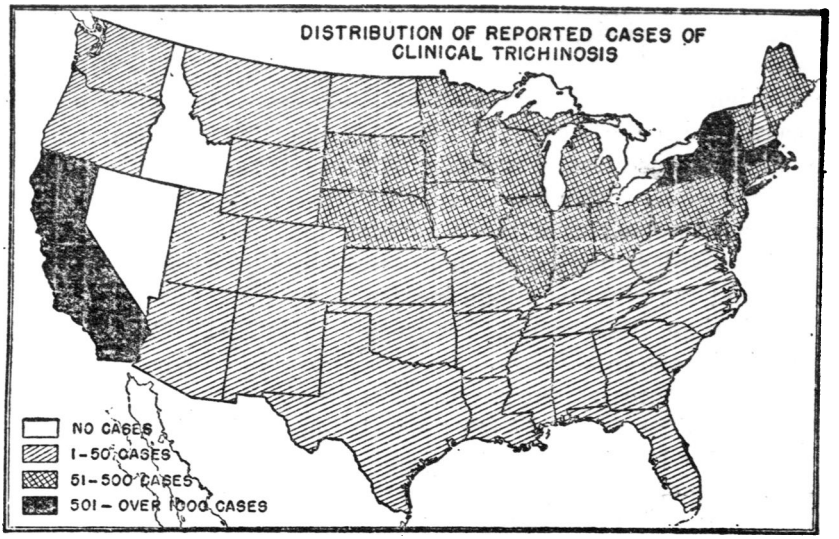

FIGURE 1

MENTAL STATUS AND LENGTH OF HOSPITALIZATION

The findings in this series of 1,000 cases sustain more convincingly and in greater detail the conclusions of Hall and Collins (*2*) in regard to the effect of prolonged hospitalization on the incidence of trichinosis. These findings have been set forth and discussed quite adequately by Nolan and Bozicevich (*3*), but it might be noted here that the time factor which operates elsewhere, as a rule, to increase incidence, as shown in table 2, reverses its effect here, when it becomes time in hospital, and operates, under controlled hygienic conditions, to decrease incidence.

ECONOMIC-SOCIAL STATUS

In the series of 1,000 cases, the positions of the high and low economic-social groups have been reversed from the former findings of Hall and Collins (*2*), the high group now being the high-incidence group, and the low group now being the low-incidence group. Both the high and the low groups, on the basis of economic-social status, are composite groups, each with high- and low-incidence groups as components. There is no evident shift in the proportion of these incidence groups, but, as based on a larger series, the present picture may prove to be the more accurate, in spite of the theoretical objec-

tions to the contrary, as presented by Hall and Collins (*2*). However, it is evident that shifts in component groups will shift the incidence figures, and only a weighted set of figures would show, in any area, the relative positions of the incidences in groups of different economic-social status.

AGE

We have no data regarding age in 13 cases, of which 1 is positive, leaving 987 cases, with 173 positives, for which age is known. These cases are tabulated in table 2 by decades of age, together with data as to whether the trichinae present were all alive, all dead, or some alive and some dead.

TABLE 2.—*Incidence and state of trichinae by age at death*

Age at death	Total number of cases	Positive				State of trichinae		
		Number	Percent	Percent		Live	Mixed	Dead
				0–50 years	51–100 years			
0–10	38	1	2.6	16.0		1	0	0
11–20	29	2	6.9			2	0	0
21–30	93	14	15.1			9	3	2
31–40	142	21	14.8			7	7	7
41–50	250	50	20.0			18	13	19
51–60	159	25	15.7			9	4	12
61–70	162	37	22.8			10	5	22
71–80	77	17	22.1		19.5	1	2	14
81–90	32	4	12.5			1	0	3
91–100	5	2	40.0			1	0	1
Unknown	13	1	7.7			1	0	0
Total	1,000	174	17.4			60	34	80

Our cases for the first two decades are still too few to establish incidence figures for these decades, but there is no question that the incidences are low in both decades, and that on an adequate series of cases the incidence for the first decade would be the lowest of any decade, with that of the second decade probably the next lowest.

While the peak of incidence in our series of 1,000 is in the decades 61 to 70 and 71 to 80, the total cases for all decades are still too few to establish a peak for trichina infestation in general. It is reasonable to suppose that, with longer life, an increase in the time element of exposure to infection would lead to a peak of incidence in the later decades. If we take the age group of 0 to 50 years and the group of 51 to 100 years, we find in the first group an incidence of 16 percent, and in the second group an incidence of 19.5 percent, instead of the almost identical percentages found by Hall and Collins (*2*) in their smaller series. The larger series tends to bear out the theory that the peak of incidence is in the later decades.

Our total cases in the groups from 81 to 100 years are too few to throw additional light on the question raised by Hall and Collins as to whether there may be a mortality factor, such as chronic myocarditis as a sequel of clinical trichinosis, operating to cause death in earlier decades among recovered cases of trichinosis, and thus removing these survivors from older age groups. If such a factor operated at an adequate level, it would move to an earlier decade a peak that would otherwise occur in a later decade.

It will be noted that, in the series of 174 positives, infestations with live trichinae now occur in every decade, infestations with both live and dead trichinae from the third through the eighth decade, and infestations with dead trichinae from the third through the tenth decade. We may, therefore, restate the discussion of this subject by Hall and Collins (*2*), as follows:

Live trichinae may be found in any decade through the age of 91 to 100 years, since infection may occur in any decade, and the digestion-Baermann technique will detect these cases with great dependability, even with very few trichinae present. In light infestations the trichinae apparently live for a long time.

Mixed infestations will occur more frequently after the first two decades, but probably will be found occasionally in the second, or even the first, decade. Probably mixed infestations persist in that form for a relatively short time, passing on to dead infestations, and the chance of finding an infestation during its transitional period as a mixed infestation is much less than the chance of finding it during the longer period when the trichinae are alive or the still longer period when they are dead. Evidence in support of this assumption is found in table 2, from which it appears that in the total of 173 positives of known age, mixed infestations total 34, or 19.6 percent, live infestations 60, or 34.3 percent, and dead infestations 80, or 46.1 percent. Tentatively accepting the present data, and ignoring the possibility of failing to detect light dead infestations, and assuming that the chance of finding trichinae in any state is roughly proportional to the length of time that state persists, we may surmise that, for the cases in our series, the transitional period, during which dying trichinae are present in mixed infestations, has an average duration of about one-fifth of the total period of infestation for the series; the period when all trichinae are alive is about one-third of the total period of infestation; and the period when all trichinae are dead is a little less than half the total period of infestation. Naturally, the matter cannot be quite that simple, since our calculations ignore the fact of repeated infections and the likelihood that light infestations live longer than heavy infestations, but it is a tentative estimate in comparative terms of the duration of the transitional period represented by mixed infestations.

Infestations with dead trichinae only will be found from the third through the tenth decade of age. It is probable that they, as well as mixed infestations, will be found in the second decade, and possible that they will be found in the first decade. As incidental comment, it may be noted that calcification in general, and especially in association with pathologic conditions, is a process more commonly observed in the later decades of life than in the earlier decades.

DISCUSSION

A consideration of the incidence of trichinae in various population groups indicates that the incidence in any given group is likely to be modified by the interplay of various factors. As a result, many of our population groups, as set up for investigation, turn out to be composite groups with components having from high to low trichina incidences, and, since mixtures will show a shift of incidence up or down with the increase in the number of high- or low-incidence components in the sample, there can be no precise correlation of the mixed group with the incidence of trichinae, and no precise incidence can be obtained for such a group except as weighted figures are considered for the group as limited geographically and otherwise. It is now clear that in our groupings the following groups are composites, and that as groups they have no precise correlations with trichina incidence: Sex, race, participation in the World War, civilian status, merchant marine status as a whole and aside from geographical considerations, and economic-social status.

Our groups are still too small to establish correlations definitely, but the available evidence still points to the probable validity of certain of our tentative assumptions of correlation. The correlations which still appear to be valid are those of trichina incidence as related to geographic areas, certain subgroups as established on a race-sex basis, some nationalities, military life, prolonged hospitalization, and age. These correlations are as follows:

The geographic correlation, first noted by Hall and Collins (*1*), assumes that the incidence of trichinae in any group will be dependent on the incidence of trichinae in the swine from which the pork supply of the group is derived, since human trichinosis rests on swine trichinosis as its base. The incidence of trichinosis in swine has been discussed by Hall (*6*). It is correlated with methods of raising swine, and is of approximately this order: Pasture-raised swine, mostly in the Middle West, free or almost entirely free from trichinae; southern swine, with less than 1 percent trichina infestation; grain-fed swine of the Middle West, a mixture of many pasture-raised swine with some hog-lot swine and garbage-fed swine, the mixture having an average of approximately 1.5 percent infestation with live trichinae;

garbage-fed swine, with approximately 5 percent infested with live trichinae; offal-fed swine, a small and almost extinct group, showing up to 18 percent infestation in studies made about 50 years ago.

Garbage-fed hogs are most numerous along the northeastern Atlantic coast and along the southern part of our Pacific coast, the garbage feeding industry developing in the region of big cities with abundant garbage and in the absence of such abundant supplies of corn and similar feed for hogs as are found in the Middle West, the latter being the great hog-raising section of the United States. These coastal areas are the areas at or near which necropsy studies have shown the highest incidences found in the United States, approximately one case being infested out of every four cases examined. The low incidence of trichinae in southern swine, less than 1 percent, is correlated with the lowest incidence found in necropsy studies, 3.5 and 5 percent at New Orleans. Over the rest of the country, a mixture of pasture-raised swine, practically free from trichinae, with smaller numbers of hog-lot and garbage-fed swine having a relatively high incidence of trichinae, is correlated with an intermediate incidence in necropsy studies on man, probably close to that for the entire country, of approximately one out of seven persons infested.

In other words, food habits are highly individual matters in almost any population group, and are such that some part of almost any group, exclusive of those who never eat meat, or, at least, never eat pork, will acquire trichina infestations more or less in proportion to the incidence of trichina in the pork they eat. The geographic correlation is naturally influenced by the factor of travel and transportation, and in the presence of modern transportation geographic correlations tend to become less dependable. There is a shuffle of population groups by the travel of individuals, and a shuffle of pork in trade. However, it is still safe to make such assumptions as that the South is populated mostly by Southerners, and that local markets are largely supplied with pork produced locally.

Human trichinosis may then be regarded as resulting from the operation of the following two factors: (1) The food habits of individuals (including, especially, exposure to infection from all accidents and failures of cookery), and (2) the frequency of occurrence of live trichinae in the swine supplying the pork consumed by a population group. In view of the large number of persons in the population groups considered in our epidemiologic studies, the first factor may safely be regarded as a random or accidental factor which may be treated as a constant, and the variations in incidence of trichinosis in population groups is accordingly treated here as a function of the second factor only, this factor being more or less of a constant in any local area within certain time limits.

For working purposes, a preliminary estimate must be obtained for the ratio existing between the incidence of trichinosis in man and that in swine. As a basis for that estimate, we take the available data for human trichinosis in the high-, intermediate-, and low-incidence areas shown on the map (fig. 1). On the basis of total clinical cases reported, the high-incidence area, with 501 to over 1,000 cases reported per State, includes New York and Massachusetts in the Northeast, and California on the west coast. Necropsy findings indicate peaks with an incidence of approximately 25 percent in this area (Boston, 27.6 percent; San Francisco, 24 percent). On the same basis, the intermediate-incidence area, with 51 to 500 cases per State, is mostly the Middle West, but includes Maine, Vermont and Connecticut, and extends from Connecticut and New Jersey through Nebraska and South Dakota, lying, in general, north of the Potomac, Ohio, Missouri and Platte Rivers. Necropsy findings indicate an incidence of approximately 15 percent in this area (21 cases in 137 necropsies at St. Louis (at the edge of this area) and Minneapolis, and our own unpublished findings). The low-incidence area, with 50 cases or less per State (two of these States with no cases), includes the South, the Rocky Mountain States, the Southwest, and the Pacific Coast States north of California, its northern boundary in the East being substantially identical with the northern boundary of uncinariasis in man. Necropsy findings at New Orleans indicate an incidence of 4.25 percent (17 positives in 400 necropsies) for this area. Our unpublished data indicate that New Hampshire is in at least an intermediate-incidence area, with trichinosis still inadequately reported. These areas, as shown on the map (fig. 1), are outlined tentatively. Probably there will be States in some of these areas in which the incidences are out of line with the area incidence.

Over these three incidence areas, the known data for the incidence of live trichinae in swine, only live trichinae in swine being involved in the production and occurrence of human trichinosis, are as follows: Over the high-incidence area, the swine supplying the pork are mixtures of various sorts, including a large proportion of garbage-fed and swill-fed hogs, of which the garbage-fed hogs show an incidence of about 5 percent for live trichinae. Over the intermediate-incidence area, the swine are so-called grain-fed hogs, predominantly pasture-raised and free from trichinae, but with enough garbage- and swill-fed hogs to give a general incidence of about 1.5 percent for live trichinae. Over the low-incidence area, the swine are mostly southern swine, which run at large and are not fed garbage or swill, with less than 1 percent live trichina infestations.

Our estimate of the ratio between the incidence of trichinae, in any stage, in man and of live trichinae in swine is derived most readily

from the figures for the intermediate-incidence area. In this area, with an indicated incidence of 15 percent in man and of 1.5 percent in swine, we have an indicated ratio between human and porcine infestation of 10:1. This indicated ratio is taken here, in our preliminary consideration, as the basis for further discussion, with no assumption that this ratio is at all precise; more data are necessary for more precision. At the peaks of the high-incidence areas of the northeast and the west coast, with approximately 25 percent human infestation, swine should show an incidence, on the basis of the 10:1 ratio, of 2.5 percent, or the equivalent of a mixture of equal numbers of clean swine, free from trichinae, and of garbage-fed swine with 5 percent trichina infestation. Over the low-incidence area, a base figure of 4.25 percent infestation in man in New Orleans indicates, from our 10:1 ratio, that the fraction of 1 percent shown by various studies of southern swine would have a level of 0.425 percent. Actually, in 1881, Deverson, cited by de Pietra Santa (7), found an incidence of 0.4 percent in 5,400 swine at New Orleans. In round numbers, the situation would be about as follows: In high-incidence areas, 25 percent human incidence, 2.5 percent swine incidence; in intermediate-incidence areas, 15 percent human incidence, 1.5 percent swine incidence; in low-incidence areas, approximately 4.3 percent human incidence, 0.43 percent swine incidence. This generalization, naturally, is both tentative and oversimplified. Giving a more accurate picture would require many more data, and the picture would show several shifts and variations.

Using as our basic factors our ratio of 10:1 and the life span of man and of slaughtered swine (ignoring the life span of swine as affected by disease and accident, since this has no bearing on production of human trichinosis), the probable relative intensity of exposure to trichina infestation can now be estimated, as follows:

The life span of slaughtered hogs is approximately 1 year. The average age of 987 necropsy cases of known age in our base series is 48 years, and that of 173 positive cases of known age is 51.76 years. Since our incidences as ascertained by necropsies are based on hospitalized cases, we take for our cases the round number of 50 years as the average span of life for man in our incidence correlations. Thus, the relative probability for trichina infection in man per year is 10/50, or 1/5, while in swine it is 1/1. In other words, the probable intensity of exposure to trichina infection in swine is five times as great as in man. This is a tentative figure, based on still too limited data.

Since the consumption of pork and pork products by man is vastly greater than the consumption of pork scraps in feed by swine, it is evident that trichina infection in man is controlled and held to its present level by the practice of cooking pork and processing pork products for human consumption. This raises the question: Should

the people of this country continue to run the risk of trichinosis from defects in cooking and similar factors, and the practice of feeding raw and undercooked pork scraps to swine be perpetuated, or should we require that pork scraps be eliminated from the feed of swine or else cooked to destroy any trichinae that may be present in order that man may eat pork in safety? Since the great majority of swine are free from trichinae, it seems reasonable that the bad practice of feeding raw and undercooked pork scraps to a small minority of swine should be abolished in the interest of the public health. This prohibition of the feeding of raw pork scraps to swine has been recommended by previous writers, including Ransom (*8*), but adequate action on this vital point has not yet been taken.

In the above discussion, the occurrence of only dead trichinae in swine is ignored, since these trichinae have no etiologic relation to human trichinosis. The incidence of such dead trichinae, as ascertained from 1898 to 1906, is 1.16 percent for grain-fed hogs. If this factor is considered, the intensity of exposure to infection is not just five times as great for swine as for man, but is actually about six times as great.

The race-sex group of white males appears to be a high-incidence group, and colored males and white females appear to be low-incidence groups. Colored females now fall within the probable error of the difference between their incidence and the mean incidence of the base series.

As regards nationality, our figures still indicate that, although names may be misleading to some extent, the incidence among such nationalities as the Teutonic and the Italian groups is relatively high, in spite of the fact that the great majority of positive cases are in the older American stocks which make up the great bulk of the population. The figures are supported by evidence from the role of the Teutonic and Italian groups as manufacturers and consumers of most of the dry, summer sausages which figure so largely in the origin of cases of trichinosis.

Our analysis of the correlation with military life indicates that the correlation is valid, since a consideration of length of service shows that the incidence rises with the lengthening of the period of military service, and rises for officers well above the levels of such comparable groups as age groups in late decades with high incidences, white males, persons of high economic-social status, whites in general, and males in general.

Prolonged hospitalization, under conditions ensuring that pork will usually be eaten only as well cooked pork, still shows definite correlations with incidence of trichinae, the incidence decreasing as the period of hospitalization increases.

Age continues to appear as a factor correlated with incidences of trichinae, the incidence rising to a peak somewhere in the later decades of life. The location of this peak is not yet known. It may not fall in the last decades of life because of the elimination of some positives from these decades by death in earlier decades as a result of some sequelae of trichinosis, such as chronic myocarditis.

Correlations with merchant marine service will probably be found to be modified by geographic factors, the incidence being determined by the ports at which ships touch in the United States. The only group we have examined, one from the Marine Hospital at Baltimore, is a high-incidence group, but we are informed that this is not the case for the group examined at the Marine Hospital at New Orleans.

Our data are still too inadequate to ascertain whether any particular civilian occupation has any correlation with trichina incidence. Theoretically, groups associated with the handling and preparation of meats might show a higher incidence.

CONTROL

The control of trichinosis has been discussed by Hall and Collins (*1*) and by Hall (*6*). Basically, it is a matter of keeping raw and undercooked pork scraps out of the feed of swine, either by not feeding garbage, table scraps, and the like to swine, or by cooking such material to kill any trichinae present before feeding it. A control program requires an authoritative, adequate, coordinated, nation-wide set-up under which all garbage-feeding plants and hog lots are located, and the feeding of raw or undercooked pork scraps abolished by agreement, by new procedures, or by legal measures. Precise reports of status and improvements are essential for determining progress and locating areas in which there is no progress and in which additional measures must be taken to ensure progress. Progressive swine growers and packers will undoubtedly cooperate in this movement to improve the quality of the pork supply produced and handled by them. Under a control program of this sort, trichinosis can be quickly and cheaply brought under control by personnel, funds, and, for the most part, laws and regulations, already available.

SUMMARY

From a study of various population groups in 1,000 necropsy cases, it appears that a number of such groups are composite groups, with high- and low-incidence components. Such groups have no precise correlations with the incidence of trichinae. In our series, these groups include those based on sex, race, participation in the World War, civilian status, merchant marine status as a whole and aside from geographic considerations, and economic-social status.

Correlations which still appear to be valid are those with geographic areas, certain subgroups on a race-sex basis, some nationalities, military life, prolonged hospitalization, and age. The geographic correlations indicate a low incidence in the South, a high incidence along the northern part of the Atlantic coast and along the southern part of the Pacific coast, and an intermediate incidence elsewhere. Groups with an indicated correlation with a high incidence include white males, the Teutonic and Italian groups, military personnel with long service (commissioned, warrant, and higher noncommissioned officers), and older age groups. Groups with an indicated correlation with a low incidence include colored males, white females, those under prolonged hospitalization, and the younger age groups.

The correlations in the merchant marine will probably be qualified by geographic factors.

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DEATHS DURING WEEK ENDED JUNE 11, 1938

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

	Week ended June 11, 1938	Corresponding week, 1937
Data from 87 large cities of the United States:		
Total deaths	7,859	[1] 7,777
Average for 3 prior years	8,197	
Total deaths, first 23 weeks of year	198,563	219,591
Deaths under 1 year of age	541	[1] 480
Average for 3 prior years	531	
Deaths under 1 year of age, first 23 weeks of year	12,315	13,548
Data from industrial insurance companies:		
Policies in force	69,285,076	69,834,315
Number of death claims	12,847	12,892
Death claims per 1,000 policies in force, annual rate	9.7	9.6
Death claims per 1,000 policies, first 23 weeks of year, annual rate	9.8	10.9

[1] Data for 86 cities.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

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

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 18, 1938, and June 19, 1937

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937
New England States:								
Maine	0	2	------	------	81	16	0	0
New Hampshire	0	0	------	------	56	76	0	0
Vermont	1	0	------	------	47	2	0	0
Massachusetts	2	0	------	------	420	460	0	3
Rhode Island	0	0	------	------	4	35	1	1
Connecticut	6	13	5	------	36	72	1	0
Middle Atlantic States:								
New York	13	42	[1]1	[1]9	3,186	1,384	16	4
New Jersey	10	7	4	3	547	787	3	1
Pennsylvania	20	18	------	------	2,267	1,408	8	7
East North Central States:								
Ohio	11	13	------	7	918	898	0	1
Indiana	1	3	2	3	97	262	1	2
Illinois	37	26	10	19	508	427	0	3
Michigan [2]	4	17	------	1	1,751	189	2	1
Wisconsin	0	2	10	11	2,092	59	1	2
West North Central States:								
Minnesota	2	1	2	1	208	3	0	0
Iowa	2	2	2	------	223	5	1	1
Missouri	5	7	2	33	50	69	0	0
North Dakota	0	2	------	1	59	------	0	0
South Dakota	0	1	------	------	------	3	0	0
Nebraska	1	0	------	------	95	17	0	0
Kansas	3	6	1	1	179	24	0	0
South Atlantic States:								
Delaware	1	0	------	------	5	5	0	0
Maryland [2 3 4]	3	1	1	1	79	123	1	0
District of Columbia [3]	12	3	------	------	28	93	3	3
Virginia [3]	7	6	------	------	298	181	0	4
West Virginia	3	9	8	13	159	75	1	1
North Carolina [3]	5	11	1	17	842	196	4	3
South Carolina [4]	3	2	50	56	50	49	2	0
Georgia [4]	1	2	------	------	65	------	0	0
Florida [4]	6	8	------	------	31	------	0	0
East South Central States:								
Kentucky	4	6	13	5	65	205	1	5
Tennessee	5	4	5	18	49	127	3	0
Alabama [4]	7	5	8	7	76	27	1	4
Mississippi [3]	6	3	------	------	------	------	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 18, 1938, and June 19, 1937—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937
West South Central States:								
Arkansas	8	3	8	4	86	3	1	0
Louisiana	10	16	10	21	10	10	3	4
Oklahoma	2	3	38	4	69	48	1	1
Texas [4]	26	35	138	138	90	239	1	5
Mountain States:								
Montana	0	0	-------	-------	56	5	1	0
Idaho [3]	0	0	7	6	18	51	0	0
Wyoming [3]	2	0	-------	-------	8	1	0	0
Colorado [4]	19	3	-------	-------	107	47	0	0
New Mexico	2	5	1	-------	64	46	0	0
Arizona	2	3	14	20	6	16	0	0
Utah [2 3]	3	0	-------	-------	263	77	0	0
Pacific States:								
Washington	0	2	-------	-------	30	54	0	1
Oregon [3]	0	2	22	7	49	3	3	0
California [4]	34	36	290	110	1,017	162	4	2
Total	289	330	653	516	16,444	8,039	64	59
First 24 weeks of year	11,648	10,995	43,019	272,055	718,565	210,220	1,813	3,575

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fever		Whooping cough
	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938
New England States:									
Maine	0	0	6	5	0	0	4	0	41
New Hampshire	0	0	9	4	0	0	0	0	-------
Vermont	0	0	5	4	0	0	0	1	45
Massachusetts	0	3	239	137	0	0	0	0	89
Rhode Island	0	0	11	19	0	0	0	0	19
Connecticut	1	0	77	85	0	0	0	1	84
Middle Atlantic States:									
New York	6	2	407	447	0	0	9	7	541
New Jersey	0	1	100	95	0	0	4	0	182
Pennsylvania	0	1	403	204	0	0	21	12	225
East North Central States:									
Ohio	1	1	155	76	2	5	5	8	196
Indiana	0	0	53	46	12	9	3	3	10
Illinois	3	0	255	319	13	12	6	14	232
Michigan [3]	0	3	236	576	1	2	4	5	280
Wisconsin	0	1	90	185	1	7	3	1	170
West North Central States:									
Minnesota	0	0	43	89	12	9	1	0	40
Iowa	0	0	49	69	43	25	0	7	24
Missouri	1	1	26	93	23	10	7	7	24
North Dakota	0	0	10	11	8	13	0	0	37
South Dakota	0	0	8	26	10	3	0	0	14
Nebraska	0	0	6	16	1	1	0	0	17
Kansas	0	1	30	63	13	5	2	1	130
South Atlantic States:									
Delaware	0	0	3	2	0	0	0	0	9
Maryland [2 3 4]	0	0	43	19	0	0	4	6	57
District of Columbia [3]	0	0	6	7	0	0	0	0	9
Virginia [3]	0	3	18	5	0	0	14	8	115
West Virginia	0	0	20	28	0	0	3	4	118
North Carolina [3]	0	3	30	18	1	0	27	3	398
South Carolina [4]	0	0	0	1	0	0	1	12	79
Georgia [4]	1	0	2	4	0	0	37	23	53
Florida [4]	0	0	7	4	0	0	11	4	26

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 18, 1938, and June 19, 1937—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fever		Whooping cough
	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938	Week ended June 19, 1937	Week ended June 18, 1938
East South Central States:									
Kentucky	1	0	17	31	9	0	23	9	66
Tennessee	1	9	10	4	0	0	20	13	75
Alabama [4]	3	4	5	4	7	0	10	10	77
Mississippi [2]	3	17	5	6	10	0	8	7	----
West South Central States:									
Arkansas	1	3	4	9	1	0	15	11	25
Louisiana	1	1	6	8	0	0	10	18	54
Oklahoma	3	1	11	13	14	1	11	13	52
Texas [4]	0	6	33	57	11	7	34	30	347
Mountain States:									
Montana	0	0	8	----	0	36	2	2	57
Idaho [3]	0	0	7	11	5	3	4	1	7
Wyoming [3]	0	0	3	6	0	2	1	0	10
Colorado [3]	0	0	29	12	3	0	3	1	29
New Mexico	0	0	14	17	7	0	1	1	27
Arizona	0	0	1	7	4	0	11	2	23
Utah [2 3]	0	0	15	12	1	0	0	0	113
Pacific States:									
Washington	0	0	22	25	21	3	4	2	90
Oregon [3]	0	2	12	16	5	13	2	0	16
California [4]	1	6	149	138	38	14	16	7	349
Total	27	69	2,698	3,033	276	180	341	254	4,681
First 24 weeks of year	477	575	126,575	152,197	11,525	7,078	3,563	3,069	103,484

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended June 18, 1938, 19 cases as follows: Maryland, 1; District of Columbia, 1; Virginia, 2; North Carolina, 2; Idaho, 5; Utah, 4; Oregon, 4.
[4] Typhus fever, week ended June 18, 1938, 41 cases as follows: Maryland, 2; South Carolina, 1; Georgia, 16; Florida, 6; Alabama, 4; Texas, 11; California, 1.
[5] Colorado tick fever, week ended June 18, 1938, 7 cases as follows: Wyoming, 1; Colorado, 6.

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
May 1938										
Alabama	20	32	109	266	1,226	93	5	24	9	23
California	16	103	176	14	3,705	13	7	855	203	44
Idaho	0	0	29	----	122	----	0	22	58	2
Indiana	2	54	8	----	2,158	----	2	257	134	15
Maryland	6	14	17	6	333	1	0	317	0	15
Michigan	5	34	2	3	13,892	----	3	1,713	19	9
Minnesota	5	10	10	----	1,325	----	1	583	51	3
Missouri	2	62	67	28	1,425	----	0	507	70	5
Nebraska	0	8	1	----	976	----	0	106	53	0
New Jersey	2	49	27	1	3,603	----	0	432	0	14
New Mexico	1	8	17	1	369	2	1	64	9	7
New York	24	130	----	6	14,979	----	4	2,981	0	30
North Dakota	----	3	20	----	412	----	0	94	49	2
Ohio	11	49	66	3	6,715	----	3	1,048	78	33
Rhode Island	1	0	1	----	14	----	0	128	0	0
Vermont	0	0	----	----	587	----	1	54	0	7

Summary of monthly reports from States—Continued

May 1938

	Cases
Botulism:	
California	2
Chickenpox:	
Alabama	98
California	3,083
Idaho	33
Indiana	120
Maryland	427
Michigan	1,468
Minnesota	654
Missouri	194
Nebraska	185
New Jersey	1,800
New Mexico	93
New York	2,684
North Dakota	136
Ohio	1,492
Rhode Island	50
Vermont	117
Conjunctivitis:	
Idaho	1
Maryland	1
New Mexico	2
Diarrhea:	
Maryland	7
New Mexico	4
Ohio (under 2 years; enteritis included)	27
Dysentery:	
Alabama (amoebic)	1
California (amoebic)	11
California (bacillary)	14
Maryland	19
Michigan (amoebic)	2
Michigan (bacillary)	1
Minnesota (amoebic)	2
Missouri (amoebic)	3
New Jersey (amoebic)	3
New Jersey (bacillary)	1
New Mexico (amoebic)	3
New Mexico (bacillary)	1
New York (amoebic)	7
New York (bacillary)	18
Ohio (bacillary)	1
Encephalitis, epidemic or lethargic:	
Alabama	4
California	2
Maryland	2
Michigan	1
Minnesota	1
New Jersey	3
New York	12
Food poisoning:	
California	132
German measles:	
Alabama	5
California	211
Idaho	6
Maryland	31
Michigan	457
New Jersey	98
New York	284
North Dakota	3
Ohio	49
Rhode Island	5
Granuloma, coccidioidal:	
California	3
Impetigo contagiosa:	
Maryland	3
Jaundice, epidemic:	
California	3
Michigan	2
Leprosy:	
California	1
Mumps:	
Alabama	81
California	2,731
Idaho	81
Indiana	59
Maryland	112
Michigan	1,144
Missouri	165
Nebraska	90
New Jersey	1,137
New Mexico	55
North Dakota	11
Ohio	707
Rhode Island	18
Vermont	213
Ophthalmia neonatorum:	
California	2
Maryland	2
Missouri	1
New Jersey	16
New York [1]	6
Ohio	65
Rhode Island	1
Paratyphoid fever:	
California	5
Idaho	1
Michigan	1
New Jersey	2
New Mexico	1
New York	9
Ohio	1
Psittacosis:	
California	1
Puerperal septicemia:	
Idaho	1
New Mexico	2
Ohio	3
Rabies in animals:	
Alabama	69
California	164
Indiana	62
Maryland	1
Michigan	1
Minnesota	25
Missouri	7
New Jersey	56
New York [1]	10
Rhode Island	1
Rabies in man:	
California	1
Indiana	1
New York	1
Rocky Mountain spotted fever:	
Idaho	8
Maryland	9
New Jersey	2
New Mexico	1
Ohio	1
Scabies:	
Maryland	5
Septic sore throat:	
California	11
Idaho	3
Maryland	22
Michigan	146
Minnesota	13
Missouri	41
Nebraska	5
New Jersey	14
New Mexico	5
Septic sore throat—Con.	
New York	143
Ohio	101
Rhode Island	9
Tetanus:	
Alabama	4
California	4
Maryland	1
Michigan	2
Missouri	1
New York	4
Ohio	1
Trachoma:	
California	50
Michigan	2
Missouri	46
New Jersey	2
North Dakota	1
Trichinosis:	
California	1
Maryland	3
Michigan	2
New York	5
Tularaemia:	
Indiana	2
Minnesota	1
Missouri	3
Ohio	1
Typhus fever:	
Alabama	16
California	1
Maryland	1
New Jersey	1
New York	1
Undulant fever:	
Alabama	4
California	18
Idaho	1
Indiana	5
Maryland	3
Michigan	7
Minnesota	9
Missouri	1
New Jersey	4
New Mexico	2
New York	12
Ohio	8
Rhode Island	1
Vermont	7
Vincent's infection:	
Idaho	2
Maryland	4
Michigan	18
New York [1]	76
North Dakota	2
Whooping cough:	
Alabama	191
California	2,166
Idaho	33
Indiana	52
Maryland	268
Michigan	1,252
Minnesota	111
Missouri	87
Nebraska	49
New Jersey	833
New Mexico	89
New York	2,060
North Dakota	95
Ohio	763
Rhode Island	93
Vermont	213

[1] Exclusive of New York City.

PLAGUE INFECTION PROVED IN FLEAS FROM GROUND SQUIRRELS IN FRESNO COUNTY, CALIFORNIA

Under date of June 15, 1938, Dr. W. M. Dickie, State Director of Public Health of California, reported that plague infection had been proved, by animal inoculation, in a pool of 78 fleas from 9 *Beecheyi* squirrels collected from the Sierra National Forest, Swanson Public Camp Ground, 4 miles east and 1 mile south of Shaver Lake, Fresno County, California.

PLAGUE INFECTION IN RODENTS AND PARASITES FROM RODENTS IN GALLATIN COUNTY, MONT., AND BANNOCK COUNTY, IDAHO

Under date of June 17, 1938, Senior Surgeon C. R. Eskey reported plague infection proved in Gallatin County, Mont., and Bannock County, Idaho, as follows:

In a pool of 210 fleas from 34 ground squirrels, *Citellus elegans*, shot May 25, on a ranch 19 miles north of West Yellowstone, Gallatin County, Mont.

In a pool of 375 fleas from 137 ground squirrels, *Citellus armatus*, shot May 21, two to 5 miles east of Inkom, Bannock County, Idaho.

In a pool of 149 fleas from 7 marmots, *Marmota flaviventris*, shot June 1, 7 miles south of Grace, Bannock County, Idaho.

In a pool of 6 fleas and 3 lice from 1 *Citellus armatus* and in tissue from 2 ground squirrels of the same species, (proved separately) all shot June 3, 11 miles south of Turner, Bannock County, Idaho.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 11, 1938

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

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	158	68	26	4,633	472	1,593	13	402	38	1,288	----
Current week	112	28	15	4,902	360	1,157	27	368	31	1,321	----
Maine:											
Portland	0	1	0	21	3	0	0	1	0	7	19
New Hampshire:											
Concord	0	----	0	0	0	0	0	0	0	0	4
Manchester	0	----	0	0	1	1	0	0	0	0	19
Nashua	0	----	0	0	0	0	0	0	0	0	8
Vermont:											
Barre	0	----	0	2	0	0	0	0	0	0	1
Burlington	0	----	0	0	0	0	0	0	0	0	15
Rutland	0	----	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	0	----	1	222	19	89	0	6	1	16	201
Fall River	0	----	0	0	1	2	0	0	0	1	28
Springfield	0	----	0	112	3	2	0	2	0	6	33
Worcester	1	----	0	4	3	32	0	5	0	18	47
Rhode Island:											
Pawtucket	0	----	0	0	0	0	0	0	0	0	12
Providence	0	----	1	0	2	7	0	1	0	14	58

City reports for week ended June 11, 1938—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								
Connecticut:											
Bridgeport	0	------	1	2	2	2	0	0	1	0	26
Hartford	1	------	0	3	2	21	0	3	0	0	--------
New Haven	0	2	0	2	0	1	0	1	2	22	35
New York:											
Buffalo	0	------	0	6	6	35	0	7	0	24	120
New York	27	4	2	1,730	72	209	0	75	4	275	1,463
Rochester	0	1	0	53	1	20	0	1	0	4	53
Syracuse	0	------	--------	88	2	3	0	0	0	6	--------
New Jersey:											
Camden	0	1	1	4	3	6	0	0	0	2	43
Newark	0	------	0	7	6	9	0	6	0	36	104
Trenton	0	------	0	0	2	2	0	3	0	2	38
Pennsylvania:											
Philadelphia	5	1	1	332	19	84	0	27	4	50	440
Pittsburgh	2	1	0	19	12	33	0	7	0	13	153
Reading	0	------	0	25	1	1	0	2	0	1	26
Scranton	0	------	0	2	0	4	0	0	0	1	1
Ohio:											
Cincinnati	4	------	0	11	5	6	0	8	0	11	105
Cleveland	3	4	0	183	5	42	0	9	2	47	153
Columbus	0	------	0	6	3	3	0	1	0	1	59
Toledo	0	1	1	53	3	5	0	3	0	9	59
Indiana:											
Anderson	1	------	0	8	0	1	1	0	0	0	5
Fort Wayne	0	------	0	4	1	7	0	1	0	0	16
Indianapolis	1	------	1	78	8	10	3	4	0	2	87
South Bend	0	------	0	31	1	0	0	2	0	1	16
Terre Haute	1	------	0	0	0	4	0	0	0	0	20
Illinois:											
Alton	0	------	0	0	1	1	0	0	0	0	9
Chicago	15	2	0	128	28	174	0	39	1	140	643
Elgin	0	------	0	0	2	2	0	0	0	2	15
Moline	1	------	0	1	0	0	0	0	0	0	5
Springfield	0	------	0	0	1	6	0	0	0	4	24
Michigan:											
Detroit	2	------	0	123	14	102	0	18	0	135	238
Flint	0	------	0	69	8	10	0	0	0	15	31
Grand Rapids	0	------	0	188	5	6	0	0	0	2	35
Wisconsin:											
Kenosha	0	------	0	93	0	0	0	0	0	6	10
Madison	0	------	0	223	0	0	0	0	0	0	8
Milwaukee	0	1	1	18	3	15	0	7	0	68	90
Racine	0	------	0	82	0	8	0	0	0	8	14
Superior	0	------	0	16	0	0	0	0	0	0	7
Minnesota:											
Duluth	0	------	0	35	0	2	0	1	0	6	26
Minneapolis	0	------	1	282	4	15	8	0	0	10	89
St. Paul	1	------	0	4	3	3	0	2	0	6	70
Iowa:											
Cedar Rapids	0	------	--------	12	-------	2	1	-------	0	6	--------
Davenport	0	------	--------	0	-------	0	0	-------	0	0	--------
Des Moines	0	------	0	25	0	11	3	0	0	0	27
Sioux City	0	------	--------	83	-------	2	0	-------	0	7	--------
Waterloo	0	------	--------	12	-------	7	0	-------	0	1	--------
Missouri:											
Kansas City	0	------	0	3	1	9	0	3	0	2	87
St. Joseph	1	------	0	0	0	3	0	0	0	0	12
St. Louis	6	------	1	6	6	25	1	10	0	1	199
North Dakota:											
Fargo	0	------	--------	7	-------	2	0	-------	0	0	--------
Grand Forks	0	------	--------	4	-------	0	0	-------	0	0	--------
Minot	1	------	0	4	0	0	1	0	0	1	6
South Dakota:											
Aberdeen	0	------	--------	0	-------	0	0	-------	0	5	--------
Nebraska:											
Lincoln	1	------	--------	27	-------	7	0	-------	0	5	--------
Omaha	0	------	0	95	3	3	0	0	0	0	58
Kansas:											
Lawrence	0	------	0	6	1	0	0	0	0	1	4
Topeka	0	------	0	49	2	0	0	0	0	19	21
Wichita	0	------	0	28	3	1	0	0	0	11	25

City reports for week ended June 11, 1938—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								
Delaware:											
Wilmington	1		0	1	3	3	0	0	0	2	17
Maryland:											
Baltimore	6	2	1	28	9	37	0	9	1	35	193
Cumberland	0		0	8	0	0	0	0	0	0	7
Frederick	0		0	0	0	0	0	0	0	0	3
Dist. of Col.:											
Washington	5		0	16	5	6	0	12	0	7	151
Virginia:											
Lynchburg	0		0	1	1	0	0	0	0	2	13
Norfolk	0		0	3	4	3	0	2	0	1	32
Richmond	0		0	131	2	1	0	1	0	0	59
Roanoke	0		0	6	0	7	0	0	0	2	12
West Virginia:											
Charleston	0		0	0	4	1	0	0	1	0	48
Huntington											
Wheeling	0		0	7	2	1	0	0	0	6	16
North Carolina:											
Gastonia	0			5		0	0		0	4	
Raleigh	0		0	9	1	0	0	0	0	3	7
Wilmington	0		0	3	1	0	0	0	0	12	14
Winston-Salem	0		0	64	1	0	0	2	0	20	18
South Carolina:											
Charleston	0		0	0	2	0	0	1	1	0	27
Florence	0		0	1	3	0	0	0	0	0	17
Greenville	0		0	6	3	0	0	0	0	5	11
Georgia:											
Atlanta	1	1	0	3	2	3	0	8	2	17	80
Brunswick	0		0	4	0	0	0	0	0	0	5
Savannah	0		0	13	1	0	0	1	1	0	25
Florida:											
Miami	0	2	1	2	3	0	0	2	1	2	33
Tampa	1		0	3	1	0	0	1	0	0	17
Kentucky:											
Ashland	0		0	0	1	0	0	1	0	3	24
Covington	1		0	2	3	0	0	0	1	5	16
Lexington	0		0	3	0	1	0	2	0	2	19
Tennessee:											
Knoxville	2		0	2	2	2	0	0	0	7	22
Memphis	0		0	2	2	0	0	1	3	0	69
Nashville	0		0	10	3	5	0	1	0	5	60
Alabama:											
Birmingham	1		0	5	1	4	0	0	0	0	55
Mobile	0		0	0	0	0	0	0	0	0	21
Montgomery	0			1		0	0		0	0	
Arkansas:											
Fort Smith											
Little Rock	1		0	1	1	1	0	6	0	0	9
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	0	6
New Orleans	7		1	6	9	2	0	10	0	31	155
Shreveport	0		0	1	5	0	0	3	0	0	45
Oklahoma:											
Muskogee	2			1		1	0		0	0	
Oklahoma City	1		0	0	4	3	0	1	0	0	49
Tulsa	2			50		0	8		0	8	
Texas:											
Dallas	4		0	1	2	9	0	3	1	9	64
Fort Worth	0		0	0	4	2	0	2	1	5	34
Galveston	0		0	0	2	0	0	1	0	0	18
Houston	2		0	0	2	1	0	4	3	1	72
San Antonio	0		0	0	4	1	0	13	1	0	56
Montana:											p
Billings	0		0	0	1	0	0	0	0	5	5
Great Falls	0		0	0	1	0	0	0	0	4	10
Helena	0		0	0	0	1	0	0	0	0	5
Missoula	0		0	0	0	0	0	0	0	0	7
Idaho:											
Boise	0		0	0	3	0	0	0	0	0	10
Colorado:											
Colorado Springs	0		0	0	1	0	0	0	0	0	14
Denver	4		0	16	6	18	0	5	0	8	93
Pueblo	0		1	14	1	4	0	1	1	0	8

City reports for week ended June 11, 1938—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								
New Mexico:											
Albuquerque	0	------	0	1	0	0	0	0	0	0	11
Utah:											
Salt Lake City	0	------	0	273	2	1	0	0	0	1	31
Washington:											
Seattle	0	------	0	4	4	0	1	3	0	44	86
Spokane	0	------	0	2	1	2	1	0	0	9	27
Tacoma	0	------	0	0	0	2	1	1	0	4	15
Oregon:											
Portland	2	------	0	13	1	9	1	3	0	0	85
Salem	0	2	--------	1	-------	1	0	-------	0	0	--------
California:											
Los Angeles	8	6	0	56	7	26	12	22	0	38	325
Sacramento	0	------	0	36	0	0	0	4	0	18	33
San Francisco	1	1	1	7	5	7	0	4	1	46	156

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Kansas:			
Boston	2	0	0	Wichita	1	0	0
Rhode Island:				Maryland:			
Providence	1	0	0	Baltimore	0	0	1
New York:				Virginia:			
Buffalo	1	0	0	Richmond	0	0	1
New York	3	2	1	Alabama:			
Pennsylvania:				Birmingham	0	1	0
Philadelphia	1	0	0	Montgomery	0	0	2
Pittsburgh	1	0	0	Arkansas:			
Ohio:				Little Rock	0	0	1
Toledo	0	0	1	Louisiana:			
Indiana:				New Orleans	0	0	1
Indianapolis	1	0	0	Texas:			
Michigan:				San Antonio	1	1	0
Detroit	1	0	1	California:			
Wisconsin:				Los Angeles	2	0	0
Superior	1	0	0				
Minnesota:							
St. Paul	1	1	0				

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Alton, 2; Washington, 1.
Pellagra.—Cases: Worcester, 1; Baltimore, 3; Raleigh, 2; Atlanta, 1; Brunswick, 1; Savannah, 6; Birmingham 1; Mobile, 2; Montgomery, 3; New Orleans, 1; San Antonio, 1; San Francisco, 4.
Typhus fever.—Cases: Hartford, 1; Savannah, 1; Miami, 3; Tampa, 1; New Orleans, 1.

FOREIGN AND INSULAR

CANADA

Vital statistics—Fourth quarter 1937.—The Bureau of Statistics of the Dominion of Canada has published the following preliminary statistics for the fourth quarter of 1937. The rates are computed on an annual basis. There were 18.1 live births per 1,000 population during the fourth quarter of 1937 and 18.3 per 1,000 population during the fourth quarter of 1936. The death rate was 9.7 per 1,000 population for the fourth quarter of 1937 and 9.6 per 1,000 population for the fourth quarter of 1936. The infant mortality rate for the fourth quarter of 1937 was 73 per 1,000 live births and 75 per 1,000 live births for the fourth quarter of 1936. The maternal death rate was 4.4 per 1,000 live births for the fourth quarter of 1937 and 5.5 per 1,000 live births for the same quarter of 1936.

The accompanying tables give the numbers of births, deaths, and marriages, by Provinces, for the fourth quarter of 1937 and deaths from certain causes in Canada for the fourth quarter of 1937 and the corresponding quarter of 1936.

Number of births, deaths, and marriages, fourth quarter 1937

Province	Live births	Deaths (exclusive of stillbirths)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	50,748	27,126	3,681	222	24,632
Prince Edward Island	464	292	32	3	171
Nova Scotia	2,606	1,417	201	1	1,283
New Brunswick	2,311	1,257	202	5	1,012
Quebec	17,553	8,416	1,698	84	5,840
Ontario	14,257	9,495	777	73	8,091
Manitoba	2,999	1,447	175	14	2,123
Saskatchewan	4,245	1,501	226	22	2,044
Alberta	3,649	1,453	221	10	2,309
British Columbia	2,664	1,848	149	10	1,759

[1] Exclusive of Yukon and the Northwest Territories.

Deaths by Provinces, fourth quarter 1937

Cause of death	Canada [1] (fourth quarter)		Province								
	1936	1937	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents	404	443	1	22	20	116	209	16	13	17	29
Cancer	2,969	3,038	33	176	122	765	1,171	200	157	152	262
Diarrhea and enteritis	635	880	8	44	70	481	147	39	42	37	12
Diphtheria	97	156		4	10	121	12		4	5	
Diseases of the arteries	2,254	2,405	36	124	102	461	1,193	134	99	110	146
Diseases of the heart	4,199	4,342	35	207	148	1,000	1,911	269	220	245	307
Homicides	31	37			1	6	11	1	4	11	3
Influenza	693	632	4	29	14	296	176	31	24	32	26
Measles	80	136		8	1	29	5	2	11	15	65
Nephritis	1,596	1,564	26	69	63	667	480	43	61	67	88
Pneumonia	2,028	1,981	24	94	105	599	702	98	135	101	123
Poliomyelitis	41	36		3		4	15	3	9	2	
Puerperal causes	277	222	3	1	5	84	73	14	22	10	10
Scarlet fever	67	77		2		52	13	4	1	3	2
Suicides	226	219	4	6	8	29	86	20	17	22	27
Tuberculosis	1,448	1,371	17	93	75	537	273	87	68	75	141
Typhoid fever and paratyphoid fever	56	148	1	4	9	94	13	4	18	1	4
Violent deaths	1,020	1,028	10	57	50	251	380	45	71	54	110
Whooping cough	146	200		5		134	19	14	4	8	16

[1] Exclusive of Yukon and the Northwest Territories.

Vital statistics—Year 1937.—The following preliminary vital statistics data for Canada for the year 1937 have been issued by the Bureau of Statistics:

Number of births, deaths, and marriages, year 1937

Province	Live births	Deaths (exclusive of stillbirths)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	219,339	113,510	16,650	1,060	87,715
Prince Edward Island	2,065	1,135	151	12	584
Nova Scotia	11,342	5,963	806	25	4,319
New Brunswick	10,544	5,392	1,069	39	3,662
Quebec	75,582	35,442	7,578	397	24,870
Ontario	61,499	38,462	3,379	319	29,889
Manitoba	12,888	6,070	826	55	6,113
Saskatchewan	18,559	6,865	1,225	86	5,762
Alberta	15,717	6,247	990	76	6,340
British Columbia	11,143	7,934	626	51	6,176

[1] Exclusive of Yukon and the Northwest Territories.

Deaths by Provinces, year 1937

Cause of death	Canada [1]	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents	1,611	6	82	66	395	771	66	46	55	124
Cancer	11,942	136	703	465	3,028	4,548	738	688	598	1,038
Diarrhea and enteritis	4,202	23	159	415	2,527	562	142	202	115	57
Diphtheria	367	---	11	17	277	30	10	10	10	2
Diseases of the arteries	9,589	95	542	370	1,871	4,632	558	437	452	632
Diseases of the heart	16,806	133	808	628	3,980	7,224	962	875	848	1,348
Homicides	137	1	4	3	30	51	8	9	18	13
Influenza	5,249	63	244	155	1,610	1,656	304	400	471	346
Measles	813	1	10	10	227	30	13	234	120	168
Nephritis	6,522	95	313	221	2,896	1,945	191	267	240	354
Pneumonia	7,713	102	339	423	2,262	2,596	444	564	462	471
Poliomyelitis	199	---	7	5	21	119	12	22	13	---
Puerperal causes	1,060	12	25	39	397	319	55	86	76	51
Scarlet fever	268	---	9	2	147	50	12	16	24	8
Smallpox	2	---	---	---	---	---	---	---	1	1
Suicides	974	6	29	29	154	365	87	87	101	116
Tuberculosis	6,633	65	452	383	2,767	1,315	426	294	337	594
Typhoid fever and paratyphoid fever	328	1	13	28	185	39	10	36	6	10
Violent deaths	4,594	35	252	183	1,160	1,661	218	304	299	482
Whooping cough	762	4	42	4	444	104	39	47	49	29

[1] Exclusive of Yukon and the Northwest Territories.

CZECHOSLOVAKIA

Communicable diseases—March 1938.—During the month of March 1938, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	1	---	Paratyphoid fever	11	1
Cerebrospinal meningitis	73	22	Poliomyelitis	4	1
Chickenpox	195	---	Puerperal fever	31	3
Diphtheria	2,711	127	Scarlet fever	1,876	24
Dysentery	1	---	Trachoma	86	---
Influenza	362	15	Tularaemia	3	---
Lethargic encephalitis	1	1	Typhoid fever	369	22
Malaria	317	---	Typhus fever	3	---

LATVIA

Notifiable diseases—January-March 1938.—During the months of January, February, and March 1938, cases of certain notifiable diseases were reported in Latvia as follows:

Disease	January	February	March	Disease	January	February	March
Anthrax	2	---	---	Paratyphoid fever	5	2	6
Botulism	2	2	2	Poliomyelitis	11	17	17
Cerebrospinal meningitis	8	9	17	Puerperal septicemia	14	8	11
Diphtheria	127	129	146	Scarlet fever	464	455	509
Epidemic encephalitis	---	2	---	Smallpox	---	1	---
Erysipelas	74	69	53	Tetanus	---	1	1
Influenza	163	150	138	Trachoma	69	62	66
Lead poisoning	1	1	1	Tuberculosis	313	346	379
Leprosy	3	2	4	Typhoid fever	36	30	48
Malaria	1	---	---	Typhus fever	---	---	3
Measles	9	5	10	Whooping cough	594	526	456
Mumps	36	83	158				

SWEDEN

Notifiable diseases—April 1938.—During the month of April 1938, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	12	Poliomyelitis	[1] 18
Diphtheria	5	Scarlet fever	2,432
Dysentery	5	Syphilis	20
Epidemic encephalitis	4	Typhoid fever	1
Gonorrhea	887	Undulant fever	12
Paratyphoid fever	7	Weil's disease	2

[1] Includes 3 cases nonparalytic at time of notification.

YUGOSLAVIA

Communicable diseases—4 weeks ended May 22, 1938.—During the 4 weeks ended May 22, 1938, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	20		Poliomyelitis	1	
Cerebrospinal meningitis	84	26	Scarlet fever	225	2
Diphtheria and croup	379	29	Sepsis	8	1
Dysentery	13		Tetanus	34	6
Erysipelas	163	5	Typhoid fever	168	19
Favus	2		Typhus fever	76	3
Lethargic encephalitis	1	1	Weil's disease	1	
Paratyphoid fever	10	1			

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 June 24, 1938, pages 1049-1064. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

United States.—A report of plague-infected fleas in California, plague-infected fleas, lice, and ground squirrels in Idaho, and plague-infected fleas in Montana appears on page 1110 of this issue of PUBLIC HEALTH REPORTS.

Typhus Fever

China—Hong Kong.—During the week ended May 21, 1938, 1 imported case of typhus fever was reported in Hong Kong, China.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Minas Geraes State, May 16–21, 1938, 3 deaths; Sao Paulo State, April 15, 1938, 1 death.

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