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MORTALITY FROM CERTAIN CAUSES DURING THE FIRST SIX MONTHS OF 1937 [1]

The mortality rates presented in the accompanying table are based upon preliminary reports from the State departments of health of 39 States, the District of Columbia, and Hawaii. For 20 States and the District of Columbia comparative data are shown for the 3 immediately preceding years, 1934–36.

Because of lack of uniformity in the method of classifying deaths according to cause, and because a number of death certificates were not filed in time to be included, these mortality rates are preliminary and are intended to serve as an index of current mortality conditions only within the same area for which previous reports are available. The mortality rates of one State are not strictly comparable with those of another, owing to the varying practices in tabulation procedure in the different States and to the fact that crude rates are affected by differences in the age, sex, and racial characteristics of the populations concerned.

After an unfavorable start in the first quarter, due to the influenza epidemic during the first part of the year, mortality from all causes during the second quarter was lower than in the corresponding period of any of the 3 preceding years. As a result, mortality during the first half of 1937, 11.8 per 1,000 population, was slightly less than that for the corresponding period of last year and only about 2.5 percent greater than that of 1934 and 1935. This improvement in mortality conditions was widespread, especially in comparison with 1936; only 7 of the 26 States for which comparative data are available reported a higher death rate in the first 6 months of 1937 than in the corresponding period of 1936. All of the important causes of death except cancer shared in the decrease, although for some causes the death rate was still higher than in 1934 and 1935.

Especially noteworthy is the continued decrease in the number of maternal deaths. The rate per 1,000 live births was 4.8, about 13 percent less than the corresponding figure for last year.

The record of the communicable diseases was also favorable. Only for whooping cough was a higher rate reported than for last year, and even this rate was well below the corresponding rate for 1934 and 1935.

[1] From the Division of Public Health Methods, National Institute of Health.

The slight increase in the death rate from tuberculosis which was reported for the first quarter was replaced by a marked decrease during the second quarter so that the rate for the first 6 months is lower than for the corresponding period in any of the 3 preceding years.

Neither the birth rate nor the infant mortality rate showed any change as compared with 1936.

Altogether the record for the first 6 months has been very favorable in spite of the influenza outbreak during the first few weeks of the year.

Mortality from certain causes in the first 6 months of 1937, with comparative 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 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]
21 STATES [2]																							
January–June:																							
1937	11.8	15.5	55	4.8	0.7	0.9	2.3	3.0	1.4	42.3	0.2	0.6	2.1	53.6	117.2	27.9	85.9	294.0	108.9	61.8	5.4	84.5	70.4	23.6
1936	12.0	15.5	55	5.5	.9	1.0	3.0	2.0	1.7	29.7	.2	.6	3.3	53.8	115.5	28.1	92.7	295.7	115.5	62.7	5.3	88.3	------	------
1935	11.5	15.6	58	5.7	1.0	5.4	3.1	4.4	1.9	28.8	.2	.7	2.6	54.9	113.3	25.4	86.9	270.0	105.1	64.8	5.9	85.8	------	------
1934	11.5	15.3	61	6.1	1.3	6.4	2.9	4.6	2.0	19.8	.3	.6	1.0	56.0	110.9	26.0	82.2	267.6	101.7	66.4	7.0	90.6	------	------
January–March:																							
1937	12.8	15.2	61	5.2	.6	.7	2.8	3.1	1.8	67.3	.2	.7	2.4	54.2	117.2	30.9	91.1	316.6	144.4	60.2	4.2	88.0	67.9	23.1
1936	12.6	15.5	58	5.8	.9	.9	3.4	2.0	2.2	36.0	.2	.6	3.5	53.8	114.9	30.5	98.0	313.9	143.6	61.6	4.9	92.8	------	------
1935	12.0	15.5	63	6.0	.9	4.9	3.2	3.9	2.4	43.7	.2	.6	2.4	54.8	110.6	27.3	90.1	282.5	126.9	62.7	4.2	88.4	------	------
1934	12.0	15.0	64	6.1	.9	5.5	3.3	4.0	2.5	27.4	.3	.6	1.0	55.2	108.6	27.4	85.4	282.8	122.2	63.3	5.8	94.0	------	------
April–June:																							
1937	10.8	15.8	49	4.4	.8	1.2	1.8	2.8	1.0	17.5	.2	.6	1.7	52.9	117.2	25.0	80.7	271.6	73.7	63.4	6.6	81.0	73.0	24.1
1936	11.3	15.4	52	5.3	1.0	1.1	2.6	1.9	1.2	23.2	.1	.6	3.0	53.9	116.0	25.6	87.2	277.6	87.2	63.7	5.6	83.9	------	------
1935	10.9	15.8	53	5.4	1.2	6.0	3.0	4.9	1.4	14.1	.2	.8	2.9	55.0	116.0	23.6	83.7	257.6	83.6	66.7	7.6	83.3	------	------
1934	11.1	15.6	59	6.2	1.7	7.2	2.4	5.2	1.4	12.3	.4	.6	1.0	56.8	113.1	24.6	79.1	252.4	81.4	69.5	8.3	87.4	------	------
JANUARY TO JUNE																							
Alabama:																							
1937	11.4	20.8	71	6.6	1.2	.1	.3	6.6	2.4	82.8	.6	.3	5.2	65.2	57.2	11.0	68.6	165.0	117.1	57.0	13.1	79.5	70.	3 20.
1936	11.6	21.3	71	6.5	.8	1.2	.5	2.6	2.7	82.2	.4	.1	1.1	68.2	56.1	12.6	69.3	152.2	139.1	59.7	13.2	82.4	------	------
Colorado, 1937	14.3	17.9	73	5.8	1.3	.2	2.3	6.2	2.4	86.1	1.9	1.3	3.8	73.3	122.5	17.5	92.9	242.2	245.0	81.2	4.9	86.1	87.4	27.9
Connecticut:																							
1937	10.9	12.6	45	3.3	.3	1.3	1.2	1.7	.9	20.0	[3]	.5	.9	38.8	125.6	34.8	86.0	246.1	89.9	49.9	3.6	87.6	64.4	21.8
1936	10.9	12.5	47	4.9	.1	.7	.8	2.1	.2	13.4	.1	.3	1.3	40.6	128.7	32.0	[4]	247.1	99.6	[4]	2.9	96.4	------	------
1935	11.0	12.6	47	5.6	.7	3.4	2.0	1.3	.9	12.3	.2	.5	1.1	47.3	124.3	34.8	[4]	243.6	90.3	[4]	1.5	93.0	------	------

[1] Data not compiled for these reports prior to 1937.

[2] States included are Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Montana, New Jersey, New York, Pennsylvania, Rhode Island, Tennessee, Virginia, West Virginia, and Wisconsin (estimated population as of July 1, 1937, 72,178,000). List includes all of the States with available data for the 4 years covered in this summary.

[3] No deaths.

[4] Data not available.

Mortality from certain causes in the first 6 months of 1937, with comparative 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 (90–95)	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)	Automobile accidents (206, 208, 210)
JANUARY TO JUNE—contd.																							
Delaware:																							
1937	14.3	15.8	67	3.9	1.5	2.3	(3)	7.7	.8	36.2	(3)	(3)	3.1	55.4	108.5	30.8	103.1	384.1	129.3	66.2	6.9	143.9	106.2	39.2
District of Columbia:																							
1937	14.8	18.5	65	6.8	.9	3.8	.9	4.4	3.1	27.9	(3)	.9	7.5	99.3	140.6	31.3	101.4	337.2	161.9	75.2	5.6	96.1	78.9	26.0
1936	15.8	18.4	72	5.6	1.9	2.3	.6	5.5	6.5	13.0	.3	.6	14.6	114.4	132.5	33.5	111.1	370.7	177.4	77.6	5.8	102.7	------	------
1935	15.3	18.0	62	4.9	1.4	(3)	2.7	.3	3.7	18.0	(3)	1.4	20.0	113.7	129.0	28.5	101.2	359.2	171.4	91.0	9.2	106.6	------	------
Florida:																							
1937	13.1	15.9	64	7.4	3.4	.4	.1	3.3	2.4	54.2	.2	.4	6.6	59.4	96.7	20.4	108.1	253.6	81.1	94.5	13.4	103.4	107.5	41.4
1936	13.3	15.1	69	9.1	2.4	.4	.1	1.7	2.8	79.4	.7	.5	3.3	54.1	87.9	21.7	106.9	257.6	105.3	83.5	8.2	110.1	------	------
1935	12.6	15.1	69	9.1	2.2	3.4	(3)	3.9	3.9	58.7	.6	(3)	.6	56.7	85.3	22.4	97.6	228.3	80.7	93.3	16.1	110.2	------	------
Georgia:																							
1937	10.9	18.7	66	7.7	2.0	.1	.3	3.4	2.0	70.0	.6	.2	1.7	49.9	54.1	11.3	84.7	167.5	107.8	63.4	12.9	104.2	67.9	25.7
1936	11.8	18.5	70	7.5	3.0	.3	.3	2.0	2.4	95.5	.3	.4	3.0	55.4	53.2	11.2	80.1	176.5	151.4	61.3	9.7	103.5	------	------
1935	10.9	18.7	75	8.0	3.6	1.4	.7	6.7	2.9	66.8	.7	.1	.9	56.0	50.9	11.9	72.2	156.8	114.0	74.2	15.8	102.7	------	------
Hawaii: [4]																							
1937	9.1	20.3	81	5.8	2.2	(3)	(3)	.5	3.8	8.1	(3)	(3)	1.1	77.7	71.2	16.7	40.5	118.2	100.9	71.2	21.6	72.8	51.8	16.7
1936	8.0	20.3	73	5.2	2.8	(3)	(3)	1.1	2.2	16.0	(3)	.6	3.3	74.9	57.3	14.3	43.5	133.3	74.4	82.7	19.3	73.3	------	------
1935	8.1	22.3	68	5.6	1.7	(3)	(3)	4.0	(3)	7.9	(3)	(3)	1.7	77.7	61.3	14.8	44.2	115.2	76.0	63.6	22.1	73.8	------	------
Idaho:																							
1937	10.5	20.6	46	3.5	1.2	5.2	2.0	2.4	.4	67.9	(3)	1.2	1.2	22.1	78.7	10.8	74.3	171.1	95.2	68.7	4.0	34.9	86.4	30.1
1936	10.9	20.2	47	3.5	1.2	2.5	15.3	1.7	.8	21.1	.4	.8	9.1	29.0	77.5	17.0	76.3	193.6	130.2	56.4	.4	28.6	------	------
1935	10.2	20.1	61	7.3	1.3	2.5	4.6	10.1	.4	23.6	.4	2.9	5.1	25.7	66.9	13.5	68.2	162.5	115.8	60.6	.8	29.0	------	------
Illinois:																							
1937	11.9	13.3	50	4.5	.2	.2	3.2	2.1	2.2	30.2	.2	.3	1.8	53.6	128.5	28.4	75.7	309.5	92.9	69.2	3.1	103.8	76.0	30.0
1936	12.2	13.3	51	4.6	.5	.2	4.9	2.3	2.8	19.7	.1	.4	3.0	54.0	131.2	30.9	84.4	331.0	100.5	67.7	3.8	109.2	------	------
1935	11.5	13.2	54	5.5	.7	7.3	7.8	3.4	2.8	24.9	.2	.6	3.7	54.8	126.7	25.5	75.3	288.6	98.2	69.7	3.6	101.6	------	------
Indiana:																							
1937	12.0	13.7	57	4.1	.4	.6	4.4	4.6	1.3	54.6	.3	.5	2.2	49.0	104.3	16.1	123.3	263.2	123.6	(4)	4.7	68.3	76.6	34.4
1936	12.4	13.8	55	5.4	.8	.2	4.5	1.7	3.7	42.8	.1	.7	2.7	49.9	108.7	18.1	135.9	280.5	132.1	(4)	3.7	83.8	82.7	29.4
1935	11.5	13.6	59	5.8	.5	4.8	4.2	5.5	2.6	37.1	.1	.6	3.7	50.0	110.5	14.7	129.3	269.8	108.0	(4)	3.1	68.7	69.9	29.1

Iowa:																							
1937	10.1	14.8	46	5.2	.4	.1	5.8	2.2	.2	56.3	.3	.9	1.1	21.2	119.1	21.6	105.9	225.8	84.1	51.5	2.9	62.7	45.8	17.2
1936	10.5	16.5	44	4.6	1.1	.2	4.6	1.6	1.1	26.6	(2)	.3	2.7	23.9	125.4	27.4	110.6	251.4	91.3	55.5	2.8	66.2	------	------
1935	10.7	14.6	55	5.4	.8	11.9	3.0	1.6	1.9	32.5	.4	.8	2.1	27.7	126.2	23.5	107.0	238.3	98.1	55.9	3.0	64.1	------	------
Kansas:																								
1937	11.0	13.9	49	4.7	(3)	.1	6.2	1.7	1.5	57.1	.3	1.2	1.7	28.1	113.0	24.2	104.2	247.8	84.8	58.8	3.5	90.7	98.5	23.1
1936	12.4	14.8	56	6.9	1.2	.2	6.6	1.4	2.6	75.7	.3	1.2	1.8	32.9	112.3	23.2	113.4	259.3	119.0	67.0	4.0	107.2	------	------
1935	11.5	15.7	56	5.5	.4	22.8	2.6	3.5	2.0	50.6	.2	1.5	2.9	29.8	110.3	22.1	98.7	235.4	115.5	68.5	4.7	92.4	------	------
Kentucky:																								
1937	10.6	19.2	49	4.3	2.5	3.9	1.6	5.9	3.8	81.1	.6	.6	3.7	67.8	65.1	11.5	86.8	176.4	116.1	54.4	9.0	64.6	68.1	22.6
Louisiana:																								
1937	12.4	18.8	77	8.6	4.4	1.5	.7	8.3	3.5	89.5	.1	.4	1.9	75.3	77.3	18.1	70.6	214.2	129.6	73.2	16.0	109.4	66.5	19.3
1936	12.7	17.1	87	11.2	4.5	3.8	.3	5.8	3.7	77.8	.4	.2	2.4	74.6	77.9	18.0	74.8	275.2	150.8	76.4	17.8	111.6	------	------
1935	11.2	17.0	77	7.7	7.4	10.2	.7	3.2	4.7	34.1	.7	.6	1.0	78.8	75.3	15.1	69.2	181.2	97.5	82.2	16.3	108.7	------	------
Maine:																								
1937	14.1	18.6	60	5.2	.9	.2	.7	1.9	.5	65.3	.5	.2	.9	34.4	144.7	23.7	124.6	392.8	126.0	57.6	5.4	95.3	59.7	13.4
Maryland:																								
1937	14.0	16.1	65	3.8	.6	4.2	1.1	6.1	1.8	27.4	.4	1.9	3.7	88.5	131.6	27.1	117.6	332.1	144.0	62.7	7.4	152.3	86.6	29.1
1936	13.9	16.2	63	4.8	1.0	2.4	1.0	4.0	1.8	15.4	(2)	1.0	11.8	82.7	129.3	29.8	119.2	326.3	143.5	58.0	4.2	155.4	------	------
1935	13.6	16.4	64	5.4	1.1	2.2	2.7	3.9	1.2	25.1	(2)	1.1	5.0	86.9	130.0	27.7	119.1	298.9	139.1	67.5	8.0	142.3	------	------
Michigan:																								
1937	11.4	18.0	55	3.8	.4	.2	4.5	2.7	1.0	31.4	(2)	.3	1.1	46.9	115.4	26.9	91.1	291.0	112.6	64.1	3.9	66.1	80.0	33.4
1936	11.8	18.1	54	5.2	.6	.3	3.1	2.4	.7	17.7	.3	.6	1.6	43.9	113.4	27.7	98.7	297.0	115.2	70.6	6.3	70.1	------	------
1935	11.5	18.3	56	5.4	.5	7.4	3.2	3.0	.9	23.6	(2)	.3	1.1	46.5	111.8	27.1	93.9	276.5	107.7	69.3	4.3	67.6	------	------
Minnesota:																								
1937	10.7	18.4	45	3.4	.3	.2	2.4	2.1	.4	43.3	(2)	.9	1.5	37.2	141.7	24.8	91.9	242.2	98.6	55.5	2.1	48.6	66.2	17.2
1936	10.8	16.9	45	4.7	.5	1.6	7.4	1.0	.3	18.1	.2	.6	2.6	37.7	129.0	27.3	84.6	250.7	100.7	60.7	4.0	49.8	------	------
1935	10.4	16.5	50	5.6	.2	4.1	4.8	3.4	.5	24.3	.1	1.0	2.1	36.8	130.2	23.5	85.6	219.2	97.8	64.9	3.1	50.1	------	------
Missouri:																								
1937	12.9	13.0	68	6.5	2.7	.1	4.1	3.0	2.4	62.9	.4	.8	1.8	60.3	122.4	25.0	99.4	281.4	165.2	58.1	5.2	109.4	80.0	27.2
Montana:																								
1937	12.8	19.4	57	4.3	2.7	.4	3.8	1.1	2.3	102.2	(2)	.8	2.3	44.0	107.8	20.1	98.4	230.5	145.1	68.7	1.1	71.4	92.7	20.5
1936	12.1	19.2	51	5.3	1.1	.4	12.1	4.2	3.0	29.9	(2)	(2)	4.2	44.7	100.0	24.2	91.3	198.4	149.2	81.8	6.4	76.5	------	------
1935	12.2	18.4	63	5.2	1.9	17.5	3.0	6.1	3.4	60.0	.4	1.1	3.0	46.0	101.8	18.6	84.7	211.2	156.8	105.6	6.5	80.1	------	------
Nebraska:																								
1937	10.5	15.7	51	5.2	.4	.4	4.9	2.4	1.2	76.0	.6	.3	1.6	23.7	107.3	28.5	87.7	236.8	83.5	61.2	3.1	67.1	58.2	20.1
1936	10.6	16.4	46	6.8	.7	1.5	8.4	1.8	1.6	27.1	.3	.6	1.8	19.0	112.2	27.7	94.7	247.1	89.0	81.4	3.4	77.5	------	------
1935	10.3	16.3	48	5.8	.6	11.5	3.5	1.2	1.5	35.9	.3	.6	4.3	22.8	102.5	20.6	105.9	198.8	114.4	68.3	3.0	50.6	------	------
Nevada:																								
1937	13.2	13.6	60	10.3	(3)	(3)	4.0	4.0	(3)	16.0	(3)	(3)	(3)	71.9	73.9	10.0	83.8	257.6	173.7	37.9	4.0	45.9	135.8	39.9
New Jersey:																								
1937	10.8	12.2	44	3.7	.5	2.2	.6	1.4	.7	16.7	.1	.7	1.7	50.2	121.5	32.6	79.1	329.8	91.6	57.1	2.6	73.6	73.6	24.0
1936	10.7	12.2	49	4.1	.5	.4	1.0	1.3	.5	11.3	.3	.8	2.4	51.6	122.5	32.3	85.0	315.6	88.7	56.0	3.3	82.4	------	------
1935	10.6	12.6	51	4.8	.5	2.4	1.1	2.8	1.2	14.7	.3	.6	.8	52.2	118.8	29.9	80.4	302.0	80.8	55.9	3.3	86.1	------	------
New York:																								
1937	12.8	14.5	49	4.1	.3	.6	1.2	1.2	.9	17.1	(6)	.7	1.5	62.1	150.3	40.0	73.0	389.1	119.7	70.4	6.1	82.7	67.9	19.7
1936	12.7	14.0	50	5.6	.6	1.8	2.3	1.0	.4	9.5	(3)	.7	3.0	61.5	146.1	38.1	85.0	375.8	117.9	69.9	5.2	84.9	------	------
1935	12.4	14.4	54	5.7	.4	2.5	2.3	3.0	1.0	10.6	.2	.6	2.7	61.4	143.9	35.1	80.5	344.3	110.8	69.6	6.7	85.1	------	------

[3] No deaths.
[4] Data not available.
[5] January to May.
[6] Less than 1/16 of 1 per 100,000 population.

Mortality from certain causes in the first 6 months of 1937, with comparative 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 (90–95)	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)	Automobile accidents (206, 208, 210)
JANUARY TO JUNE—con.																							
North Carolina:																							
1937	10.1	23.0	65	6.0	1.4	1.3	.4	3.6	3.0	42.5	.3	.6	1.4	60.7	52.5	11.0	82.0	165.4	107.6	60.2	16.4	89.9	67.6	24.9
1936	11.0	22.7	65	6.7	1.0	.2	.7	.9	3.0	53.2	.4	.6	1.9	62.0	52.5	12.6	(4)	(4)	142.7	(5)	9.8	(5)	------	------
1935	10.6	23.2	72	6.9	1.1	3.9	.6	12.4	3.1	48.3	1.4	.4	1.1	60.8	50.0	10.4	(4)	(4)	118.3	(5)	16.4	(5)	------	------
North Dakota:																							
1937	8.6	18.8	56	5.3	(3)	(3)	1.7	.3	1.1	47.4	(3)	.3	2.9	26.8	78.5	19.1	77.7	172.5	87.7	53.7	9.7	37.4	50.6	11.7
Oklahoma:																							
1937	9.2	14.2	66	6.4	2.2	1.7	1.7	1.7	2.0	71.0	1.1	.2	3.4	56.1	74.0	13.3	62.2	141.3	103.8	55.8	4.0	68.9	60.5	22.9
Oregon:																							
1937	13.2	15.1	46	4.3	.6	.2	1.4	2.4	.2	54.6	.6	1.0	.8	38.1	122.4	24.0	112.0	303.1	89.8	57.2	.6	115.8	88.6	29.1
Pennsylvania:																							
1937	12.1	15.6	55	4.7	.6	1.0	2.2	2.8	1.1	44.8	.1	.8	1.9	49.8	115.2	33.4	82.7	323.3	101.8	54.3	4.2	92.1	61.0	19.9
1936	11.8	15.7	52	4.7	.5	.5	2.2	1.2	1.5	20.8	.1	.5	1.8	46.6	111.5	31.0	92.2	316.7	103.0	54.7	5.5	90.4	------	------
1935	11.4	16.0	58	5.4	.6	4.2	2.7	2.4	1.7	28.3	.2	.9	1.4	48.2	106.9	28.7	86.0	291.8	105.8	55.1	5.1	90.9	------	------
Rhode Island:																							
1937	13.4	15.2	52	4.1	.3	.9	2.1	2.4	.6	20.7	(3)	.6	3.8	53.3	162.0	45.9	104.5	395.9	130.6	57.2	4.4	123.8	49.2	15.1
1936	12.6	14.9	52	4.5	(3)	.6	2.7	.9	.3	15.1	(3)	.6	5.0	50.8	135.0	36.9	102.5	362.9	123.5	62.3	4.4	107.2	------	------
1935	12.4	15.4	55	2.9	.3	1.8	.6	1.5	.6	13.0	.3	.3	4.1	55.1	144.5	38.8	101.9	367.2	103.6	68.4	6.2	106.3	------	------
South Carolina:																							
1937	10.6	18.4	91	8.4	4.3	1.0	.4	3.0	2.5	65.1	.6	.3	1.1	47.2	48.4	11.2	89.5	178.2	109.1	26.5	6.9	85.8	43.1	24.7
1936	10.8	18.7	85	8.9	3.2	.6	.5	3.6	2.2	76.6	.9	.2	4.1	51.9	43.0	10.0	94.6	178.8	137.2	26.2	4.1	88.0	------	------
1935	11.5	17.8	94	10.1	3.7	2.0	(3)	10.4	2.4	113.3	.4	1.8	2.4	50.9	37.9	11.7	92.6	183.4	129.4	19.2	4.4	91.9	------	------
South Dakota: [7]																							
1937	10.8	16.8	62	5.7	.4	(3)	5.7	1.3	.4	100.2	(3)	.4	2.2	36.0	80.0	25.9	76.9	180.2	116.5	46.2	2.2	54.9	44.0	10.5
1936	9.4	18.7	49	5.8	1.3	.4	5.7	.9	.9	28.8	(3)	.4	(3)	39.3	88.3	21.4	82.2	172.2	97.5	55.1	5.7	74.0	------	------
1935	10.3	19.0	64	7.9	.4	10.5	2.6	4.0	1.3	62.8	1.8	(3)	.4	40.9	96.3	18.9	80.4	140.2	152.0	56.3	6.2	62.4	------	------
Tennessee:																							
1937	10.6	15.4	67	8.3	2.1	1.1	.8	3.9	3.3	76.2	.5	.6	3.3	86.5	65.2	11.2	79.1	159.7	119.8	62.5	10.3	65.2	63.4	21.3
1936	11.6	15.9	68	7.4	1.8	1.2	1.1	2.6	2.9	87.3	.3	1.0	5.4	91.6	61.3	13.5	81.5	167.5	159.3	62.4	7.5	67.8	------	------
1935	10.3	16.4	69	7.7	2.6	2.2	.5	21.8	3.7	59.6	.6	.6	4.7	87.0	63.0	11.5	77.5	139.0	115.6	64.4	11.4	60.7	------	------

Utah:																							
1937	10.2	23.6	42	3.6	.8	1.2	2.0	3.1	1.2	38.6	.4	1.2	2.0	23.8	90.9	23.8	62.4	252.0	75.7	71.8	2.3	58.1	76.8	29.2
Vermont:																							
1937	12.0	13.1	57	12.0	1.0	(3)	(3)	1.0	1.0	53.7	(3)	(3)	.5	46.9	135.8	22.6	104.2	321.7	126.4	53.2	3.7	74.8	59.5	15.8
Virginia:																							
1937	11.4	18.2	69	5.4	1.0	3.7	.4	7.8	2.0	65.6	.6	.7	6.2	65.9	71.9	16.9	92.4	233.2	132.5	43.9	7.2	86.5	61.5	22.6
1936	12.1	19.1	64	5.5	1.5	1.4	.6	3.8	3.0	58.3	.3	.4	7.5	70.2	70.8	17.4	101.6	244.1	123.1	46.8	3.7	98.9	------	------
1935	11.7	19.0	71	5.8	1.1	9.7	1.1	11.1	3.2	58.5	.4	.5	4.9	74.3	70.5	16.1	98.0	229.6	104.8	50.9	7.2	90.2	------	------
Washington:																							
1937	12.1	14.0	44	5.1	.7	1.3	1.6	.8	1.1	42.3	.1	2.4	1.3	46.1	129.7	23.5	108.2	305.8	88.8	54.9	1.2	80.0	87.6	26.7
1936	12.2	13.8	46	4.6	.4	3.7	2.4	.9	.2	39.3	.6	2.3	1.8	52.4	128.7	26.2	110.1	291.1	90.5	65.9	1.2	80.7	91.4	31.7
1935	11.6	13.9	45	5.9	.4	2.1	1.7	2.7	1.1	23.8	.9	2.0	2.5	52.1	132.5	24.1	101.4	281.4	61.4	65.6	2.2	83.8	------	------
West Virginia:																							
1937	10.7	20.4	64	6.4	1.6	1.5	2.1	10.4	3.2	70.2	.8	.1	6.2	56.6	67.7	15.8	73.8	176.3	124.2	55.6	8.0	66.7	94.5	20.3
1936	10.8	19.1	64	7.2	1.8	2.2	1.8	3.5	5.2	45.0	.8	.5	7.0	56.7	67.4	15.2	81.4	185.6	127.6	52.7	4.5	75.1	------	------
1935	10.1	20.7	65	6.4	3.1	11.8	4.9	11.1	5.8	44.0	.3	.6	4.3	61.3	70.6	12.0	71.4	144.0	107.9	58.7	5.9	69.8	------	------
Wisconsin:																							
1937	12.0	17.4	49	3.9	.3	.1	3.5	1.0	.6	74.9	.1	.4	1.0	37.1	137.5	28.4	97.9	312.2	90.8	(4)	4.2	75.2	75.4	24.2
1936	11.5	17.1	51	4.5	.5	.5	6.8	1.9	.4	19.5	(3)	.6	1.5	37.0	133.9	28.8	103.8	297.6	90.8	(4)	4.6	73.1	------	------
1935	10.8	17.2	54	4.1	.1	4.0	5.4	1.6	.5	30.7	.1	1.1	1.7	38.7	128.1	25.7	91.7	265.3	80.4	(4)	4.9	73.6	------	------
Wyoming:																							
1937	11.6	18.3	54	5.1	.9	.9	6.9	3.4	(3)	81.9	.9	1.7	3.4	15.5	74.1	8.6	84.4	271.5	150.0	77.6	11.2	35.3	106.0	40.5

[3] No deaths.
[4] Data not available.
[7] January to April.

STUDIES ON OXYURIASIS

VI. THE INCIDENCE OF OXYURIASIS IN 1,272 PERSONS IN WASHINGTON, D. C., WITH NOTES ON DIAGNOSIS

By ELOISE B. CRAM, *Senior Zoologist;* MYRNA F. JONES, *Zoologist;* LUCY REARDON, *Junior Zoologist;* and MABELLE O. NOLAN, *Junior Zoologist, National Institute of Health, United States Public Health Service*

In a series of investigations of oxyuriasis, initiated in the spring of 1936 as a group research project in the Division of Zoology, one of the first phases to receive consideration has been the incidence of this parasitic infestation in residents in or near Washington, D. C. The present report is based on the examination of 1,272 persons, including children and adults, males and females, and members of the white and of the Negro race, the latter being referred to throughout the paper as "colored." Approximately half of these persons (628) were from the general population, widely scattered as to place of residence, representing for the most part a low social-economic level, but also including persons of the middle and a few persons of the upper social-economic levels. The other half (644) of the total number consisted of institutionalized boys and girls, between the ages of 11 and 20, at the National Training School for Boys (617 individuals), and the National Training School for Girls (27 individuals); the majority of these represented a low social-economic level, with a few from the middle level.

All examinations here reported were made purely for diagnostic purposes; examinations following any form of treatment, to check its efficacy, were not included, except in a very few cases in which examinations remained consistently positive. An attempt has been made to analyze the data, so that they will not only furnish information as to incidence but will throw light on diagnostic procedures, in order that conclusions may be drawn as to the reliability of results.

METHOD OF EXAMINATION

It is now recognized, by those well informed regarding pinworms, that the usual methods of examination of feces for parasites are unreliable in the diagnosis of *Enterobius vermicularis* infestation. The eggs of the parasite are not deposited in the alimentary canal, as are those of other worm parasites in that location, but are deposited on the skin of the perianal region after the females have wandered out through the anus; eggs will appear in the feces probably only in those few cases in which the eggs were dislodged from the anal region, or in heavy infestations where occasional female worms have passed in feces and the eggs have been released when the worms ruptured or disintegrated.

It seems apparent, therefore, that a diagnostic method should be used which includes a search for the eggs in the location where they are deposited, that is, on the perianal region, by some such technique as will remove them from that region and allow their identification microscopically. However, very little emphasis has been placed on this point and on appropriate procedures. As will be noted later, in a review of previous investigations, the examination of such material has been used in special investigations for the past 60 years, but books on human parasitology or on medical diagnosis for the most part do not specifically recommend these procedures. Even though the authors may point out that the pinworm constitutes a special case, from the diagnostic point of view, they recommend a search for the worms themselves, in feces after a purgative or in enema returns; they are usually silent on the question of search for the eggs. Brumpt (1936) states that if a clinical diagnosis cannot be verified by actually seeing the worms at the anal opening, "On pourra les rechercher dans les matières fécales expulsées spontanément ou après un lavement froid; il est généralement nécessaire de diluer les matières dans l'eau et de décanter. La recherche des oeufs dans les selles est rarement positive et seulement dans le cas où les femelles, évacuées dans le milieu extérieur, ont pondu sur la parcelle prélevée pour l'examen coprologique." In another part of his discussion, Brumpt refers to Netter's use of lard suppositories for the detection of worms; the suppository having been inserted at night, worms present are said to be found attached to it when it is withdrawn in the morning. It is not clear to us how a lard suppository could be withdrawn after this period of time.

Neveu-Lemaire (1936), after stating under a discussion of the biology of the parasite that "Un fait bien connu est la rareté de la constatation des oeufs d'oxyure dans les selles", gives no specific procedure in his section on diagnosis, but simply states: "Le diagnostic de l'oxyurose, étant donnés ses symptômes objectifs trés nets, ne présente en général aucune difficulté."

Langeron (1921, 1933) recommends examination of fecal material obtained directly from the rectum, using an instrument devised by Riff (1916), as noted later in this paper, and urges that material from under the fingernails also be examined microscopically. We have found the latter material very unreliable, for diagnostic purposes, in a small group of individuals known to have pinworms, who were examined by us.

In this country, Stitt (1927) recommends the administration of a diagnostic dose of calomel and salts, and subsequent examination of the stools for the worms. Todd and Sanford (1936) point out that "The worms are not infrequently found in the feces, particularly after a copious enema; the ova, rarely. The latter are best found by

scraping the skin with a dull knife at the margin of the anus." However, they recommend for diagnosis the giving of a purgative or copious enema and searching the stool for the worms.

Chandler (1936) states that "eggs are seldom found in the feces before the worms have disintegrated, but can be obtained from scrapings from about the anus or lower part of the rectum." He gives no more specific directions.

In medical practice it would be possible, of course, in individual suspected cases in which clinical symptoms indicated pinworm infestation, to employ several methods, such as examination of feces, as given above, after enemas, and, in addition, examination of the perianal material for eggs of the parasite. In determining the incidence of pinworm infestation as a public health problem, a complicated technique involving the administration of drugs or of enemas, with collection and examination of feces for worms, is impossible as a diagnostic procedure; here as well as in medical practice a simpler technique, such as the making and examination of anal swabs, has great advantages.

It is surprising how frequently figures are still given for the incidence of pinworms in surveys of parasitic infestations based on ordinary fecal examinations, with no notation of the fact that these figures cannot be relied upon to portray the true state of affairs as regards this parasite. As discussed later, a considerable number of European studies have been made, using the more reliable method of perianal examination for eggs. So far as we know, such a method had not been employed in the United States prior to the present investigations, with the single exception of the critical study made by Headlee (1935).

The method employed in the present investigation consisted of the use of anal swabs; fecal examinations were made in some cases, for supplementary information, and a small series in which swab material was lacking but fecal material available is included for comparative purposes.

Hall (1937) has discussed various types of anal swabs and scrapers and the development of the NIH swab as the most reliable type, from all points of view. This swab consists of a cellophane-tipped glass rod, carried through a rubber cork fitted into a glass tube. Transparent, colorless cellophane is used. The folds of the cellophane provide the proper amount of scraping of the skin when the swab is used, and, in addition, eggs stick to the cellophane. Not only eggs of *Enterobius* but also those of *Trichuris*, *Ascaris*, *Necator*, *Hymenolepis*, and *Taenia* have been found on the swabs. The glass tube prevents loss of material during transportation and ensures the safety of the carrier from infection. The cellophane tip, held to the rod by a narrow rubber band, is easily removed and mounted directly onto a glass

slide for microscopic examination of the material which it has picked up. The arrangement for transporting the NIH swab, that is, a perforated rubber cork in a glass tube, has been used in Europe for an instrument devised for obtaining a sample of rectal contents, this instrument consisting of a glass rod with a depression near its tip. The description and illustration of this instrument, given originally by Riff (1916) and subsequently by Forget-Urion (1918) and Langeron (1921 and 1933), came to our notice after the NIH swab had been described.

As is noted later, some of the swab samples from patients were taken by the writers, assisted at times by other members of the Division of Zoology, and some by other persons. The time of day varied, as did also the time elapsing between examinations when more than one examination was made.

PREVIOUS INVESTIGATIONS

In Europe, various methods have been employed for obtaining pinworm eggs from the anal and perianal region, and data concerning the incidence of this parasite are available from studies made in this manner. The earliest reference which we have found relating to the examination of material secured in a manner comparable to the use of an anal swab is that of Heller, who, in 1876, in discussing methods of diagnosis, listed, first, the direct examination of the patient for migrating worms; second, the use of a small enema for removing worms from the rectum; and, last, the microscopic examination of "intestinal mucus, either from the end of the rectum by means of a spatula, or from any piece of paper that may have been made use of after a motion." Heller does not provide data as to incidence based on the use of these methods.

Data from investigations comparable to the present studies are summarized in table 1. These are from reports published by 19 authors, from 1886 to 1937, in 5 countries; namely, Germany, Finland, Soviet Russia, Sweden, and the United States. In a total of 14,427 persons, 6,574, or 45.57 percent, were positive. This includes Dahlberg's large group of 2,753 showing a very low incidence, only 81 persons, or 3.1 percent, being positive; without this group, the total would be 11,674 persons examined, with 6,493, or 55.62 percent, positive. Omitting the two reports from the United States and considering only the European studies, a total of 13,915 individuals showed 46 percent positive. The positive findings from Finland are 3 and 32 percent, respectively; from Germany they range from 19 to 76 percent, from Sweden from 45 to 70 percent, and from Soviet Russia from 48 to 93 percent. The Russians have emphasized

the desirability of making repeated examinations, and in three of their studies the individuals were examined several times. In one of these groups, in which up to seven examinations were made to establish a positive diagnosis, the highest percentage of positives of any study to date, namely, 93 percent, was obtained.[1]

[1] A paper by W. Th. Schmidt (1914), not available in time to be included in the manuscript, reports 100 patients examined for pinworm eggs at Rostock, Germany. Anal scrapings were made on children and adults by means of a curette. The 1st scraping showed 87 percent positive; additional scrapings showed 96 percent positive. Two groups of children in institutions also were examined. In the 1st group, chiefly 1 to 3 years old, 18 were examined, with 28 percent positive; in the 2nd group, boys 8 to 16 years old, 23 were examined, with 91.3 percent positive.

TABLE 1.—*Previous reports of incidence of* Enterobius vermicularis, *based on examinations of anal or perianal material* [1]

Date	Author	Number examined	Number positive	Percent positive	Method		Social type	Age	Sex	Country
					Material	Instrument				
1886	Banik	315	95	30.15	Fecal residue around anus		Children of laborers and artisans.	Up to 14		Germany.
1905	Dahlberg in Sievers	2,753	81	3.1	Rectal feces and mucus	Small metal spoon		All		Finland.
1911	Ruotsalainen	300	95	31.67	do	Gallstone spoon	Children of laborers and artisans.	Up to 15		Do.
1919	Berndt	1,165	886	76.1	Anal scrapings	Earspoon	Children's clinic	2 to 14	M and F	Germany.
1919	Gmelin	400	76	19.0	Rectal feces	Glass tube	Militia	Adults	M	Do.
1921	v. Gottberg	200	64	32.0	Rectal mucus	Glass rod	Children of poor families.	Under 15		Do.
1922	Goebel	1,000	446	44.6	Anal scrapings		Clinic	3 to 14		Do.
1925	v. Drigalski and Koch.	200	114	57.0	do	Glass spatula	School children (State school).	6 to 15		Do.
1925	Japha	200	132	66.0	do	do	School children			Do.
		285	209	73.3	do	do		1st to 8th school year.	M	Do.
1927	Bogoiavlenskii and Demidova.[2]	96	89	92.7	Perianal scrapings	Match		3 to 16		Union of Soviet Socialist Republics.
1927	Serbinow and Schulmann.[3]	113	66	58.4	do	do	Child welfare centers at tobacco factories.	Up to 4		Do.
1928	Panov	319	(256)	80.2	do			10 to 16		Do.
1929	Bogojawlenski and Lewitski.[4]	1,000	556	55.6	do	Match	Military conscripts		M	Do.
1929	Oleinikov	5,130	3,042	59.29	Anal and perianal scrapings.	Wooden spatula				Do.
1931	Schuchat	299	147	48.2	Perianal scrapings			Children and adults.		Do.
1933	Hellsten	310				Lint greased with vaseline inserted into rectum.	Hospital patients.			Sweden.
		60	42	70.0			Asylum inmates.			
		40	27	67.5	Rectal feces		School children.			
1935	Headlee	282	62	21.99	Perianal scrapings		State Hospital patients.	15 to 60	M and F	United States.
1936	Spaak	40	18	45.0	Anal and rectal scrapings	Urethral ladle	Pediatric clinic	2 to 14		Sweden.
1937	Bozicevich	230	71	31.3	Anal scrapings	NIH swab	Mostly low social-economic level.	6 to 18	M	United States.

[1] Unless otherwise stated, only one examination made
[2] Repeated examinations (up to 7)
[3] Repeated examinations (up to 4).
[4] Repeated examinations (number not stated).

In the United States, Headlee's (1935) report provided comparative findings by three different methods—fecal examination by direct smear and by the Willis flotation method, and the examination of perianal scrapings; he does not describe the instrument used in the last method, but he concludes that this method is the only one approaching reliability. His findings by the three methods are as follows: Fecal examination, by direct smear, 89 persons examined, 0 positive; by salt flotation, 505 persons examined, 17 (3.37 percent) positive; perianal scraping, 282 persons examined, 62 (21.99 percent) positive, this number of patients including 147 previously examined by one of the two methods of fecal examination. In his tabulated data Headlee shows that in 1 ward having 206 patients he examined 194 by salt flotation of feces and found 12 cases (6.19 percent), whereas examination of perianal scrapings of 128 persons from this ward revealed 45 cases (35.16 percent) positive.

In Bozicevich's (1937) report, made as a preliminary to the present investigation, 230 white boys, 6 to 18 years old, residents of Washington, D. C., were examined during their stay at a summer camp. The same method of examination was used as we have used in the present study; 72 cases of pinworm infestation were detected, an incidence of 31.3 percent.

PRESENT FINDINGS

While there are a number of studies in the literature dealing with the use of swabs in the diagnosis of oxyuriasis, much more work is desirable. In this paper we include preliminary data bearing on the matter of number of swabs necessary to establish positive and negative diagnoses; we hope to investigate this phase of the subject further, under more controlled conditions. Correlations between pinworm incidence and population groups are also given consideration here.

As mentioned in the introduction, the 1,272 individuals examined fall into two groups of approximately equal size; namely, a general population group and an institutionalized group.

General Population

The NIH cellophane type of anal swab was used for examination of all of the 628 persons of this group, a total of 1,173 swabs, or 1.9 swabs per person, being made, with the following results:

Total positive_____222 persons
Total negative_____406 persons
Percent positive_____35.4

The 222 positive cases have been subdivided for analysis as follows:

I. Positive on all swabs..... 148 (66.7 percent)
II. Positive on first, negative on some later swabs..... 31 (14 percent)
III. Negative on first, positive on same later swabs..... 43 (19.4 percent)

The three groups involving positive findings and a fourth group containing only negative findings are tabulated and analyzed below.

I. Positive on all swabs

148 persons = base

The number of swabs made was 253, or 1.7 swabs per person, distributed as follows:

1 swab..... 89 persons (60.1 percent)
2 swabs..... 39 persons (26.3 percent)
3 swabs..... 10 persons (6.8 percent)
4 swabs..... 7 persons (4.7 percent)
5 swabs..... 2 persons (1.4 percent)
18 swabs..... 1 person (0.7 percent).

This group of 148 persons with consistently positive histories furnishes data for comparison with the remaining 74 persons infested with pinworms, on whom examinations were sometimes negative and sometimes positive.

The age, sex, and race of the 148 persons represented in this group are shown in table 2.

TABLE 2.—*Classification of 148 persons on whom swab examinations were always positive*

Age (in years)	Male						Female						Sex unknown		Total	
	White		Colored		Race unknown		White		Colored		Race unknown		Colored			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Preschool (through 5)	21	14.2	2	1.35	0	0	22	14.9	7	4.7	0	0	0	0	52	35.0
6–18	34	23.0	4	2.7	0	0	25	16.9	3	2.0	0	0	0	0	66	44.6
Children, age unknown, less than 15	1	.67	0	0	3	2	3	2.0	0	0	3	2	1	.67	11	7.4
Adult	8	5.4	0	0	0	0	11	7.4	0	0	0	0	0	0	19	12.8

Summarizing these data, we see that, of the 148 persons positive on all swabs, the sexes were practically equal in number, 73 persons, or 49.4 percent, being males, and 74, or 50 percent, being females; the sex of 1 individual, 0.7 percent of the entire number, was unknown. As regards age, 129, or 87 percent, of the individuals were children

(through 18 years of age) and 19, or 13 percent, were adults. As regards race, 125 persons, or 84.5 percent of the group, were white, whereas 17 persons, or 11.5 percent, were colored; the race of 6 persons, 4 percent of the group, was unknown.

II. Positive on first, negative on some later swabs

31 persons = base

The number of swabs made was 97, or an average of 3.1 swabs per person. Of the 97 swabs made on the 31 persons with pinworm infestations, 56 swabs, or 57.7 percent, were positive.

The distribution of positive and negative findings, in this group, is shown in table 3. Of the 31 persons who were positive on the first examination, 25 were negative and 6 positive on the second examination. As regards the subsequent history of these 25 negatives, 13 had no later examinations; of the remaining 12, 6 were negative and 6 positive on the 3d examination. Of these 6 positives, 4 had no later examinations; the 2 remaining were positive on the 4th examination, 1 was positive and the other negative on the 5th examination. Of the 6 negatives on the 3d examination, 3 had no later examinations; of the 3 remaining, 1 was positive on both the 4th and 5th examinations, and the other 2 were negative on the 4th examination, of which 1 had no more examinations while the other was positive on both the 5th and 6th examinations.

TABLE 3.—*Distribution of positive and negative findings on 31 persons, positive on first examination*

[In parentheses, number for which no later examination]

1st examination						31+							
2 1 examination			6+						25−				
3d examination		2+		4−				6+			6−		(13)
4th examination		2−		1−	(3)		(4)	2+		1+		2−	(3)
5th examination	(1)	1+					1+	1−		1+		1+	(1)
6th examination		1+										1+	
7th examination		1+											
8th examination		1+											

As regards the subsequent history of the 6 positives of the 2d examination, 4 were negative and 2 positive on the 3d examination. Of these 4 negatives, 3 had no later examinations; the 1 remaining was negative on the 4th, its last, examination. Of the 2 positives on the 3d examination, both were negative on the 4th examination; 1 had no more examinations and the other had 4 more examinations (5th to 8th, inclusive), all positive.

The age, sex, and race of the 31 persons represented in this group are shown in table 4.

TABLE 4.—*Classification of 31 persons, positive on first, negative on some later swabs*

Age (in years)	Male				Female				Total	
	White		Colored		White		Colored			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Preschool (through 5)	3	9.7	0	0	1	3.2	0	0	4	12.8
6 to 18	8	25.8	0	0	10	32.2	1	3.2	19	61.3
Children, age unknown, less than 15	0	0	0	0	1	3.2	0	0	1	3.2
Adult	4	12.8	0	0	3	9.7	0	0	7	22.6

Summarizing these data, it is seen that, of the 31 persons who were positive on the first swab but negative on some later swabs, the sexes were about evenly divided, 15, or 48.4 percent, being males and 16, or 51.6 percent, being females. As regards age, 24, or 77 percent of the group, were children (through 18 years of age) and 7, or 23 percent, were adults. As regards race, 30, or 97 percent, were white, and the remaining 1, or 3 percent, was colored.

III. Negative on first, positive on some later swabs

43 persons = base

The number of swabs made was 144, or an average of 3.3 swabs per person. Of the 144 swabs made on the 43 persons, all of whom proved to be infested with pinworms, 64 swabs, or 44.4 percent, were positive.

The distribution of negative and positive findings in this group is shown in table 5. It is seen that, of the 43 persons who were negative on the first examination, 29 were positive and 14 negative on the second examination. As regards the subsequent history of these 29 positives, 17 had no later examinations; of the remaining 12, 6 were negative and 6 positive on the 3d examination. Of these 6 negatives, 2 had no later examinations; of the remaining 4, 1 was positive on both the 4th and 5th examinations, and of the other 3, negative on the 4th examination, 2 had no later examinations, while the remaining 1 was negative on the 5th, 6th, and 7th examinations. Of the 6 positives on the 3d examination, 4 had no later examinations; of the remaining 2, 1 was positive on the 5th, 6th, 7th, and 8th examinations, and the other was negative on the 4th and 5th examinations.

As regards the subsequent history of the 14 negatives of the 2d examination, 4 were negative and 10 positive on the 3d examination. Of these 4 negatives, 2 were positive and 2 negative on the 4th examination. The 2 positives had no later examinations; of the 2 negatives, 1 was positive and 1 negative on the 5th examination; the 1 positive had no later examinations, while the 1 negative became positive on

both the 6th and 7th examinations. Of the 10 positives on the 3d examination, 4 had no later examinations; of the remaining 6, 2 were negative and 4 positive on the 4th examination. The 2 negatives and 2 of the 4 positives had no later examinations; the remaining 2 were positive on the 5th examination, and of these, 1 had no later examination and the remaining 1 was positive on the 6th examination.

TABLE 5.—*Distribution of negative and positive findings on 43 persons, negative on first examination*

[In parenthesis, number for which no later examination]

1st examination	-----	-----	-----	-----	-----	-----	-----	43−	-----	-----	-----	-----	-----	-----	-----	-----
2d examination	-----	-----	-----	29+	-----	-----	-----	-----	-----	-----	-----	14−	-----	-----	-----	-----
3d examination	(17)	-----	6+	-----	6−	-----	-----	-----	-----	-----	10+	-----	-----	4−	-----	-----
4th examination	(4)	1+	1−	-----	1+	3−	(2)	-----	(4)	4+	2−	-----	2+	-----	2−	-----
5th examination	-----	1+	1−	-----	1+	1−	(2)	-----	(2)	2+	-----	-----	-----	1+	-----	1−
6th examination	-----	1+	-----	-----	-----	1−	-----	-----	(1)	1+	-----	-----	-----	-----	-----	1+
7th examination	-----	1+	-----	-----	-----	1−	-----	-----	-----	-----	-----	-----	-----	-----	-----	1+
8th examination	-----	1+	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

The age, sex, and race of the persons represented in this group are shown in table 6.

TABLE 6.—*Classification of 43 persons, negative on first, positive on some later swabs*

Age (in years)	Male				Female						Total	
	White		Colored		White		Colored		Race unkrown			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Preschool (through 5)	10	23.3	0	0	5	11.6	0	0	0	0	15	34.9
6 to 18	13	30.2	1	2.3	5	11.6	0	0	0	0	19	44.1
Children, age unknown, less than 15	0	0	0	0	0	0	0	0	1	2.3	1	2.3
Adult	3	7	0	0	5	11.6	0	0	0	0	8	18.6

Summarizing these data, it is seen that of the 43 persons who were negative on the first swab but positive on some later swabs, 27 persons, or 63 percent of the group, were males and 16, or 37 percent, were females. As regards age, 35, or 81.5 percent of the group, were children (through 18 years of age) and 8, or 18.6 percent, were adults. As regards race, 41 persons, or 95.5 percent of the group, were white, 1 person, or 2.3 percent, was colored, and the race of the remaining 1, or 2.3 percent of the group, was unknown.

IV. Negative on all swabs

406 persons = base

The number of swabs made was 685, or an average of 1.7 swabs per person, distributed as follows:

1 swab	265 persons (65.2 percent)
2 swabs	90 persons (22.1 percent)
3 swabs	14 persons (3.5 percent)
4 swabs	18 persons (4.4 percent)
5 swabs	6 persons (1.5 percent)
6 swabs	7 persons (1.7 percent)
7 swabs	2 persons (0.5 percent)
8 swabs	2 persons (0.5 percent)
10 swabs	1 person (0.25 percent)
14 swabs	1 person (0.25 percent)

The age, sex, and race of the persons represented in this group are shown in table 7.

TABLE 7.—*Classification of 406 persons, on whom swab examinations were always negative*

Age (in years)	Male						Female						Total	
	White		Colored		Race unknown		White		Colored		Race unknown			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Preschool (through 5)	71	17.5	28	6.9	0	0	52	12.8	24	5.9	0	0	175	43.1
6–18	46	11.3	7	1.7	0	0	41	10.1	9	2.2	0	0	103	25.3
Children, age unknown, less than 15	1	.25	0	0	26	6.4	2	.5	0	0	29	7.2	58	14.2
Adult	23	5.7	0	0	0	0	44	10.8	3	.7	0	0	70	17.2

Summarizing these data, it is seen that, of the 406 persons who were negative on all swabs, the sexes were about evenly divided, 202 persons, or 49.8 percent, being males and 204 persons, or 50.2 percent, being females. As regards age, 336, or 82.8 percent of the group, were children (through 18 years of age) and 70 or 17.2 percent, were adults. As regards race, 280 persons, or 69 percent, were white; 71, or 17.5 percent, were colored; and the race of the remaining 55 persons, or 13.5 percent of the group, was unknown.

SUMMARY OF FINDINGS ON GENERAL POPULATION GROUPS

The four groups, for which swab examinations have been reported in detail above, may be summarized as follows:

Total number of persons examined..... 628
Total number of persons positive..... 222
Percent positive..... 35.4

Distribution by sex

	Males	Females	Sex unknown
Positive	115	106	1
Negative	202	204	0
Total	317	310	1
Percent positive	36.3	34.2	100

Distribution by race

	White	Colored	Race unknown
Positive	196	19	7
Negative	280	71	55
Total	476	90	62
Percent positive	41.2	21.1	11.3

Distribution by age

	Children			Adults
	Preschool (through 5 years)	School (6–18 years)	Age unknown, under 15 years	
Positive	71	104	13	34
Negative	175	103	58	70
Total	246	207	71	104
Percent positive	28.9	50.3	18.3	32.8

Total children positive..... 188
Total children negative..... 336
Total children..... 524
Percent positive..... 35.8

The present findings indicate, therefore, as regards pinworm infestations, that—

Sex is not a factor of importance; males showed a very slightly higher percentage of infestation than females.

White persons are more frequently parasitized than colored; in this series the percentage of infestation is almost twice as great for whites as for colored. However, the number of colored persons is too small for the data to be conclusive.

Age is not a factor of importance; children showed a very slightly higher percentage of infestation than adults. However, preschool

children and adults showed a lower percentage than children of school age (6 to 18 years). This is true even if the children of unknown age were all of school age, [2] making 117 positives out of a total of 278, or 42 percent positive, a considerably higher percentage than that of the preschool or the adult group.

VALUE OF REPEATED SWAB EXAMINATIONS

An extremely important practical consideration in the diagnosis of pinworm infestation is the number of anal swab examinations which should be made before a negative diagnosis is justified. The present data may throw a little light on this problem. It is recognized, however, that the variable factors in this series of examinations are numerous.

There is always, of course, the variation in *severity of infestation* in different cases, which influences the frequency of appearance of pinworms in the anal region and their consequent discovery by the use of a swab. There are high variables in numbers of worms present, numbers migrating, and days on which they migrate or fail to migrate.

Of importance also is the question which has been raised by European parasitologists, of a possible *cyclic nature of the infestation*, with the worms disappearing and reappearing at certain periods. We have found no evidence of this. In group I, the 18 positive swabs made on one individual, a 3-year old white female, covered a period of almost 4 months, the days on which swabs were made being as follows: 1st, 3d, 4th, 9th, 14th, 15th, 22d, 23d, 28th, 29th, 36th, 46th, 48th, 49th, 65th, 66th, 113th, and 114th day after the investigation was started. During this time several different kinds of treatment were administered, but without altering the positive character of subsequent examinations.

In our examinations, too, the *time of day* at which the swab was made was variable. It was usually early morning, immediately after the person had risen and before bathing or use of the toilet; this was supposedly true of all adult cases, the swab being made by the person involved, and was true in many of the children's cases, the swab being made by the mother or father. However, in some cases swabs were made in both the late evening and early morning; on the other hand, in a considerable number of cases the swab was made on children at clinics during the day, usually in the morning.

The time *elapsing between examinations* was also variable, sometimes swabs being made on successive days, or a longer period of several days to several weeks intervening. In group III, of individuals who were first negative, then proved positive, the time elapsing between

[2] The evidence is strongly to the contrary, as these were all cases from Children's Hospital, most of them from the dispensary, where many of the patients are of preschool age.

examinations in some cases was sufficiently long to have allowed an infestation to be acquired subsequent to the first examination.

Different *persons making the swab* contributed another highly variable factor, and it is probable that certain techniques of making the swab are more effective in picking up pinworm eggs than are others. We have found that a firm stroking motion, directed outward from the anal opening, parallel to and penetrating the folds, and repeated so that most of the area immediately surrounding the opening has been swabbed, is the most effective technique.

Granted that our results may have been affected by the fact that the examinations were made at different times of day, with different periods of time elapsing between examinations, and by different persons, presumably these differences would result in *fewer* positive findings than would have been secured had a better, that is, a more controlled, system of examinations been possible, and consequently our percentages of positives are undoubtedly lower than those actually existing. Also, group IV, containing only cases of negative findings, would undoubtedly have yielded a considerable number of positive cases had it been possible to repeat the examinations on a larger percentage of those individuals. From the data it is seen that, of the 222 positive cases, 40 percent had only one swab, that is, the 89 persons of group I, and 60 percent were reexamined, whereas in group IV, 406 negative cases, 65 percent had only one swab and only 35 percent were reexamined.

With the varying set of conditions previously noted, the results of repeated examinations were as follows:

Of 628 persons, 179 (28.5 percent) were positive on the 1st swab.

Of 184 persons, negative on 1st swab, 29 (15.7 percent) were positive on the 2d swab.

Of 65 persons, negative on 1st and 2d swabs, 10 (15.4 percent) were positive on the 3d swab.

Of 41 persons, negative on 1st to 3d swabs, inclusive, 2 (4.9 percent) were positive on the 4th swab.

Of 21 persons, negative on 1st to 4th swabs, inclusive, 1 (4.8 percent) was positive on the 5th swab.

Of 14 persons, negative on 1st to 5th swabs, inclusive, 1 (7.1 percent) was positive on the 6th swab.

Of 13 persons, negative on the 1st to 6th swabs, inclusive, none (0 percent) proved positive on later swabs.

From another point of view:

Of 628 persons, 222 (35 percent) were positive.

Of these 222 positives—

80.7 percent showed positive on the 1st swab.

93.7 percent showed positive on the 1st or 2d swab.

98.2 percent showed positive on the 1st, 2d, or 3d swab.

99.1 percent showed positive on the 1st, 2d, 3d, or 4th swab.

99.5 percent showed positive on the 1st, 2d, 3d, 4th, or 5th swab.

100 percent showed positive on the 1st, 2d, 3d, 4th, 5th, or 6th swab.

If only one swab examination had been made on all 628 persons, the positive cases would have consisted only of 148 cases of group I plus 31 cases of group II, a total of 179, or 28.5 percent positive, rather than a total of 222, or 35.4 percent positive.

The manner in which successive examinations increase the percent of positives in a group is strikingly illustrated if we select from our series the 49 individuals on each of whom 4 swabs were made. The findings were as follows:

	1st swab	2d swab	3d swab	4th swab
Previous positives	0	15	21	27
New positives	15	6	6	2
Total positives	15	21	27	29
Negatives	34	28	22	20
Percent positive	30.6	42.8	55.0	59.1

These 49 individuals were distributed over a wide area; they included children of various ages and adults, both sexes and both races. The difference between the 59.1 percent of positives in this group, examined four times, and the 35.4 percent of our entire series of 628 persons, on whom an average of 1.9 swabs per person was made, is a strong argument for the advisability of repeated examination in the diagnosis of pinworm infestation.

FECAL EXAMINATIONS

As noted earlier in this paper, fecal examinations are inadequate for diagnosis of pinworm infestations, because of the habit of the female worm of migrating to the perianal region and depositing the eggs on the skin. In connection with the examination of persons in our general population series, a relatively small number of fecal specimens were examined from the same individuals on whom anal swab examinations were made, to obtain comparative data as to the results of the two methods in the diagnosis of the infestation; in addition, a small series of fecal specimens were examined from individuals from whom no anal swab material was available. The findings in both cases are given below.

FECAL EXAMINATIONS IN ADDITION TO ANAL SWABS

In most cases salt flotation was the only method of preparation employed for examination of feces. In a few negative cases the direct smear method and other methods also were tried; screening of the feces and examination for worms were done in a few cases.

Of group I, "Positive on all swabs", fecal specimens were examined from 13 individuals, of which 2, or 15 percent, were positive for pinworm eggs.

Of group II, "Positive on first, negative on some later swabs", fecal specimens were examined from 4 individuals, of which none, or 0 percent, were positive for pinworm eggs.

Of group III, "Negative on first, positive on some later swabs", fecal specimens were examined from 8 individuals, of which 1, or 12.5 percent, was positive for pinworm eggs.

Summarizing these three groups, 25 fecal specimens were examined from *known* pinworm cases, with only 3, or 12 percent, showing the presence of pinworm eggs in the feces.

Of group IV, "Negative on all swabs", fecal specimens were examined from 22 individuals, of which 1, or 4.5 percent, was positive for pinworm eggs, and 1 other (4.5 percent) was found to contain two immature female pinworms, but no pinworm eggs. An anal swab made the same day on the latter individual was negative. These two positive findings are definite evidence that our group IV contained positive cases which were undetected by swab examinations but which probably would have come to light if more swab examinations had been made. The finding of nongravid females indicates that fecal examinations, including screening of the feces and examination of the residue on the screen, might be of value in diagnosis, especially if the individual had received enemas or if cathartics had been used, which would have removed gravid migrating females and thus have prevented depositing of eggs in the perianal region.

FECAL EXAMINATIONS ONLY

From 33 individuals, fecal specimens alone were available for examination, of which 2, or 6 percent, proved positive for pinworm eggs. All except one of these individuals were children under 15 years of age, in whom both positives occurred; the remaining individual was an adult female.

According to the above findings on *known* pinworm cases, only 12 percent were positive on fecal examination; if this percentage held true in the present group, so that the 2 positive findings were only 12 percent of the actual positives, the number of the latter would be 16. The series is too small and there are too many variables for conclusions to be drawn.

Institutionalized Individuals of Adolescent Age

For comparison with the results of examinations of the 628 persons from the general population of the District of Columbia and nearby vicinities, discussed previously, we have the results of examinations on 644 persons in two institutions, the National Training School for Boys and the National Training School for Girls, in Washington, D. C. Of these the boys' school is much larger than the girls' school. In a continuing investigation at the former, 617 boys have been

examined, as compared with 27 girls examined on one occasion at the latter institution.

As regards the boys, the investigation divides itself into two distinct parts. In May 1936, anal swabs were made on all boys then at the school, totaling 400, the results of those examinations indicating the number of pinworm cases *in* the school at that time. Subsequently, however, all boys were examined *at the time of entrance* in the school, the boys coming from widely scattered areas throughout the United States.

The 400 boys were examined during the time that various types of anal scrapers and swabs were being tested, before the development of the NIH cellophane-tipped swab. Hall (1937), as noted at the beginning of this paper, has reported on these various types and our reasons for discarding them; he refers also to these same 400 boys. A single swab examination was made on each boy, in the early evening (6 to 8 p. m.), after the evening meal. The number of boys examined with each type of swab, and the findings, are as follows:

Cotton swab:		
Used wet	106 persons	3 positive.
Used dry	8 persons	1 positive.
Rayon swab:		
Used wet	97 persons	0 positive.
Used dry	50 persons	1 positive.
Used damp	24 persons	1 positive.
Chamois swab:		
Used wet	52 persons	0 positive.
Celluloid scraper:		
Used dry	63 persons	0 positive.
Total	400 persons	6 positive (1.5 percent).

Classification of these cases was as follows:

White: Total 187; positive 3; percent positive 1.6.
Colored: Total 213; positive 3; percent positive 1.4.

Age of positives:
White: 17, 18, and 20 years, respectively.
Colored: 14, 14, and 15 years, respectively.

Length of stay in school, by positives, from time of entry to time of examination:
White: Approximately 10 months, 2 years, and 3 years.
Colored: Approximately 4, 9, and 10 months.

Distribution of positives as to living quarters:

White: All three boys in same cottage, the cottage having a total of 62 boys.
Colored: 2 in one cottage, having a total of 61 boys, and 1 in another cottage, having a total of 56 boys.

Fecal specimens from the 6 positive individuals were all negative as regards pinworm eggs.

As stated above, examinations for pinworms were made subsequently on all boys at the time of their commitment to the school, a

total of 217 boys to date. The NIH cellophane type of anal swab was used in all these cases; the swab was made during the day, when the general physical examination was given.

The results of these examinations were as follows:

Total boys examined	217
Total boys positive	17
Percent positive	7.8

Classification according to race and age was as follows:

White boys

Age (in years)	Total number	Number positive	Percent positive
11–15	20	3	15.0
16–18	90	11	12.2
19	2	0	0
Total	112	14	[1] 12.5

[1] Average.

Colored boys

Age (in years)	Total number	Number positive	Percent positive
11–15	43	2	4.7
16–18	62	1	1.6
Total	105	3	[1] 2.9

[1] Average.

Fecal specimens from the 17 individuals from whom anal swabs had proved positive for pinworms showed only 1 specimen positive for pinworm eggs, only 5.8 percent of known positive cases being detected by this method.

COMPARISON OF TWO SERIES OF EXAMINATIONS OF BOYS

Combining the original set of 400 examinations, of which 1.5 percent were positive, made during May 1936, with the examinations made during the following 10 months on 217 boys at time of entry, of which 7.8 percent were positive, there were 617 boys examined, with 3.7 percent positive. Of those examined, 299 were white and 318 were colored boys. The differences in the percentages of infestations in the two races is striking; the white boys of the former group showing a percentage of positives of 1.6, and of the latter group, 12.5; whereas the percentage of positives for colored boys of the former group was 1.4, and of the latter group, 2.9. Factors which may account for the later findings being decidedly higher than the earlier ones include the difference in type of swabs used—various types which were later discarded as not satisfactory, as compared with the cellophane type—and different histories of the boys—one group which had

been living under excellent sanitary conditions during their stay in the school, as compared with another group just arriving at the school from all sorts of environments.

The higher percentage of infestation in boys of the white race as compared with those of the colored race is an interesting finding; similar differences were noted in the series representing the general population. We do not feel that the numbers examined are sufficiently large, or other factors in the history of the individuals sufficiently well known, for a conclusion to be drawn as to whether or not the difference in infestation is correlated with the difference in race. Our initial assumption would be that the determining factors are such things as social-economic status with its bearing on sanitation, crowding, personal hygiene, bathing facilities, and similar factors. The indicated racial correlation runs so definitely counter to the expectation on the social-economic basis that we have no satisfactory explanation for our findings. In general, we do not expect the incidence with parasitic worms to show any positive correlation with race, and we should require much more evidence before we could regard such a correlation as soundly established.

EXAMINATION OF INSTITUTIONALIZED GIRLS

The NIH cellophane swab was used, and one swab examination was made of each girl during the morning. Twenty-seven girls were examined, and no cases of pinworm infestation were found. The girls were all between the ages of 14 and 18 years, except 3 who were 19, and 2 who were 20 years old. There were 4 white and 23 colored girls.

This group is too small to be comparable to the other groups examined. Judging from the percentage of infestation (35.4 percent) of the general population series, we would have expected to find several cases of pinworm infestation among the 27 girls; however, judging from the results of the examination of 400 institutionalized boys, reported above, among whom only 6 cases were found, the absence of cases is not surprising.

COMPARISON OF FINDINGS OF PRESENT AND OF PREVIOUS INVESTIGATIONS

Of the previous investigations included in our tabulated summary (p. 1485), where the method of diagnosis was somewhat similar to ours, Banik, Ruotsalainen, and also v. Gottberg found percentages of infestation similar to ours; Banik examined children to 14 and the other two authors children to 15 years of age, getting 30 percent in the first case and 32 percent in the two latter cases, for the entire groups, as compared with our 36 percent in children to 18 years old. Higher percentages in children were found by Goebel and by Spaak, both 45 percent, by Japha, 66 and 73 percent, by Berndt, 76 percent, and by

Panov, 80 percent. Bogoiavlenskii and Demidova report the highest incidence findings of any study to date, 89 out of 96 children, or 93 percent, being found infested by the very thorough method of repeating the examinations until up to seven examinations had been made. Von Drigalski and Koch, with 57 percent in children 6 to 15 years old, had results fairly comparable with our 50 percent in children aged 6 to 18 years. Hellsten's figures, 67.5 percent, are higher for a small group (40) of children of similar ages, diagnosed by a different method; i. e., examination of rectal material obtained by insertion of lint. Serbinow and Schulmann obtained twice as high a percentage (58 percent) in young children as did we (29 percent). Schuchat's findings of 35.5 percent in noninstitutionalized children and 33.3 percent in adults, are practically identical with ours of 35.8 and 32.8 percent, respectively; however, the institutionalized children in his survey were far more heavily parasitized (62.7 percent) than the noninstitutionalized, which is the reverse of our findings. Bozicevich's recent examinations of 230 boys of the same locality as that of ours showed 31 percent infested, as compared with 50 percent infested in our 207 children of both sexes, the children of both series being of school age.

SUMMARY

Data are presented as to incidence of pinworm infestation and correlations between incidence and population groups, with observations on certain phases of diagnostic technique. Examinations were made on 1,272 individuals, residing in or near Washington, D. C. Anal swabs were made in all cases, the swab used on over two-thirds of the individuals being the NIH swab, a cellophane-tipped kind. Fecal examinations also were made in a number of cases, the findings furnishing a comparison with the findings on anal swabs.

About one-half of the individuals examined belonged to the general population, residing in homes in widely scattered localities, most of them from the low social-economic level. Individuals comprising the other half of the series were institutionalized adolescents, 12 to 20 years old, some of whom had only recently come to the institution from other parts of the United States.

Of the 628 persons of the general population group, some were seen at various clinics, and through these individuals swab examinations were sometimes made on other members of their families; various physicians, nurses, and teachers also secured material of this nature, in addition to the writers and other members of the division staff. The swabs were, therefore, not all made by the same person or with the same technique, or at the same time of day; and when repeated examinations were made, the period of time between examinations was not standardized. With these highly variable factors, as to

method, the results of examination of the 628 persons, using 1,173 anal swabs, showed 222 persons, or 35.4 percent, infested with pinworms. The individuals examined do not represent a random sample of the population, in many cases the swab examinations being made because of the presence of clinical symptoms or because the individual belonged to a family in which one or more other members had been found to be positive.

In this general population group, the two sexes were almost equally represented in total numbers and in percent positive, 36 percent of 317 males and 34 percent of 310 females being positive. The two races, white and colored, were not equally represented, the former predominating. Of 476 white persons, 41 percent were positive, whereas of 90 colored persons, 21 percent were positive. This appears to be the first report of perianal examinations of Negroes for pinworms. It is highly desirable that larger numbers of individuals of this race be examined, as the present number is too small for the findings to be interpreted as indicating a correlation between pinworm incidence and race. As regards age, 36 percent of children up to 18 years old, as compared with 33 percent of adults, were positive. Children of school age showed a higher percentage of infestation than those of preschool age—50 percent of the former as compared with 29 percent of the latter. At the moment, we suggest the possibility that this indicates that infestations acquired in the school environment increased the incidence among school children.

In order to analyze the variations in the results of examinations of persons infested with pinworms, the positive cases have been subdivided into 3 groups; namely, 148 persons who were positive on all swabs, 31 persons positive on first but negative on some later swabs, and 43 persons negative on first but positive on some later swabs. In the first group, of 253 swab examinations, 100 percent were positive; in the second group, of 97 swab examinations, 57.7 percent were positive; in the third group, of 144 swab examinations, 44.4 percent were positive. The total number of swabs on the 222 persons was 494, of which 373, or 75.5 percent, were positive. If there is any significance in the differences shown by these groups, they may indicate different degrees of severity of infestation.

The findings confirm the work of European writers as to the value of *repeating* the swab examination, in the case of negative findings, in establishing a diagnosis; in this series, 94 percent of the positive cases were detected on either the first or second examination, but as many as 6 swabs were made before a positive diagnosis was obtained in one case. In 49 individuals on whom 4 examinations were made, the findings rose from 31 percent on the first to 59 percent on the fourth examination, or, in other words, the first examination detected about half of the cases found to be positive after 4 examinations. Of the

406 persons making up the negative cases in the general population group, 65 percent had only 1 swab examination and 22 percent only 2 swab examinations, a total of 685 swabs or an average of 1.7 swabs per person being made. It is concluded that a larger number of cases of pinworm infestation would undoubtedly have been found had it been possible to repeat the examinations on a larger percentage of these negative cases, and that the 35.4 percent positive finding is lower than actually existed among the 628 persons.

At the two institutions, one for girls and one for boys, all of the same age group, examinations consisted of only one anal swab per person. No pinworm cases were found among the girls, a small group of 27. The survey of the boys indicated an incidence of 1.5 percent infestation in 400 boys in the institution in May 1936; of 217 examinations made later on other boys at the time of their arrival at the same institution, an incidence of 7.8 percent was found.

The thesis that fecal examination is inadequate for the diagnosis of pinworm infestation is supported by the findings in this investigation—pinworm eggs were demonstrated in only 4 out of 42, or 9.5 percent, of fecal specimens from individuals shown by positive swabs to be infested with pinworms. The proportion here would be highly variable. While about 1 out of 10 positives was detected by fecal examinations in this series, other workers have shown very diverse figures; Headlee (1935) found about 1 out of 6.

In the United States there has been previously no study of incidence comparable to the present one, in the number of individuals examined and the population groups represented. Headlee found an incidence of 22 percent in 282 individuals institutionalized in Illinois; from our own locality, Bozicevich got an incidence of 31 percent by a single swab examination on 230 boys in a summer camp. European investigations have, in almost all instances, given percentages of infestation similar to or higher than those of our general population group. The data in 17 reports from 4 countries, namely, Germany, Finland, Sweden, and Soviet Russia, show a total of 13,915 individuals examined, with an average of 46 percent positive for pinworms, the positive findings ranging from 3 to 93 percent.

The evidence indicates that pinworms are much more prevalent than is generally believed, that the usual methods employed in diagnostic laboratories and in the majority of surveys, namely, fecal examination for eggs, is not reliable for their detection, and that examinations by a method such as the use of the NIH swab should be repeated several times before a negative diagnosis is justified. The present study is a continuing one, and it is expected that additional data will help to answer some of the questions raised here. Well-informed parasitologists have known and said for many years that pinworms are the commonest of the helminth parasites of man, yet this

fact still remains generally unrecognized, and, as a medical problem, oxyuriasis is probably the most neglected of all human helminthiases. So far as we have data from the city of Washington and its vicinity, an area of unusually high social-economic level, the indications are that what has been found true of the prevalence of oxyuriasis in the world in general will be found true of oxyuriasis in the United States.

ACKNOWLEDGMENTS

By far the greater part of the examinations on persons of the general population were made through cooperation at Providence Hospital, where facilities were provided for a parasite clinic, and where members of the dispensary staff and of the social-service department were most generous in aiding the study, for which courtesy the writers wish to express their great appreciation. In addition, the cooperation of the Child Hygiene Service of the District of Columbia, of Children's Hospital, and of Gallinger Hospital is gratefully acknowledged. The institutional surveys were made possible through the very hearty interest of, and efficiently conducted investigations by, officials at the National Training School for Boys and the National Training School for Girls.

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DEATHS DURING WEEK ENDED OCT. 2, 1937

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

	Week ended Oct. 2, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,861	7,285
Average for 3 prior years	7,245	
Total deaths, first 39 weeks of year	338,737	338,538
Deaths under 1 year of age	489	556
Average for 3 prior years	535	
Deaths under 1 year of age, first 39 weeks of year	21,835	21,687
Data from industrial insurance companies:		
Policies in force	69,912,986	68,530,210
Number of death claims	12,491	11,114
Death claims per 1,000 policies in force, annual rate	9.3	8.5
Death claims per 1,000 policies, first 39 weeks of year, annual rate	9.9	10.0

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) is to be interpreted to mean that no cases or deaths occurred, while leaders (----------) indicate that cases or deaths may have occurred although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 9, 1937, and Oct. 10, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936
New England States:								
Maine	1	1	----	1	5	8	0	0
New Hampshire	----	1	----	2	1	2	0	0
Vermont	----	----	----	----	5	----	0	0
Massachusetts	1	8	----	----	19	53	1	0
Rhode Island	----	1	----	----	4	4	1	0
Connecticut	6	2	3	----	3	6	1	0
Middle Atlantic States:								
New York	22	23	[1] 10	[1] 6	65	54	6	8
New Jersey	7	5	8	8	34	19	0	0
Pennsylvania	23	47	----	----	228	25	6	0
East North Central States:								
Ohio	25	20	----	2	72	10	0	2
Indiana	17	22	37	30	18	1	0	2
Illinois	23	35	12	7	57	8	3	2
Michigan	17	14	----	----	24	21	4	1
Wisconsin	4	5	17	20	22	18	0	1
West North Central States:								
Minnesota	9	1	1	----	3	8	0	0
Iowa	4	7	1	----	3	4	3	4
Missouri	30	10	39	111	53	8	1	0
North Dakota	----	2	----	----	1	2	0	0
South Dakota	----	----	----	----	----	----	0	0
Nebraska	3	1	----	----	----	1	0	0
Kansas	4	8	4	----	1	----	4	1
South Atlantic States:								
Delaware	----	1	----	----	2	4	0	0
Maryland [2]	7	8	3	5	3	4	2	2
District of Columbia	4	10	----	----	1	5	0	1
Virginia	64	41	----	----	9	8	4	3
West Virginia	34	17	8	7	11	----	0	2
North Carolina [2]	107	122	5	3	31	----	1	1
South Carolina	18	23	93	96	4	4	0	1
Georgia [2]	35	28	----	----	----	----	0	0
Florida [2]	20	5	----	3	8	1	0	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 9, 1937, and Oct. 10, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936
East South Central States:								
Kentucky	31	24	6	13	33	29	1	2
Tennessee	34	48	12	10	21	2	2	4
Alabama [3]	44	43	30	9	----	----	0	2
Mississippi [3]	15	22	----	----	----	----	1	0
West South Central States:								
Arkansas	25	9	15	1	4	1	2	0
Louisiana [3]	8	15	4	14	----	2	0	1
Oklahoma [4]	23	10	32	10	7	1	0	3
Texas [3]	48	27	170	56	20	6	1	1
Mountain States:								
Montana	1	----	----	25	10	----	0	0
Idaho	----	----	5	3	10	2	0	0
Wyoming	----	----	----	----	2	1	0	0
Colorado	4	9	----	----	10	2	2	0
New Mexico	3	3	----	1	8	20	1	0
Arizona	----	1	24	12	----	----	0	0
Utah [2 5]	----	----	12	----	81	5	1	0
Pacific States:								
Washington	1	----	----	----	6	15	1	0
Oregon	1	----	13	15	6	5	0	1
California	17	22	15	17	17	17	0	2
Total	740	701	579	487	922	386	49	49
First 40 weeks of year	17,719	18,438	277,409	142,230	246,318	269,668	4,548	6,279

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936
New England States:								
Maine	10	0	----	18	0	0	5	2
New Hampshire	2	0	1	4	0	0	1	0
Vermont	2	0	10	7	0	0	8	0
Massachusetts	7	2	76	69	0	0	6	2
Rhode Island	0	0	19	17	0	0	0	1
Connecticut	6	1	29	19	0	0	3	1
Middle Atlantic States:								
New York	43	9	145	185	0	0	25	46
New Jersey	9	2	43	18	0	0	7	5
Pennsylvania	18	7	188	174	0	0	29	47
East North Central States:								
Ohio	7	24	126	88	0	0	17	21
Indiana	4	10	124	75	1	0	1	8
Illinois	37	94	159	195	0	2	16	24
Michigan	26	18	243	156	1	2	9	14
Wisconsin	15	7	66	115	0	0	5	1
West North Central States:								
Minnesota	17	2	54	59	3	0	1	2
Iowa	18	5	44	56	0	0	11	6
Missouri	20	5	133	27	9	0	20	18
North Dakota	0	0	12	24	15	2	2	3
South Dakota	1	1	11	20	0	1	1	5
Nebraska	11	0	2	16	0	0	0	2
Kansas	19	6	113	56	0	0	5	6
South Atlantic States:								
Delaware	0	0	4	1	0	0	0	3
Maryland [3]	2	2	32	37	0	0	11	12
District of Columbia	1	1	9	7	0	0	1	2
Virginia	1	0	35	22	0	0	17	24
West Virginia	4	1	79	35	0	0	10	25
North Carolina [3]	3	0	68	42	0	0	14	15
South Carolina	0	0	4	9	0	0	3	12
Georgia [3]	0	7	39	31	0	0	10	31
Florida [3]	2	1	----	11	0	0	2	1

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 9, 1937, and Oct. 10, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936
East South Central States:								
Kentucky	0	4	37	24	0	0	16	43
Tennessee	1	15	32	28	7	0	22	10
Alabama [2]	8	9	19	17	0	0	10	16
Mississippi [2]	10	4	25	11	1	0	9	10
West South Central States:								
Arkansas	7	1	21	3	0	0	24	6
Louisiana [2]	4	1	11	8	0	0	11	5
Oklahoma [4]	15	0	29	7	16	1	22	6
Texas [3]	29	1	52	19	0	0	56	25
Mountain States:								
Montana	0	4	10	24	7	11	3	1
Idaho	2	0	11	16	6	0	0	2
Wyoming	0	0	12	6	0	0	0	0
Colorado	15	1	15	14	4	0	11	6
New Mexico	0	2	18	8	4	0	13	20
Arizona	0	0	3	10	0	0	0	5
Utah [2] [5]	2	0	33	11	0	0	1	0
Pacific States:								
Washington	11	4	22	43	8	4	3	8
Oregon	2	2	18	20	1	0	1	2
California	17	10	102	128	7	0	13	8
Total	403	263	2,338	1,990	90	23	455	512
First 40 weeks of year	8,127	3,091	174,922	187,629	8,374	6,146	12,221	11,337

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Oct. 9, 1937, 66 cases, as follows: North Carolina, 1; Georgia, 32; Florida, 4; Alabama, 20; Louisiana, 2; Texas, 7.
[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa.
[5] Rocky Mountain spotted fever, week ended Oct. 9, 1937, as follows: Utah, 1 case.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August 1937										
Arizona	8	5	44	5	8	-------	3	7	0	17
Arkansas	1	41	18	1,005	16	36	52	26	0	137
California	14	79	33	23	90	5	157	222	27	63
September 1937										
Connecticut	1	21	9	-------	7	-------	53	48	0	13
Delaware	1	0	-------	1	-------	-------	6	13	0	5
District of Columbia	2	24	2	-------	7	-------	13	19	0	5
Maine	1	6	1	[1] 3	11	-------	52	21	0	12
Missouri	5	55	139	235	94	1	141	216	7	114
Nebraska	0	5	-------	-------	7	-------	71	22	-------	2
Pennsylvania	19	83	-------	2	528	1	175	378	0	185
Tennessee	4	114	51	216	132	19	7	89	0	78
West Virginia	7	84	62	2	55	-------	9	159	1	58

[1] Imported.

Summary of monthly reports from States—Continued

August 1937

	Cases
Actinomycosis:	
California	1
Chicken pox:	
Arizona	5
Arkansas	7
California	197
Dysentery:	
Arizona	46
California (amoebic)	8
California (bacillary)	51
Encephalitis, epidemic or lethargic:	
Arizona	1
California	14
Food poisoning:	
California	50
German measles:	
California	36
Granuloma, coccidioidal:	
California	1
Jaundice, epidemic:	
California	2
Mumps:	
Arizona	4
Arkansas	15
California	345
Ophthalmia neonatorum:	
California	2
Paratyphoid fever:	
Arkansas	6
California	4
Rabies in animals:	
California	164
Relapsing fever:	
California	7
Septic sore throat:	
Arkansas	9
California	4
Tetanus:	
California	2
Trachoma:	
Arizona	30
California	8
Trichinosis:	
California	1
Tularaemia:	
Arkansas	2
California	3
Undulant fever:	
Arizona	1
California	9
Whooping cough:	
Arizona	35
Arkansas	69
California	1,218

September 1937

	Cases
Anthrax:	
Pennsylvania	1
Chicken pox:	
Connecticut	18
Delaware	3
District of Columbia	5
Maine	24
Missouri	5
Nebraska	7
Pennsylvania	167
Tennessee	6
West Virginia	7
Conjunctivitis, infectious:	
Connecticut	1
Dysentery:	
Connecticut (bacillary)	14
Delaware	1
District of Columbia (amoebic)	2
Missouri	38
Pennsylvania (bacillary)	1
Tennessee (amoebic)	4
Tennessee (bacillary)	34
West Virginia (amoebic)	1
Encephalitis, epidemic or lethargic:	
Connecticut	2
Missouri	89
Nebraska	7
Pennsylvania	2
Tennessee	2
German measles:	
Connecticut	8
Delaware	1
Maine	5
Pennsylvania	25
Tennessee	3
Hookworm disease:	
Tennessee	1
Impetigo contagiosa:	
Tennessee	8
Mumps:	
Connecticut	83
Delaware	1
Maine	11
Missouri	8
Nebraska	10
Pennsylvania	362
Tennessee	36
Ophthalmia neonatorum:	
Connecticut	4
Pennsylvania	1
Tennessee	5

September 1937—Continued

	Cases
Paratyphoid fever:	
Connecticut	7
Tennessee	8
West Virginia	1
Puerperal septicemia:	
Tennessee	2
Rabies in animals:	
Connecticut	3
Missouri	5
West Virginia	2
Rocky Mountain spotted fever:	
District of Columbia	1
Tennessee	1
Septic sore throat:	
Connecticut	8
Missouri	25
Nebraska	4
Tennessee	6
Tetanus:	
Maine	1
Missouri	3
Trachoma:	
Connecticut	1
Pennsylvania	4
Tennessee	5
Tularaemia:	
Missouri	3
Tennessee	3
Typhus fever:	
Tennessee	2
Undulant fever:	
Connecticut	9
Maine	2
Missouri	3
Pennsylvania	5
Tennessee	1
West Virginia	1
Vincent's infection:	
Maine	12
Tennessee	9
Whooping cough:	
Connecticut	133
Delaware	40
District of Columbia	28
Maine	96
Missouri	223
Nebraska	22
Pennsylvania	1,200
Tennessee	143
West Virginia	225

CASES OF VENEREAL DISEASES REPORTED FOR AUGUST 1937

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

State	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,483	5.18	374	1.31
Arizona [1]				
Arkansas [2]	257	1.27	142	.70
California	1,490	2.46	1,662	2.74
Colorado [1]				
Connecticut	208	1.20	137	.79
Delaware	187	7.22	53	2.05
District of Columbia [1]				
Florida	1,494	9.10	292	1.78
Georgia	1,557	5.09	425	1.39
Idaho	37	.76	33	.68
Illinois	1,929	2.46	1,273	1.62
Indiana [1]				
Iowa	304	1.20	238	.94
Kansas	153	.81	68	.36
Kentucky	483	1.68	296	1.03
Louisiana	207	.98	113	.53
Maine [3]	43	.50	70	.82
Maryland	754	4.50	335	2.00
Massachusetts	528	1.19	490	1.11
Michigan	629	1.32	694	1.45
Minnesota	314	1.19	319	1.21
Mississippi	2,037	10.14	2,632	13.11
Missouri	584	1.48	275	.69
Montana [2]	78	1.47	53	1.00
Nebraska	89	.65	102	.75
Nevada [3]				
New Hampshire	32	.63	25	.49
New Jersey	918	2.12	341	.79
New Mexico	107	2.54	34	.81
New York [3]	1,703	1.32	717	.55
North Carolina	3,004	8.69	826	2.39
North Dakota	30	.43	51	.73
Ohio [2]	817	1.22	423	.63
Oklahoma [3]	486	1.92	429	1.70
Oregon	102	1.00	221	2.17
Pennsylvania [4]	1,561	1.54	283	.28
Rhode Island	66	.97	54	.79
South Carolina [1]				
South Dakota [3]	27	.39	45	.65
Tennessee	718	2.51	403	1.41
Texas	545	.89	316	.52
Utah	2	.04	9	.17
Vermont	24	.63	28	.74
Virginia	1,132	4.24	376	1.41
Washington	330	2.01	630	3.83
West Virginia [3]	266	1.45	123	.67
Wisconsin [4]	39	.13	142	.49
Wyoming [3]				
Total	26,754	2.22	15,552	1.29

See footnotes at end of table.

Reports from cities of 200,000 population or over

City	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio				
Atlanta, Ga	158	5.50	125	4.35
Baltimore, Md	441	5.34	221	2.68
Birmingham, Ala	208	7.37	103	3.65
Boston, Mass	190	2.40	169	2.14
Buffalo, N. Y	234	3.95	66	1.12
Chicago, Ill	1,929	5.41	1,273	3.57
Cincinnati, Ohio [1]				
Cleveland, Ohio	191	2.05	123	1.32
Columbus, Ohio	19	.62	10	.33
Dallas, Tex	256	8.84	122	4.21
Dayton, Ohio	68	3.23	4	.19
Denver, Colo	70	2.36	54	1.82
Detroit, Mich	232	1.34	318	1.84
Houston, Tex.[1]				
Indianapolis, Ind.[1]				
Jersey City, N. J.[1]				
Kansas City, Mo	108	2.56		
Los Angeles, Calif.[1]				
Louisville, Ky	114	3.52	87	2.69
Memphis, Tenn	250	9.36	114	4.27
Milwaukee, Wis.[2]				
Minneapolis, Minn	68	1.40	101	2.08
Newark, N. J	201	4.34	119	2.57
New Orleans, La.[1]				
New York, N. Y.[1]				
Oakland, Calif	80	2.64	86	2.84
Omaha, Nebr	62	2.81	37	1.68
Philadelphia, Pa	544	2.74	39	.20
Pittsburgh, Pa	106	1.55	38	.56
Portland, Oreg.[3]				
Providence, R. I	40	1.54	27	1.04
Rochester, N. Y	50	1.48	45	1.33
St. Louis, Mo	390	4.67	264	3.16
St. Paul, Minn	20	.71	35	1.24
San Antonio, Tex	83	3.30	83	3.30
San Francisco, Calif	189	2.82	270	4.03
Seattle, Wash	196	5.16	238	6.27
Syracuse, N. Y	83	3.81	40	1.84
Toledo, Ohio	105	3.45	64	2.10
Washington, D. C.[1]				

[1] No report for current month.
[2] Incomplete.
[3] Not reporting.
[4] Only cases of syphilis in the infectious stage are reported.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 2, 1937

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. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	206	100	20	112	340	537	5	346	87	851	------
Current week [1]	113	54	21	194	376	496	2	353	81	932	------
Maine:											
Portland	0	------	0	0	2	1	0	0	1	11	28
New Hampshire:											
Concord	0	------	0	1	0	0	0	0	0	0	7
Manchester	------	------	------	------	------	------	------	------	------	------	------
Nashua	0	------	0	0	0	0	0	0	0	0	5
Vermont:											
Barre	0	------	0	0	0	1	0	1	0	0	2
Rutland	0	------	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	1	------	0	6	16	26	0	8	0	14	205
Fall River	0	------	0	0	1	1	0	0	0	3	33
Springfield	0	------	0	0	0	0	0	1	0	15	29
Worcester	0	------	0	0	4	5	0	1	1	9	42
Rhode Island:											
Pawtucket	0	------	0	0	0	3	0	0	0	0	15
Providence	0	------	0	0	3	4	0	0	1	46	57
Connecticut:											
Bridgeport	0	------	0	1	0	0	0	0	0	0	29
Hartford	0	1	0	0	3	2	0	0	1	0	35
New Haven	0	1	0	0	1	2	0	2	0	3	42
New York:											
Buffalo	0	------	0	1	5	15	0	6	0	18	147
New York	18	12	3	23	66	24	0	75	14	147	1,356
Rochester	0	------	0	0	3	1	0	0	2	10	66
Syracuse	1	------	0	9	4	2	0	0	0	8	41
New Jersey:											
Camden	0	------	0	0	1	0	0	0	2	0	28
Newark	0	------	0	2	1	5	0	7	0	22	92
Trenton	0	------	0	2	1	2	0	3	0	12	28
Pennsylvania:											
Philadelphia	5	2	2	5	17	34	0	29	6	37	455
Pittsburgh	2	3	2	38	16	20	0	8	1	41	179
Reading	0	------	0	0	0	3	0	2	0	2	20
Scranton	0	------	------	2	------	0	0	------	0	2	------
Ohio:											
Cincinnati	2	1	1	0	7	13	0	9	0	11	139
Cleveland	4	10	0	12	12	26	0	11	1	22	184
Columbus	1	1	1	1	2	9	0	3	1	2	73
Toledo	2	------	0	3	1	3	0	3	0	22	63
Indiana;											
Anderson	0	------	0	1	0	2	0	0	0	0	6
Fort Wayne	1	------	0	0	0	5	0	0	0	0	21
Indianapolis	0	------	0	2	9	10	0	3	0	17	105
Muncie	0	------	0	0	1	6	2	0	0	0	8
South Bend	0	------	0	0	1	0	0	0	0	4	15
Terre Haute	0	------	0	1	0	0	0	0	0	0	17
Illinois;											
Alton	0	------	0	1	0	1	0	0	0	0	7
Chicago	8	2	1	19	34	44	0	41	4	44	668
Elgin	0	------	0	0	2	1	0	0	0	0	7
Moline	0	------	0	0	0	0	0	0	0	3	6
Springfield	0	------	0	1	0	1	0	0	0	4	23
Michigan;											
Detroit	11	------	1	14	19	44	0	15	3	70	250
Flint	1	------	0	1	3	10	0	0	0	6	18
Grand Rapids	1	------	0	4	1	9	0	0	0	18	35
Wisconsin;											
Kenosha	0	------	0	0	0	0	0	1	0	0	8
Madison	0	------	0	0	1	2	0	0	0	2	24
Milwaukee	0	------	0	9	1	3	0	0	0	47	76
Racine	0	------	0	1	0	5	0	1	0	2	11
Superior	0	------	0	0	0	0	0	0	0	0	4

[1] Figures for Galveston and Boise estimated; reports not yet received.

City reports for week ended Oct. 2, 1937—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								
Minnesota:											
Duluth	0	----	0	0	2	1	0	0	0	6	28
Minneapolis	0	----	0	4	3	6	0	1	1	9	83
St. Paul	1	----	0	0	3	0	0	3	0	6	50
Iowa:											
Cedar Rapids	0	----	----	1	----	0	0	----	----	2	----
Davenport	0	----	----	0	----	0	0	----	0	0	----
Des Moines	0	----	0	0	----	8	0	----	0	0	23
Sioux City	0	----	----	0	----	2	0	----	0	6	----
Waterloo	0	----	----	0	----	4	0	----	0	1	----
Missouri:											
Kansas City	0	----	1	0	5	9	0	4	3	6	94
St. Joseph	0	----	0	0	8	4	0	5	0	0	41
St. Louis	11	----	1	7	7	36	0	3	6	5	259
North Dakota:											
Fargo	0	----	0	0	0	1	0	0	0	13	7
Grand Forks	0	----	----	0	----	0	0	----	0	0	----
Minot	0	----	0	0	0	0	0	1	0	0	3
South Dakota:											
Aberdeen	0	----	----	1	----	0	0	----	0	2	----
Nebraska:											
Omaha	0	----	0	0	5	1	0	1	0	2	61
Kansas:											
Lawrence	0	----	0	0	0	0	0	0	0	0	4
Topeka	0	----	0	0	0	5	0	0	0	5	9
Wichita	0	----	0	0	2	10	0	0	0	2	25
Delaware:											
Wilmington	0	----	0	0	6	1	0	0	0	1	39
Maryland:											
Baltimore	5	3	1	1	13	10	0	16	1	77	208
Cumberland	0	----	1	0	0	1	0	0	0	0	14
Frederick	0	----	0	0	1	0	0	0	0	0	4
District of Columbia:											
Washington	2	----	0	3	5	4	0	3	1	1	125
Virginia:											
Lynchburg	4	----	0	0	0	0	0	0	1	3	9
Norfolk	0	----	0	0	1	3	0	0	0	2	30
Richmond	0	----	0	1	2	6	0	4	2	2	54
Roanoke	0	----	0	0	0	4	0	0	0	2	9
West Virginia:											
Charleston	1	----	0	0	2	0	0	1	1	0	12
Huntington	3	----	----	4	----	3	0	----	0	0	----
Wheeling	0	----	0	0	2	0	0	0	1	2	21
North Carolina:											
Gastonia	2	----	----	0	----	0	0	----	0	0	----
Raleigh	0	----	0	0	1	0	0	1	0	5	17
Wilmington	0	----	0	0	0	0	0	0	0	3	11
Winston-Salem	0	----	0	0	4	1	0	1	0	7	25
South Carolina:											
Charleston	0	----	0	0	3	2	0	0	6	0	19
Florence	0	----	0	0	2	0	0	0	0	0	9
Greenville	0	----	0	0	0	1	0	0	0	0	11
Georgia:											
Atlanta	5	5	2	0	4	5	0	6	4	9	79
Brunswick	0	----	0	0	1	0	0	0	0	0	4
Savannah	2	2	0	0	0	0	0	1	1	1	30
Florida:											
Miami	2	----	0	2	2	1	0	0	0	0	24
Tampa	1	----	0	2	1	1	0	3	0	0	21
Kentucky:											
Covington	0	----	0	0	2	1	0	2	0	1	15
Lexington	0	----	0	1	0	0	0	1	0	1	18
Louisville	1	1	0	1	3	12	0	1	0	12	72
Tennessee:											
Knoxville	2	----	1	0	1	3	0	0	2	0	29
Memphis	3	----	0	1	3	5	0	2	1	7	77
Nashville	3	----	0	0	1	0	0	1	0	0	61
Alabama:											
Birmingham	0	3	0	0	3	3	0	5	0	1	86
Mobile	1	----	1	0	0	0	0	1	0	0	21
Montgomery	3	----	----	0	----	4	0	----	0	2	----
Arkansas:											
Fort Smith	0	----	----	0	----	1	0	----	0	0	----
Little Rock	0	----	0	0	3	1	0	0	1	0	4

City reports for week ended Oct. 2, 1937—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								
Louisiana:											
Lake Charles	0	----	0	0	2	0	0	0	0	0	9
New Orleans	0	1	1	0	8	0	0	9	3	2	153
Shreveport	0	----	0	0	3	2	0	1	0	0	39
Oklahoma:											
Muskogee	1	----	----	0	----	0	0	----	0	0	----
Oklahoma City	1	6	0	0	5	0	0	1	0	0	44
Texas:											
Dallas	5	----	0	1	4	5	0	1	1	0	56
Fort Worth	1	----	0	1	0	4	0	0	0	4	25
Galveston	----	----	----	----	----	----	----	----	----	----	----
Houston	0	----	1	0	6	3	0	8	0	0	86
San Antonio	1	----	0	0	1	1	0	7	3	2	48
Montana:											
Billings	0	----	0	0	4	0	0	0	0	0	9
Great Falls	0	----	0	0	1	0	0	0	0	1	7
Helena	0	----	0	0	0	0	0	0	0	0	1
Missoula	0	----	0	0	0	0	1	0	0	0	2
Idaho:											
Boise	----	----	----	----	----	----	----	----	----	----	----
Colorado:											
Colorado Springs	0	----	0	0	2	2	0	1	0	0	11
Denver	4	----	0	7	3	12	0	4	3	5	90
Pueblo	0	----	0	0	1	0	0	0	0	0	4
New Mexico:											
Albuquerque	0	----	0	0	1	1	0	3	0	5	13
Utah:											
Salt Lake City	2	----	0	2	1	1	0	1	0	4	34
Washington:											
Seattle	1	----	0	2	3	2	0	8	0	12	97
Spokane	0	1	1	1	0	3	0	1	0	6	30
Tacoma	0	----	0	0	2	1	1	0	0	4	30
Oregon:											
Portland	1	2	0	5	3	2	0	2	0	1	58
Salem	0	1	----	0	----	0	0	----	0	0	----
California:											
Los Angeles	5	5	0	8	8	16	0	17	3	37	260
Sacramento	0	----	0	0	1	1	0	2	0	3	16
San Francisco	0	1	0	1	6	4	0	5	0	36	159

City reports for week ended Oct. 2, 1937—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	2
Massachusetts:			
Boston	0	0	5
Worcester	0	0	1
Connecticut:			
Hartford	0	0	1
New York:			
Buffalo	1	0	2
New York	6	1	21
Rochester	0	0	1
New Jersey:			
Trenton	0	0	1
Pennsylvania:			
Philadelphia	0	0	16
Pittsburgh	2	0	6
Reading	1	1	0
Ohio:			
Cleveland	1	0	1
Columbus	0	0	1
Toledo	0	0	1
Indiana:			
Indianapolis	0	0	3
Illinois:			
Chicago	1	0	19
Springfield	1	0	1
Michigan:			
Detroit	3	0	7
Flint	0	0	1
Grand Rapids	0	1	2
Wisconsin:			
Milwaukee	0	0	5
Minnesota:			
Duluth	0	0	2
Minneapolis	0	0	8
St. Paul	0	0	10
Iowa:			
Des Moines	0	0	1
Sioux City	1	0	1
Missouri:			
Kansas City	0	0	5
St. Joseph	1	0	0
St. Louis	0	0	5
Nebraska:			
Omaha	0	0	6
Kansas:			
Wichita	0	0	3
Maryland:			
Baltimore	3	2	4
District of Columbia:			
Washington	0	0	2
Virginia:			
Richmond	1	0	0
Georgia:			
Atlanta	0	0	1
Kentucky:			
Louisville	0	0	1
Tennessee:			
Memphis	0	0	1
Alabama:			
Birmingham	0	0	1
Louisiana:			
New Orleans	0	0	1
Shreveport	0	1	0
Texas:			
Dallas	0	0	2
Fort Worth	0	0	2
Houston	0	0	4
Colorado:			
Colorado Springs	0	0	3
Denver	0	0	1
Pueblo	0	0	[1] 5
Utah:			
Salt Lake City	0	0	2
Washington:			
Tacoma	0	0	1
California:			
Los Angeles	0	0	2
Sacramento	0	0	2

[1] 4 nonparalytic cases included.

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Alton, 2; Minneapolis, 1; Kansas City, 1; St. Louis, 54.

Pellagra.—Cases: Winston-Salem, 1; Charleston, S. C., 2; Atlanta, 1; Savannah, 3; Tampa, 1; Los Angeles, 1.

Rabies in man.—Deaths: Tampa, 1.

Typhus.—Cases: Charleston, S. C., 2; Savannah, 2; Fort Worth, 1.

FOREIGN AND INSULAR

CUBA

Habana—Communicable diseases—4 weeks ended September 25, 1937.—During the 4 weeks ended September 25, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	16		Tuberculosis	13	2
Malaria	[1] 80	1	Typhoid fever	[1] 11	2
Poliomyelitis	1				

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended September 18, 1937.—During the 4 weeks ended September 18, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		1	2	6	1	2	12
Diphtheria	1	15	2	1		2	21
Dysentery (bacillary)		1					1
Leprosy	1	5				1	7
Malaria	85	79	110	136	35	183	628
Measles		2	4				6
Poliomyelitis	1	1				1	3
Scarlet fever			1				1
Tuberculosis	41	36	32	73	209	20	411
Typhoid fever	27	71	32	59	24	22	235
Yaws						15	15

GERMANY

Vital statistics—First quarter 1937.—Following are vital statistics for Germany for the first quarter of 1937:

Number of marriages	117,075
Number of marriages per 1,000 population	6.9
Number of births	329,193
Number of births per 1,000 population	19.5
Number of stillbirths	8,735
Number of deaths	231,193
Number of deaths per 1,000 population	13.7
Deaths under 1 year of age	25,351
Deaths under 1 year of age per 100 live births	7.9

IRISH FREE STATE

Vital statistics—Second quarter ended June 30, 1937.—The following vital statistics for the Irish Free State for the quarter ended June 30, 1937, are taken from the Quarterly Return of Marriages, Births, and Deaths, issued by the Registrar General, and are provisional:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Marriages	3,725	5.1	Deaths from—Continued.		
Births	15,140	20.6	Influenza	506	0.69
Total deaths	11,214	15.2	Measles	23	----------
Deaths under 1 year of age	1,078	[1] 71	Puerperal sepsis	9	1.59
Deaths from:			Scarlet fever	36	----------
Cancer	867	1.18	Tuberculosis (all forms)	1,015	1.38
Diarrhea and enteritis (under 2 years of age)	134	----------	Typhoid fever	13	----------
Diphtheria	75	----------	Typhus fever	4	----------
			Whooping cough	76	----------

[1] Per 1,000 births.

SWEDEN

Notifiable diseases—August 1937.—During the month of August 1937, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Diphtheria	20	Poliomyelitis	[1] 303
Dysentery	55	Scarlet fever	709
Epidemic encephalitis	2	Syphilis	24
Gonorrhea	1,276	Undulant fever	17
Paratyphoid fever	65	Typhoid fever	19

[1] Includes 48 cases nonparalytic at time of notification.

YUGOSLAVIA

Communicable diseases—4 weeks ended September 12, 1937.—During the 4 weeks ended September 12, 1937, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	96	6	Poliomyelitis	12	2
Cerebrospinal meningitis	8	1	Scarlet fever	317	4
Diphtheria and croup	688	32	Sepsis	4	3
Dysentery	613	50	Tetanus	46	17
Erysipelas	193	3	Typhoid fever	836	67
Measles	15	1	Typhus fever	10	----------
Paratyphoid fever	55	4			

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 September 24, 1937, pages 1354–1368. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 29, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—During the week ended October 2, 1937, cholera was reported in China as follows: Hong Kong, 24 cases; Kwangchow Wan, 20 cases; Shanghai, 513 cases, 156 deaths.

Indochina (French).—During the week ended October 2, 1937, cholera was reported in French Indochina as follows: Haiphong, 120 cases; Hanoi, 5 cases; Tonkin Province, 683 cases.

Japan.—Cholera has been reported in Japan as follows: Week ended October 2, 1937, 1 case in Kobe; week ended October 9, 1937, 1 case in Tokyo.

Plague

India—Cochin.—On September 18, 1937, 2 cases of plague were reported in Cochin, India.

Yellow Fever

Colombia.—Yellow fever has been reported in Colombia as follows: Boyaca Department—Muzo, August 18, 1937, 1 death; Maripi, August 22, 1 death. Cundinamarca Department—Paime, July 17, 1937, 1 death. Santander Department—Landazuri, August 27, 1937, 2 deaths.

Gold Coast—Somanya.—On September 30, 1937, 1 fatal case of yellow fever was reported in Somanya, Gold Coast.

Senegal.—Yellow fever has been reported in Senegal as follows: Rufisque, 1 case, September 29, 1937; Dakar, 1 case imported from Diourbel, October 4, 1937.

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