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DISABLING MORBIDITY, AND MORTALITY AMONG WHITE AND NEGRO MALE EMPLOYEES IN THE SLAUGHTER AND MEAT PACKING INDUSTRY, 1930-34, INCLUSIVE [1]

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There is a notable paucity of published material on the incidence of disabling sickness and nonindustrial injuries among comparable Negro and white populations (*8–10*). The occupational morbidity and mortality study offered an opportunity for the analysis of sick benefit organization records which included data on disability arising from 625,666 months of membership for white male and 101,717 months of membership for Negro male employees in the slaughter and meat packing industry covering the 5 years from January 1, 1930 through December 31, 1934. During this time there were recorded 4,951 and 1,169 cases of disability among white and Negro males, respectively.

The present report, in brief, is devoted to a comparison of the magnitude of disability rates for Negro males with the corresponding rates for white males. Moreover, for certain broad diagnosis groups and particular occupational and socio-economic classes, the variation in the ratio of Negro to white disability rates will be examined.

With regard to the possible distorting influence of the rules and regulations of the sick benefit organizations on the disability data, it is believed that the effect in the present instance is minimized, since over 95 percent of the total membership was enrolled in one organization and interest centers primarily on the *ratio* of Negro to white rates.

Since the meat packing plants were located in Middle Western cities, the data may be considered to reflect the relative morbidity experience of the urban, northern Negro in this particular industry. No deductions can be safely drawn with respect to other industries or other sections of the country. Only disabilities that began during the study period and lasted 8 calendar days or longer were counted as cases, with the result that the possible disturbing effect of minor illnesses is eliminated.

[1] From the Division of Industrial Hygiene, National Institute of Health, Washington, D. C. The supporting data of this report are drawn from material collected by the occupational morbidity and mortality study of the National Health Survey, a survey made possible by a grant from the Works Progress Administration in 1935.

Acknowledgment is made to Dr. W. M. Gafafer for suggestions and criticism.

ANALYSIS OF THE DATA

Disability rates by age.—Table 1 presents disability rates for white and Negro males of different broad age groups, the diagnoses giving rise to the rates being combined into four broad groups. The annual number of cases (all diagnoses) per 1,000 persons, or the frequency rate, is 45 percent greater for Negro than for white males. Figure 1

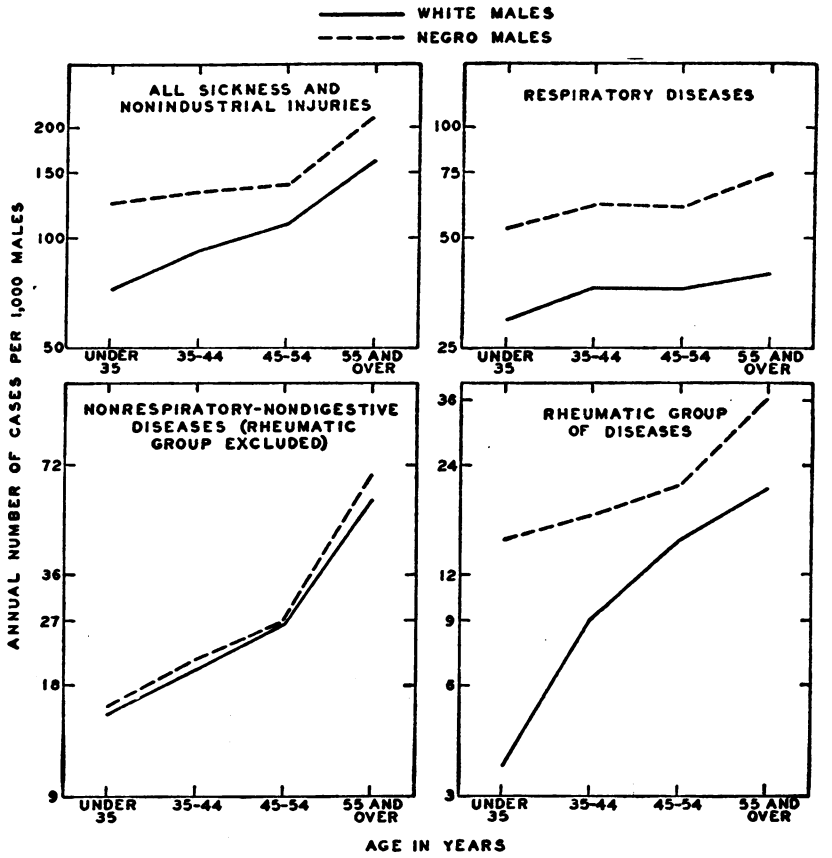

FIGURE 1.—Annual number of cases per 1,000 white males and Negro males, respectively, of sickness and nonindustrial injuries causing disability lasting 8 calendar days or longer by broad age groups, according to diagnosis, employees in the slaughter and meat packing industry, 1930-34, inclusive.

shows that the difference is more marked for males under 35 years of age than for the older age groups. From the youngest age group through 35–44 years, the rate for white males increased more rapidly than the rate for Negroes, while from 45–54 to 55 and over the rate of increase was almost the same for both races.

The frequency rates for different diagnosis groups vary greatly both as to the Negro to white ratio and as to changes with age. It will be seen from figure 1 that respiratory diseases increase but little

TABLE 1.—*Frequency of sickness and nonindustrial injuries causing disability lasting 8 calendar days or longer, annual number of days of disability per male and average number of days per case, by age and broad diagnosis group, white male and Negro male employees in the slaughter and meat packing industry, 1930–34, inclusive*

Diagnosis group	All ages[1]			Age in years as of July 1, 1932											
				Under 35			35–44			45–54			55 and over		
	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white
	ANNUAL NUMBER OF CASES PER 1,000 MALES														
Total, all diagnoses[2]	95.0	137.9	1.45	72.1	124.2	1.72	91.7	133.5	1.46	107.3	139.4	1.30	159.8	214.4	1.34
Nonindustrial injuries	13.5	18.6	1.38	12.2	23.7	1.94	12.8	17.4	1.36	12.8	17.2	1.34	22.0	5.8	.26
Respiratory diseases	34.3	59.6	1.74	29.6	53.6	1.81	36.3	61.6	1.70	36.2	60.5	1.67	39.7	74.4	1.87
Digestive diseases	13.0	14.1	1.08	10.7	13.1	1.22	12.7	15.3	1.20	15.0	11.1	.74	17.5	21.9	1.25
Nonrespiratory-nondigestive diseases	32.9	43.1	1.31	18.6	30.9	1.66	28.8	38.5	1.34	41.3	47.8	1.16	78.5	105.0	1.34
	ANNUAL NUMBER OF DAYS OF DISABILITY PER MALE														
Total, all diagnoses[2]	3.16	4.01	1.27	1.99	3.12	1.57	2.79	3.59	1.29	3.84	4.68	1.22	7.08	8.06	1.14
Nonindustrial injuries	.38	.46	1.21	.30	.48	1.60	.35	.47	1.34	.40	.52	1.30	.69	.18	.26
Respiratory diseases	.88	1.50	1.70	.67	1.31	1.96	.91	1.40	1.54	.98	1.60	1.63	1.38	2.54	1.84
Digestive diseases	.53	.40	.75	.40	.30	.75	.51	.42	.82	.66	.48	.73	.77	.59	.77
Nonrespiratory-nondigestive diseases	1.34	1.61	1.20	.60	.98	1.63	1.00	1.29	1.29	1.76	2.04	1.16	4.18	4.60	1.10
	AVERAGE NUMBER OF DAYS PER CASE														
Total, all diagnoses[2]	33.3	29.1	0.87	27.6	25.2	0.91	30.5	26.9	0.88	35.8	33.6	0.94	44.3	37.6	0.85
Nonindustrial injuries	28.0	24.6	.88	24.7	20.3	.82	27.6	27.0	.98	31.0	30.0	.97	31.6	30.0	.95
Respiratory diseases	25.9	25.2	.97	22.6	24.4	1.08	25.0	22.7	.91	27.1	26.5	.98	34.7	34.2	.99
Digestive diseases	40.7	28.6	.70	37.5	23.0	.61	39.8	27.5	.69	43.8	43.2	.99	44.2	27.0	.61
Nonrespiratory-nondigestive diseases	40.8	37.3	.91	32.2	31.8	.99	34.8	33.5	.96	42.7	42.7	1.00	53.2	43.8	.82
Number of person-years of membership	52,138.8	8,476.4	----------	18,013.1	3,043.6	----------	17,693.2	2,937.2	----------	11,168.8	1,800.1	----------	5,142.5	685.5	----------

[1] Includes some persons of unknown age.

[2] Includes some cases of ill-defined or unknown diagnosis.

with age and that the large excess in the rate for Negroes remains relatively the same throughout all age groups. Nonrespiratory-nondigestive diseases, with rheumatic diseases excluded, increase sharply at 45 years and over. There is very slight difference between the races for any age group; the rates for the Negroes are, however, consistently higher than those for the whites. The rates for digestive

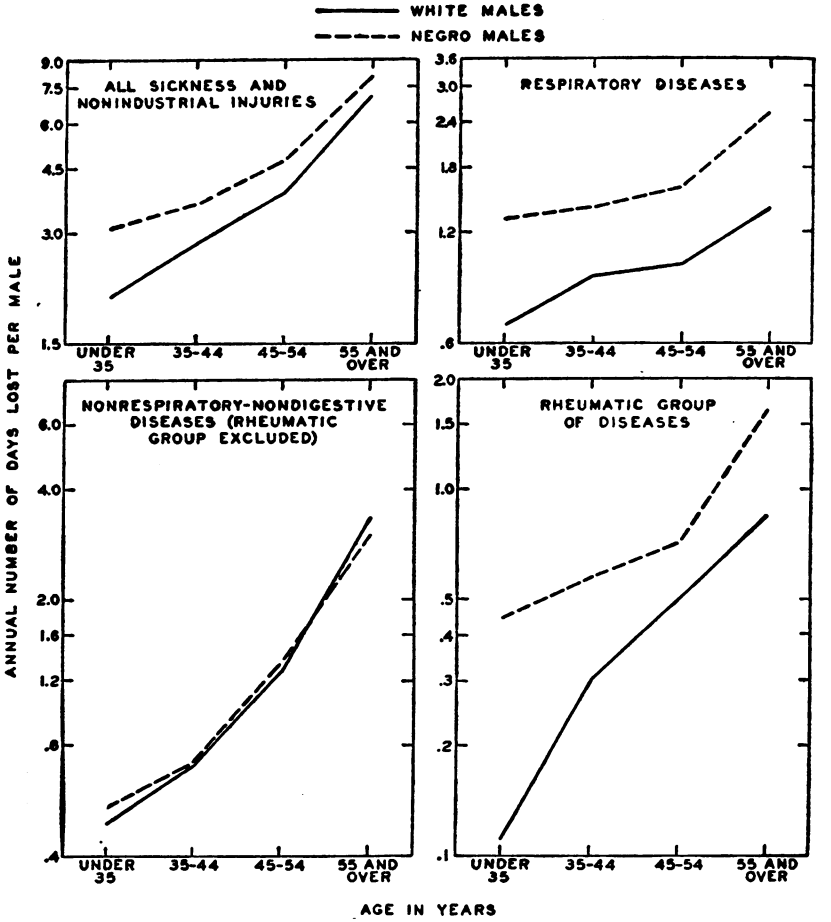

FIGURE 2.—Annual number of days of disability per white male and Negro male, respectively, from sickness and nonindustrial injuries causing disability lasting 8 calendar days or longer by broad age groups, according to diagnosis, employees in the slaughter and meat packing industry, 1930-34, inclusive.

diseases (not shown in the figure) are approximately 22 percent higher among Negroes except for the age group 45–54 years, when the white rate is in excess by 35 percent. Nonindustrial injuries (not shown in the figure) follow opposite trends for the two races, rising gradually with age for white males, and decreasing sharply with age for Negro males. On the whole, the most unfavorable frequency rates for Negroes are for respiratory and rheumatic diseases, while the other

diagnosis groups fail to show a marked or consistent difference for all age groups.

The annual number of days of disability per person for all sickness and nonindustrial injuries and for selected diagnosis groups, as shown in figure 2, follows a pattern remarkably similar to that for the frequency rate. The most noticeable effect of dividing person-years into days of disability instead of into the number of cases is to make the resulting rate rise somewhat more sharply in the older age groups.

In nearly every instance the ratio of Negro to white rate for days per person is equal to or less than the corresponding ratio for the frequency rate. Because of slightly shorter duration per case for Negro males, a rate based on annual number of days of disability per person will show less variation by race than a rate based on frequency. With respect to digestive diseases, for each age group Negroes have fewer days of disability per person than whites.

The Negro rate was favorable with respect to the average number of days per case for all ages and all diagnosis groups except nonrespiratory-nondigestive diseases for persons aged 45-54 years, where the rates for the two races were the same, and respiratory diseases among persons under 35 years, where the average case among Negroes was 8 percent longer. For all ages there was least difference between the length of Negro and white cases for respiratory diseases and most difference for digestive diseases. The latter were very much shorter for Negroes.

The rates for the rheumatic group of diseases, which includes acute and chronic rheumatism, lumbago, neuralgia, neuritis, and sciatica, are shown in the following table:

Age group in years	Annual number of cases per 1,000 males			Annual number of days of disability per male			Average number of days per case		
	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white
All ages [1]	9.6	18.9	1.97	0.33	0.64	1.94	34.4	33.7	0.98
Under 35 years	3.6	15.1	4.19	.11	.44	4.00	32.0	28.8	.90
35–44	9.1	17.4	1.91	.30	.57	1.90	32.6	32.7	1.00
45–54	14.9	21.1	1.42	.49	.71	1.45	32.9	33.8	1.03
55 and over	20.6	36.5	1.77	.85	1.63	1.92	41.0	41.7	1.09

[1] Includes some of unknown age.

It is apparent that, for the rheumatic diseases, the Negro experience, both in terms of cases per 1,000 and days of disability per male, is very unfavorable, especially in the youngest and oldest age groups. Considering both series of rates, the excess for Negroes does not fall below 42 percent and reaches a maximum of 319 percent. For males 35 years of age and over the cases among Negroes lasted on the average

longer than those among white persons, which indicates that greater frequency was associated with greater severity.

Frequency of disabilities by detailed diagnosis.—Table 2 shows for two age groups the frequency of certain diagnoses for white and for Negro males. It will be observed that for most diagnoses the rate for Negroes is higher. The white rate, however, is higher for both age groups for ulcer of the stomach or duodenum, appendicitis, hernia, and diseases of the skin. In the younger age group the white rate is higher for diseases of the pharynx and tonsils, and diseases of the nervous system.

TABLE 2.—*Frequency of sickness and nonindustrial injuries causing disability lasting 8 calendar days or longer, by age, under 35 years and 35 years and over, according to diagnosis, white male and Negro male employees in the slaughter and meat packing industry, 1930–1934, inclusive*

Diagnosis	Annual number of cases per 1,000 males					
	Under 35 years of age			35 years of age and over		
	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white
Total, all diagnoses	72.1	124.2	1.72	107.1	145.7	1.36
Nonindustrial injuries	12.2	23.7	1.94	14.2	15.9	1.12
Sickness	59.9	100.5	1.68	92.9	129.8	1.40
Respiratory diseases	29.6	53.6	1.81	36.8	62.9	1.71
Diseases of the pharynx and tonsils	7.4	6.9	.93	3.8	5.5	1.45
Bronchitis, acute and chronic	2.2	5.6	2.55	3.4	7.0	2.06
Other diseases of the upper respiratory tract	3.5	3.6	1.03	4.9	5.7	1.16
Influenza, grippe	13.5	26.0	1.93	19.5	35.0	1.79
Pneumonia, all forms	1.0	2.6	2.60	2.0	4.1	2.05
Pleurisy	.9	4.9	5.44	1.4	3.5	2.50
Respiratory tuberculosis	.6	3.0	5.00	1.5	1.9	1.27
Other respiratory diseases	.5	1.0	2.00	.3	.2	.67
Digestive diseases	16.7	13.1	1.22	14.2	14.7	1.04
Diseases of the teeth and gums	.4	1.0	2.50	.8	1.3	1.62
Ulcer of the stomach or duodenum	.9	.3	.33	1.2	1.1	.92
Other diseases of the stomach	.7	3.6	5.14	1.8	2.2	1.22
Diarrhea, enteritis	.7	3.6	5.14	2.1	4.0	1.90
Appendicitis	5.9	2.6	.44	3.4	1.5	.44
Hernia	1.1	.3	.27	2.2	1.7	.77
Other digestive diseases	1.0	1.7	1.70	2.7	2.9	1.07
Nonrespiratory-nondigestive diseases	18.6	30.9	1.66	40.4	50.0	1.24
Diseases of the circulatory system	2.1	2.6	1.24	8.2	9.4	1.15
Genitourinary diseases	1.4	2.3	1.64	3.7	5.9	1.59
Rheumatic diseases	3.6	15.1	4.19	12.8	21.0	1.64
Diseases of the nervous system	1.3	.7	.54	3.1	3.3	1.06
Diseases of the skin	1.9	1.0	.53	3.0	1.9	.63
Other infectious and parasitic diseases	4.8	5.9	1.23	3.2	3.5	1.09
Other nonrespiratory-nondigestive diseases	3.5	3.3	.94	6.4	5.0	.78
Ill-defined or unknown diagnoses	1.0	2.9	2.90	1.5	2.2	1.47
Number of person-years of membership	18,013.1	3,043.6	----------	34,004.5	5,422.8	----------

The frequency rate for most specific diseases for both races is greater for males 35 years of age and over than for those under 35 years. As was found in the soap manufacturing industry (*6*), so also for white males in the meat packing industry there were three diagnoses, diseases of the pharynx and tonsils, appendicitis, and infectious and parasitic diseases, which declined in frequency with age. These same diseases showed a decline for Negro males, but, in addition, nonindustrial injuries, pleurisy, and respiratory tuberculosis likewise decreased. This does not indicate that there was a favorable trend among Negroes for such diseases, but merely that they had a particularly high rate in the younger age group. The same reasoning applies to the generally lower rate of increase with age for Negro as compared with white males.

It will be noted that the highest ratios of Negro to white rates include the more serious respiratory diseases, diarrhea and enteritis, and genitourinary and rheumatic diseases.

Frequency of disabilities according to occupational group and diagnosis.—Occupation may influence the frequency and severity of disabilities both directly by the conditions of the working environment and indirectly by the effect of earnings translated into terms of housing and living conditions. The generally higher rates for Negroes may not, therefore, be due to racial differences but to differences in the type of work performed and in the amount of remuneration received.

In an attempt to reduce the possible influence of these disturbing factors, data for warm and cold meat workers were separated from those for all other workers, as shown in table 3. The former group represents an occupation in the meat packing industry which involves the slaughter of animals, splitting of carcasses, removal of hides, entrails, and other portions, sawing of heads and legs, trucking into the cooler room, and cutting, trimming, and boning the cold meat. Although there are many different operations performed, and it is possible that Negro and white workers may be assigned different tasks, yet the general working environment is the same. Since the floors are continually under a spray of water to wash down the blood and other matter, and the carcasses are repeatedly washed and flushed, all workers are exposed to a very damp environment. Moreover, much of the labor is quite strenuous.

TABLE 3.—*Frequency of sickness and nonindustrial injuries causing disability lasting 8 calendar days or longer, annual number of days of disability per male and average number of days per case, among warm and cold meat workers and all other workers, by age, under 35 years and 35 years and over, according to broad diagnosis group, white male and Negro male employees in the slaughter and meat packing industry, 1930–34, inclusive*

Diagnosis group	Under 35 years of age					
	Warm and cold meat workers			All other workers		
	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white
	ANNUAL NUMBER OF CASES PER 1,000 MALES					
Total, all diagnoses [1]	100.9	116.5	1.15	67.5	127.0	1.88
Nonindustrial injuries	18.3	20.8	1.14	11.2	24.7	2.21
Respiratory diseases	43.5	50.3	1.16	27.4	54.8	2.00
Digestive diseases	10.2	13.5	1.32	10.8	13.0	1.20
Nonrespiratory-nondigestive diseases	28.1	31.9	1.14	17.1	30.5	1.78
	ANNUAL NUMBER OF DAYS OF DISABILITY PER MALE					
Total, all diagnoses [1]	2.82	3.52	1.25	1.86	2.98	1.60
Nonindustrial injuries	.44	.70	1.59	.28	.40	1.43
Respiratory diseases	.91	1.40	1.54	.63	1.28	2.03
Digestive diseases	.44	.40	.91	.40	.26	.65
Nonrespiratory-nondigestive diseases	1.02	1.02	1.00	.53	.97	1.83
	AVERAGE NUMBER OF DAYS PER CASE					
Total, all diagnoses [1]	28.0	30.2	1.08	27.5	23.5	0.85
Nonindustrial injuries	24.3	33.5	1.38	24.8	16.2	.65
Respiratory diseases	20.8	27.8	1.34	23.1	23.3	1.01
Digestive diseases	43.4	29.9	.69	36.7	20.3	.55
Nonrespiratory-nondigestive diseases	36.5	32.1	.88	31.1	31.7	1.02
Number of person-years of membership	2,458.6	815.5		15,554.5	2,228.1	

Diagnosis group	35 years of age and over					
	Warm and cold meat workers			All other workers		
	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white
	ANNUAL NUMBER OF CASES PER 1,000 MALES					
Total, all diagnoses [1]	144.5	166.4	1.15	101.4	138.0	1.36
Nonindustrial injuries	19.5	16.4	.84	13.4	15.7	1.17
Respiratory diseases	49.5	78.4	1.58	34.8	57.1	1.64
Digestive diseases	18.7	15.0	.80	13.5	14.7	1.09
Nonrespiratory-nondigestive diseases	54.6	52.5	.96	38.3	49.0	1.28
	ANNUAL NUMBER OF DAYS OF DISABILITY PER MALE					
Total, all diagnoses [1]	4.99	5.05	1.01	3.60	4.32	1.20
Nonindustrial injuries	.56	.43	.77	.40	.45	1.12
Respiratory diseases	1.41	1.92	1.36	.94	1.50	1.60
Digestive diseases	.73	.39	.53	.57	.49	.86
Nonrespiratory-nondigestive diseases	2.21	2.26	1.02	1.66	1.85	1.11
	AVERAGE NUMBER OF DAYS PER CASE					
Total, all diagnoses [1]	34.5	30.4	0.88	35.5	31.3	0.88
Nonindustrial injuries	28.6	26.4	.92	29.8	28.9	.97
Respiratory diseases	28.4	24.5	.86	27.0	26.2	.97
Digestive diseases	39.1	26.1	.67	42.6	33.3	.78
Nonrespiratory-nondigestive diseases	40.5	43.0	1.06	43.3	37.6	.87
Number of person-years of membership	4,504.7	1,466.6		29,499.8	3,956.2	

[1] Includes some cases of ill-defined or unknown diagnosis.

For white males both under 35 years and 35 years and over the frequency rates for warm and cold meat workers were higher than for any other occupational group. As shown in table 3 and in figure 3, when the rates for white and Negro males of this specific occupational group are compared, the excess in the Negro rate is found to be 15 percent for each of the broad age groups; among "all other workers" the rate was 88 percent in excess for Negro males under 35 years and 36 percent in excess for those 35 years of age and over. The difference, especially for younger persons, is related to the fact that there is a large group of white males engaged in office work, an occupation which normally has a low frequency of disabilities, while there are very few Negro males employed in this type of work. Thus the apparent influence of race is greatly lessened when comparison is

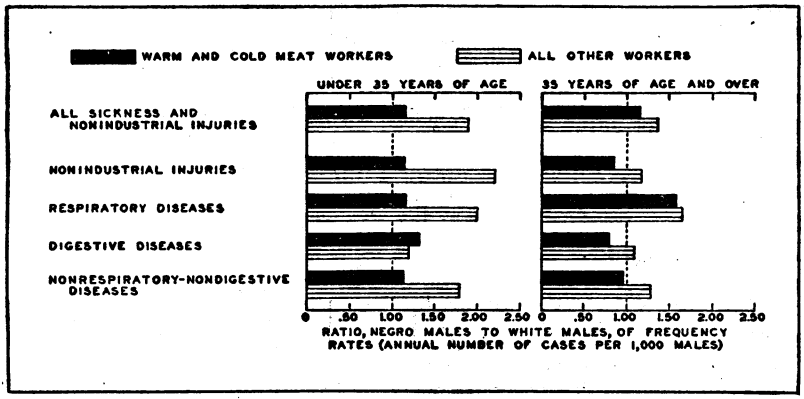

FIGURE 3.—Ratio, annual number of cases per 1,000 Negro males to annual number of cases per 1,000 white males, of sickness and nonindustrial injuries causing disability lasting 8 calendar days or longer, by ages under 35 years and 35 years and over, according to broad diagnosis groups, employees in the slaughter and meat packing industry, 1930–34, inclusive.

made between Negro and white males of similar occupational groups. Even in dissimilar occupational groups, the effect of increasing age is to reduce racial differences. This is possibly due to the fact that the rate among Negroes is already high in the younger age groups and does not increase so rapidly with advancing age as the rate among white males, which starts at a much lower level.

Among warm and cold meat workers under 35 years, it will be observed that the excess in the frequency rate for Negroes occurs to almost the same extent for nonindustrial injuries, respiratory diseases, and nonrespiratory-nondigestive diseases. The rate for digestive diseases among Negroes is slightly more unfavorable. Although for the older age group the excess for all causes is the same as for younger persons, the distribution of the excess according to diagnosis group is quite different. The rate for respiratory diseases is 58 percent greater for Negro than for white males, but for the other 3 diagnosis groups

the Negro rate is more favorable. Apparently the equalizing factor of increasing age, when added to similarity of occupation, eliminates much of the racial difference, except for respiratory diseases. Other than for this diagnosis group, Negro warm and cold meat workers would appear to have a better health record than whites engaged in the same work.

When the Negro-to-white ratio of "all other workers" for the two age groups is compared, a decided decrease is noted in the older group. For each diagnosis group the white rate increases with age at a higher rate than does the Negro rate, the difference between the two rates becoming less. Possibly age has a selective effect, causing differences in occupational status to become less marked. In other words, there may not be as many very low paid and unskilled workers among the older employees who may be presumed to have had longer service with the company.

The annual number of days of disability per person among warm and cold meat workers was 25 percent greater among young Negroes and almost the same for both races among the older males; for "all other workers" the excesses among Negroes were 60 and 20 percent, respectively. Here again is an indication that racial differences are reduced by increasing age and by greater specificity of occupation. Respiratory diseases are again the only diagnosis group that is distinctly unfavorable among old as well as young Negroes.

Warm and cold meat workers 35 years of age and over and "all other workers" of both age groups showed a lower average number of days per case for Negro males than for white males, the ratios in the three instances being almost the same. Negro warm and cold meat workers showed a very slight increase with age in average number of days per case, while white males in the same occupation showed a marked increase. This resulted in a much more favorable Negro-to-white ratio in the older age group. "All other workers," who had a favorable Negro ratio when young, had a less favorable ratio in the older group. According to the average duration per case for persons under 35 years, when similar occupations were compared the Negro and the white rates were more nearly alike, although the Negro rate was unfavorable.

Frequency of disabilities among laborers.—The data given in table 4 further confirm the possible relationship previously indicated, namely, that as employment status becomes more nearly alike, the difference between the disability rates for Negroes and whites tends to decrease. Although laborers form a rather broad socio-economic class, still the excess in the Negro frequency rate among laborers for all diagnoses is less than the corresponding excess for all socio-economic groups. Laborers work throughout the plant, both inside and outside, and are subjected to wide differences in exposure; however, they have in

common the fact that they are unskilled and receive relatively low wages. Lack of sufficient income is likely to be reflected in home conditions and standards of living. It is these factors, apparently, rather than common environmental experience in the plant, which reduce the difference between the white and Negro rates.

TABLE 4.—*Frequency of sickness and nonindustrial injuries causing disability lasting 8 calendar days or longer among laborers and all socio-economic groups, according to diagnosis group, white male and Negro male employees in the slaughter and meat packing industry, 1930 to 1934, inclusive*

Diagnosis group	Annual number of cases per 1,000 males					
	All socio-economic groups			Laborers		
	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white
Total, all diagnoses	95.0	137.9	1.45	104.6	130.4	1.25
Nonindustrial injuries	13.5	18.6	1.38	15.5	16.0	1.03
Respiratory diseases	34.3	59.6	1.74	39.1	55.6	1.42
Digestive diseases	13.0	14.1	1.08	12.3	14.1	1.15
Nonrespiratory-nondigestive diseases	32.9	43.1	1.31	36.1	42.3	1.17
Diseases of the circulatory system	6.1	7.0	1.15	5.9	6.7	1.14
Genitourinary diseases	2.9	4.6	1.59	2.8	5.0	1.79
Rheumatic diseases	9.6	18.9	1.97	13.1	17.3	1.32
Diseases of the nervous system	2.5	2.3	.92	1.6	2.0	1.25
Diseases of the skin	2.7	1.5	.56	3.9	2.0	.51
Other infectious and parasitic diseases	3.7	4.4	1.19	3.7	4.9	1.32
Other nonrespiratory-nondigestive diseases	5.4	4.4	.81	5.1	4.4	.86
Ill-defined or unknown diagnoses	1.3	2.5	1.92	1.6	2.4	1.50
Number of person-years of membership	52,138.8	8,476.4	----------	17,355.1	5,951.3	----------

It will be observed that Negro laborers differ most from white laborers with respect to respiratory diseases, and least with respect to nonindustrial injuries. For each of the four principal diagnosis groups, digestive diseases excepted, there is less difference between the white and Negro rates for laborers than for "all socio-economic groups." The actual rate for Negro laborers was lower than the Negro rate for "all socio-economic groups," while the reverse was true among white males, who showed a higher rate for laborers. Digestive diseases again were the exception. Certain nonrespiratory-nondigestive diseases showed a higher Negro-to-white ratio for laborers than for "all socio-economic groups," namely, genitourinary diseases, diseases of the nervous system, and infectious and parasitic diseases.

Mortality and fatality rates.—Despite the comparatively small number of deaths, there are certain observations concerning fatality and mortality rates among Negro and white males which are noteworthy. Table 5 shows that, while the Negro mortality rate is 57 percent greater than the white rate, the corresponding fatality rate is only 10 percent greater. As with morbidity, the greatest excess occurs for respiratory diseases. Pneumonia and respiratory tuberculosis account for 35 percent of all Negro deaths compared with 19 percent

TABLE 5.—*Annual number of deaths per 1,000 males, and percent of cases ending fatally, according to diagnosis group, white male and Negro male employees in the slaughter and meat packing industry, 1930–34, inclusive*

Diagnosis group	Annual number of deaths per 1,000 males			Percent of cases ending fatality			Number of deaths		Number of ended cases	
	White	Negro	Ratio, Negro to white	White	Negro	Ratio, Negro to white	White	Negro	White	Negro
Total, all diagnoses	5.8	9.1	1.57	5.9	6.5	1.10	300	77	5,048	1,179
Nonindustrial injuries	1.0	1.2	1.20	7.2	6.1	.85	54	10	745	165
Respiratory diseases	1.3	3.3	2.54	3.5	5.5	1.57	64	28	1,814	508
Pneumonia, all forms	.5	1.1	2.20	25.3	27.3	1.08	24	9	95	33
Respiratory tuberculosis	.6	2.1	3.50	39.3	75.0	1.91	33	18	84	24
Other respiratory diseases	.2	.1	.50	.4	.2	.50	7	1	1,635	451
Digestive diseases	.3	.4	1.33	2.5	2.5	1.00	17	3	676	122
Appendicitis	.1	----	----	1.8	----	----	4	----	219	16
Other digestive diseases	.2	.4	2.00	2.8	2.8	1.00	13	3	457	106
Nonrespiratory-nondigestive diseases	3.1	4.1	1.32	9.3	9.6	1.03	162	35	1,741	363
Diseases of the circulatory system	1.4	2.0	1.43	19.6	27.4	1.40	70	17	358	62
Genitourinary diseases	.3	.7	2.33	10.8	16.7	1.55	17	6	157	36
Diseases of the nervous system	.4	.4	1.00	13.5	16.7	1.24	18	3	133	18
Other nonrespiratory-nondigestive diseases	1.0	1.0	1.00	5.2	3.6	.69	57	9	1,093	247
Ill-defined or unknown diagnoses	.1	.1	1.00	4.2	4.8	1.14	3	1	72	21

Number of person-years of membership: White males, 52,138.8; Negro males, 8,476.4.

of all white deaths. Respiratory tuberculosis occurs more frequently among Negro males and it has a high fatality rate, with three-fourths of the cases recorded ending in death. Digestive diseases and nonrespiratory-nondigestive diseases cause a third more deaths among Negroes than whites, per 1,000 members of the sick benefit organization, although the percentage ending fatally is almost the same for the two races.

It will be observed that the excess in the Negro mortality rate is only slightly greater than the excess in the frequency rate for all sickness and nonindustrial injuries. The unfavorable morbidity and mortality experience of Negro males appears not to differ greatly as a whole, although the two rates vary by diagnosis group. In both, the greatest Negro excess is for respiratory diseases, which amount to 74 percent for the frequency rate and 154 percent for the mortality rate. Nonrespiratory-nondigestive diseases show almost the same frequency and mortality excesses, namely, 31 and 32 percent, respectively.

Mortality and fatality rates by occupation show little difference in the Negro to white ratio from the corresponding ratio for all occupations. The excess in the Negro mortality rate for warm and cold meat workers is 42 percent, while for all occupations it is 57 percent. The corresponding fatality rates show an excess of 23 and 10 percent, respectively.

SUMMARY

The results of this study of sickness and nonindustrial injuries among white and Negro male employees of certain slaughter and meat packing companies may be conveniently summarized as follows:

1. As the occupations of Negro and white males become more nearly alike, the magnitude of the excess in the frequency rate of disabilities among Negroes tended to decrease, if not to disappear entirely. This suggested that it was differences in the type of work performed together with the associated economic status rather than race per se which produced the unfavorable Negro health record when occupation was not held specific. Disregarding occupation, increasing age had the effect of reducing racial differences, since the Negro rate showed a tendency to increase less rapidly than the white. The rates for respiratory and rheumatic diseases remained unfavorable for Negroes and were less subject to the equalizing influence of occupation and age.

2. Although the Negro mortality rate was 57 percent greater than the white rate, the fatality rate was only 10 percent greater. With respect to neither of these rates did the Negro to white ratio show as marked a decrease when occupation was made specific, as did the morbidity rates.

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THE PRESENCE OF HISTAMINE IN THE PLATELETS OF THE RABBIT[1]

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The work of Loos (*1*) first suggested that histamine is carried by polymorphonuclear cells. This worker found in the rabbit an increase in the histamine content of inflammatory areas which ran parallel to the polymorphonuclear infiltration. Schwartz (*2*) showed that a histaminelike activity was present in defibrinated blood and thought that this was released from the white cells and platelets at the time of coagulation. Code (*3*) demonstrated that the buffy coat of blood carried a large fraction of the total blood histamine under normal conditions and thought that it was the granulocytic series of cells and especially the eosinophiles which were involved. In certain acute conditions, such as anaphylactic shock, insulin reactions, and following toxic drugs, it has been shown that histamine appears free in plasma, being released from injured tissues and the buffy coat (*4, 5, 6, 7, 8*). This plasma histamine is rapidly removed by several mechanisms which have been discussed by Rose and Browne (*9*).

In studying blood histamine changes both in clinical cases and in animal experiments, we have been unable to interpret the findings upon the basis that the white cells carry histamine at any time. Because of this, it was necessary to study more closely the histamine content of the various blood constituents. This paper deals with the findings in rabbits.

Histamine was determined chiefly by Code's modification of the Barsoum and Gaddum technique (*10*). This method was confidently used because it was found possible in several experiments to destroy almost completely the activity of the final water extracts by sterile incubation with a commercial preparation of histaminase.[2] The findings of Anrep et al. (*11*), however, suggested that it would be wise to repeat some of the experiments using alcohol extraction, as done in Barsoum and Gaddum's method (*12*), to make certain that there were no wide fluctuations in the alcohol insoluble material (presumably not histamine) which may be present in the water extracts.

The differences in the values obtained by extracting the final residue with water according to Code's method and four times with 2 cc. of alcohol as suggested by Anrep et al. (*11*) are shown in table 1 and table 3. The result of this comparison indicates that the findings in experiment 3 on platelet-containing plasma are valid, whether

[1] From the Clinical Research Laboratory, U. S. Marine Hospital, Baltimore, Md.

[2] Supplied through the courtesy of the Winthrop Chemical Co., Inc.

alcohol or water extraction is used. The values for whole blood are smaller with alcohol extraction, but it may be seen from table 3 that wide fluctuations in blood histamine are adequately shown by either method. This is in agreement with the findings of Barsoum and Gaddum (*12*) to the effect that in rabbit blood the alcohol extraction may be omitted.

The precision and accuracy of the method in our hands using water extraction may be judged from the duplicates and recovery experiments shown in table 1. Since it was necessary to work with heavily oxalated blood (about 10 mg. potassium oxalate per cc.), controls were run which showed that whole blood values are essentially the same when coagulation was inhibited using potassium oxalate, sodium citrate, or Heparin. The last two anticoagulants did not protect the platelets as well, however, as potassium oxalate. All samples were run in as comparative a manner as possible, those of table 3 being run simultaneously with the control and titrated upon the same piece of guinea-pig intestine. All values are in gammas of the free base.

TABLE 1.—*Comparative histamine values of water and alcoholic extracts and dependability of histamine assay method*

Whole blood (gammas per cc.)		Turbid plasma (gammas per cc.)		Red cells (gammas in R. B. C. in 1 cc. whole blood)	
Water extract	Alcohol extract	Water extract	Alcohol extract	Water extract	Alcohol extract
2.76	1.77	2.72	2.56	0.10	0.09
2.33	2.14	1.35	1.18	.37	.34
3.00	2.20	4.65	4.40	.51	.20
1.45	1.31				

WATER EXTRACTIONS

Material	Recovery (gammas)		Duplicates (gammas per cc. blood)	
	Added	Found	First sample	Second sample
Blood	3.00	2.68	3.01	3.28
Distilled water	3.27	3.36	3.75	3.54
Blood	6.00	5.12	2.16	2.14
Plasma	6.00	5.66	4.5	4.9
Distilled water	6.54	6.32	1.80	1.82
Blood	9.00	7.49	.08	.078
Blood	9.00	8.65	.88	.94

EXPERIMENT 1

Table 2 is made up from an experiment originally intended to demonstrate the changes in blood histamine following vaccine administration. These rabbits were sensitized to a strain of b-hemolytic streptococcus of low virulence. Following the intravenous adminis-

tration of 10 cc. of the killed homologous vaccine to sensitized animals and also to nonsensitized controls, blood samples were withdrawn after 5 to 10 minutes and platelets, white cells, and histamine were determined. These values are compared with control samples of blood drawn just before administration of vaccine. It may be seen that there can be an almost complete disappearance of granulocytic cells with little change in histamine content. Further, there is no increase in the plasma histamine, which rules out any shift in histamine from injured white cells to plasma. These observations suggested the investigation of platelets.

TABLE 2.—*Histamine values following white-cell reduction by means of streptococcal vaccine*

Rabbit No.	Time interval (min.)	Blood histamine (gammas per cc.)		Polymorphonuclears (per cu. mm.)		Platelets (thousand per cu. mm.)		Plasma histamine (gammas per cc.)	
		Before	After	Before	After	Before	After	Before	After
14	5	2.76	0.60	5,100	9	350	210	0.18	0.13
0	5	2.60	.39	2,450	22	545	95	.80	.27
27	5	2.58	.85	1,820	8	----	----	----	.18
16	5	2.40	.68	3,200	16	730	350	----	----
24	6	.96	1.17	2,670	21	----	350	.72	.16
22	10	1.63	1.18	1,395	0	----	----	.48	.50
25	10	1.17	1.34	1,092	100	----	----	.57	.15
11	10	2.7	1.47	2,850	550	550	485	.72	.16
28	10	2.18	.87	2,800	26	275	315	----	----

When attention was focused upon the platelets it was found that 5 minutes after the vaccine injection there was usually a drop in platelets parallel to that of the white cells. At the 10-minute interval the platelets recover their normal value, while the white cells are still reduced. Later, at the 1- to 3-hour stage, the platelets are above the initial value and the white cells have also risen slightly above normal. These findings are in agreement with those of Aynaud (*13*) and Bull and McKee (*14*), who found somewhat the same blood changes following injection of bacteria.

Since there may be a difference in the number of platelets between heart and peripheral blood (*20*), it was necessary to count the platelets in the same sample that was drawn for histamine analysis. This introduced error in counting, since the platelets have a tendency to clump. This fact, coupled with the difficulty of catching the sequence of changes at just the moment that the white cells are depressed and the platelets are at a normal level, suggested that the relationship must be demonstrated by some more controllable method.

EXPERIMENT 2

Anti-rabbit-platelet serum was made in guinea pigs by the method of Bull and McKee (*14*). Intraperitoneal injections of washed plate-

lets from 50 cc. of rabbit blood were given each pig three times at weekly intervals. Seven days following the last injection the pigs were bled and serum removed. Care was taken to remove red and white cells from the washed platelet material by differential centrifugation, in order that the resulting serum should be as specific as possible. The immunological properties of such sera have been described by Bedson (*15*, *16*).

Table 3 shows the results of intravenous injection of between ¼ and 2 cc. of the antiplatelet serum (amount depending upon size of rabbit and potency of serum). Blood was drawn just before serum was given, as a control sample.

TABLE 3.—*Histamine values in relation to platelet, polymorphonuclear, and mononuclear cell counts before and after the administration of antiplatelet serum. Controls showing effect of bleeding and normal serum*

Rabbit No.	Time interval (hour)	Blood histamine (gammas per cc.)				Platelets ($\times 10^{-3}$)		Polymorphonuclears (per cu. mm.)		Mononuclears (per cu. mm.)		Remarks
		Before		After		Before	After	Before	After	Before	After	
21	4½	2.40		0.55		500	75	2,975	4,225	6,625	5,725	
28	4½	1.80		.08		500	50	4,750	5,755	5,250	3,240	Died with purpura.
11	4	3.02		.06		434	17	2,060	9,525	8,775	1,680	Died.
7	1½	1.87		.80		775	190	2,320	2,410	2,730	3,470	
7	4	1.13		.075		340	30	955	826	4,075	2,020	Died with purpura.
13	4½	3.38		1.15		600	135	3,150	7,425	8,750	2,475	
18	4½	2.06		.29		472	102					
19	3	1.59		.15		423	38	2,610	3,680	5,190	2,670	
20	4	3.75		2.92		515	120	6,500	8,950	5,100	2,380	
3	4	1.40		.65		317	180	2,650	4,700	7,350	4,700	
14	4½	4.60	[1] 3.80	1.74	[1] 1.29	638	434	3,745	8,125	9,625	4,150	
27	4	2.46	[1] 1.72	.09	[1] .07	558	78	1,860	3,910	5,290	690	
21	[2] 5	2.50	[1] 2.06	.35	[1] .35	412	52	4,745	1,080	6,030	2,845	Died; bled after death.
CONTROLS												
13	3	3.06		3.00		624	337	2,300	2,575	8,650	8,625	
1	4	1.85		1.20		592	633	4,360	5,485	3,640	5,265	
2	18	3.20		2.94		650	650	9,250	4,240	4,350	6,360	
25	6	2.31		2.60		600	440	4,375	5,760	13,125	7,040	1 cc. normal G. P. serum.
21	4	4.20		3.75		462	218	4,105	2,925	5,445	4,125	

[1] Alcohol extractions.
[2] Minutes.

For the sake of brevity, the results of only the 1- to 4-hour samples are shown. In four of these rabbits, blood was also withdrawn after 18 to 24 hours. In every case the platelets and blood histamine were still depressed, while the white cells had returned almost to normal. This suggests that the changes are not due to some evanescent cause and agrees well with the findings of Tocantins (*17*) that it takes several days for platelets to recover after antiplatelet serum. The control

rabbits cover the possibility that the changes are due to the effects of the bleeding alone. Three rabbits died, two of which were autopsied. These showed a gross picture similar to that reported for guinea pigs and dogs receiving antiplatelet serum (*16*, *18*).

The results of this experiment are definite and clearly suggest that it is the platelets which carry the major portion of the blood histamine. There are, however, two objections which may be raised. The first is that the other blood elements have been injured by anti-white-cell and anti-red-cell properties of the serum (Bedson (*15*)) and have released their histamine which has been removed from the plasma by the mechanisms referred to above. The change in the platelets might thus be merely a concomitant feature. The second point is that, although there appears to be a relation between a drop in platelets and a drop in blood histamine, the relation between the number of platelets and the histamine value is poor. The following experiment is designed to cover the first point, while the second one will be discussed later.

EXPERIMENT 8

Rabbit blood was drawn into syringes containing powdered potassium oxalate and rapidly mixed. The oxalated blood was centrifuged briefly. The turbid plasma was then fractionally centrifuged. Platelet and white blood cell counts and histamine determinations were performed upon the different samples. Figure 1 shows the relationship found. The abscissa represents gammas of histamine per cc. of oxalated plasma, the ordinate, platelets and white cells per cu. mm.

The character of the curve may be explained as follows: The platelet count undoubtedly includes a certain proportion of pseudo-platelets and cellular debris. Tocantins (*20*) has called attention to this difficulty in the counting of wet preparations. Such elements will give an additive factor to the ordinate values. The smallest of the platelets will carry little histamine and sediment very slowly, and thus cause the line to drop steeply, cutting the abscissa at the value of 0.13 gammas, which represents the amount of histamine dissolved in the oxalated plasma.

In figure 1 the ordinate and abscissa are of equal length and the constants chosen so that each arm is almost equal to the range of values. The curve thus represents proportionate changes. The platelets make a line roughly 45°, which suggests that they are the carriers of histamine, while gross proportionate changes in the white count produce little histamine change, and in the lower values no change in the white cells is associated with considerable histamine change. The number of white cells is also entirely out of proportion to normal blood findings. For instance, the average number of white

cells at the histamine value of 1 gamma is about 75 cells per cu. mm. Normal blood containing 5,000 to 8,000 cells should then contain 65 to 100 gammas of histamine per cc. if the histamine were carried by the white cells present. The determinations were carried out in groups of 5 to 6 samples from the same plasma. The most heavily centrifuged plasma in each group constitutes a control for the preceding samples of the group. There is little chance then that there is

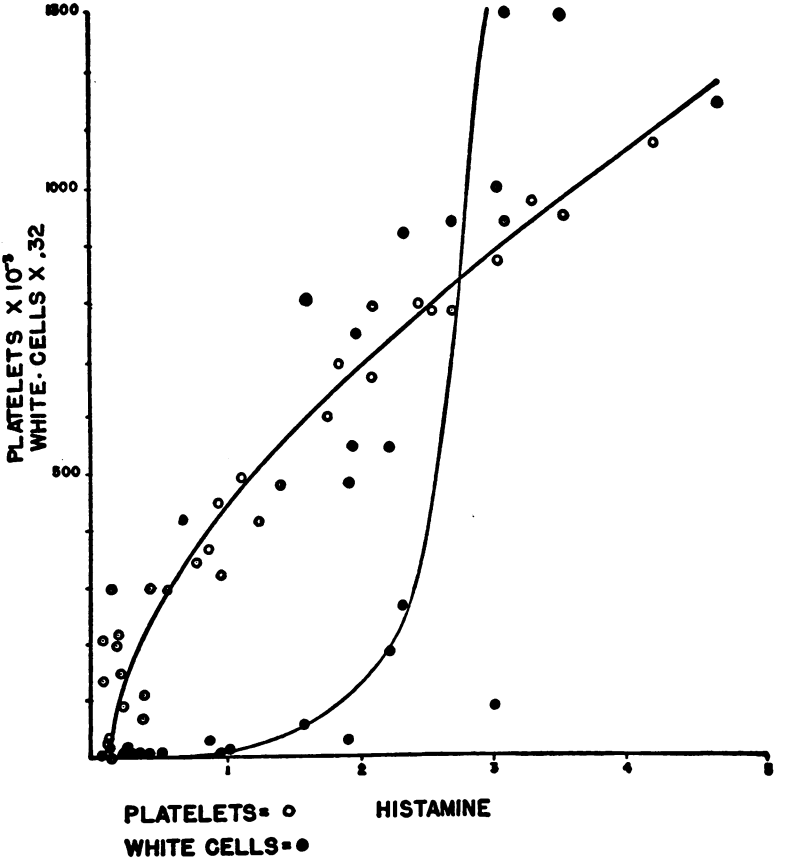

FIGURE 1.—The relationship of histamine values to platelets and leucocytes in oxalated plasma.

dissolved histamine much above the value of 0.13 gammas in any of the determinations. Doubts as to accuracy of platelet counts done on whole oxalated blood are not applicable to this experiment. The clumps of platelets are removed by the preliminary sedimentation, and the counts in these experiments were reproduceable within the limits of sampling error.

Whatever the explanation of the peculiarities of the relation found, considering the inaccuracies of both histamine determinations and

platelet counts, there seems a definite relation of platelets to histamine content in the oxalated plasma.

There exists the possibility that histamine is released from white cells on being injured by oxalate and that it is adsorbed by platelets. When 9 gammas of histamine were added to 5 cc. of oxalated blood, mixed, and allowed to stand 20 minutes, and then fractionated and assayed along with a control sample, 80 percent of the recovered histamine (94 percent total recovery) was recovered from the plasma, 13.5 percent in the buffy coat, and 6.5 percent in the red cells. These are the averages of two experiments which agree fairly well. When 4.5 gammas of histamine were added to 5 cc. of oxalated plasma containing platelets, the platelets contained 30 percent of the total added histamine, while the plasma contained 70 percent. It may be seen from these results that histamine added to whole blood and also platelets is adsorbed to a certain extent. The plasma, however, contains the greatest fraction of the added histamine. This indicates that if there were some transfer of histamine from injured or disintegrated white cells to the platelets under the conditions in the oxalated plasma, we should expect a large proportion of the total histamine to be present in the plasma. From table 2 and figure 1 it may be seen that this is not the case.

The average histamine content of the whole blood of the 8 rabbits contributing plasma to experiment 3 (unfortunately not determined at the same time as the samples in experiment 3) was 1.82 gammas per cc. The average platelet count was 515,000 per cu. mm. blood. The curve in figure 1 predicts a value of 1.25 gammas per cc. for the number of platelets. To this may be added the value of 0.49 gammas, the amount of histamine in the red cells in 1 cc. of whole blood (average of 10 determinations) giving 1.74 gammas per cc. This value for red cells was determined by analysis of centrifuged packed red cells drawn from the bottom to minimize contamination with the buffy coat. The value is very definitely a maximum one, for the cells were thus not washed. It may be noted also that the plasma values given in table 2 are too large, because at the time of these determinations the fact that a slightly turbid plasma might contain numerous suspended platelets was not fully appreciated. The value of 0.13 from figure 1 is probably more nearly correct. We can account, then, for from 1.25 to 1.74 gammas of the 1.82 average blood histamine value. This discrepancy may be due to experimental errors, the presence of small amounts of histamine in the white cells, or to the fact that the platelets examined in experiment 3 were obtained by differential centrifugation, thus losing the larger-sized platelets which would carry more histamine.

There remains the question as to why the histamine value is not more directly dependent upon the absolute number of platelets (see

table 3). We have noticed that the histamine value for an individual rabbit usually remained constant for long periods of time. The blood histamine 5 to 14 days following an episode of platelet decrease caused by antiplatelet serum was frequently two to three times as high as in a previous resting period. The platelet count at such times was not correspondingly increased.

Bedson (*19*), Tocantins (*17*), and others have pointed out that following administration of various agents which decrease the platelets, regenerative processes are set in motion which replace and even exceed the normal number of platelets. The regenerating platelets are different in morphology and size from resting platelets. The increase in histamine following antiplatelet serum may, therefore, be associated either with an increased histamine content of the individual platelet or an increase in average size (since the numbers are not increased). This physiological variation in the platelets which must also occur in the normal rabbit to a lesser degree possibly accounts for the lack of direct relation between the platelet number and the histamine content.

It has long been known that platelets contain pharmacologically active substances. Tocantins (*20*) in his review of this point remarks that some of the extracts behave like histamine. The work of Barsoum and Gaddum (*12*) and also Code (*10*) made it highly probable that the material extracted by their techniques is in reality histamine. The inactivation by use of the specific enzyme upon such extracts by Best and McHenry (*21*), Anrep et al. (*11*), and Bachman (*8*) brings the proof just short of chemical identification. It seems to follow, then, that at least one of the pharmacologically active substances in the platelets of the rabbit is histamine. From the foregoing experiments it seems also that the platelet is the chief carrier of the blood histamine in the rabbit.

SUMMARY

1. It has been found that the white cells of the rabbit may be markedly depressed without significant change in blood histamine.

2. The administration of antiplatelet serum caused a significant drop in blood histamine along with a drop in platelets.

3. Fractional centrifugation of platelet-containing plasma removes histamine nearly in proportion to the platelets removed.

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THE SUSCEPTIBILITY OF FIVE INBRED STRAINS OF MICE TO LIVER CHANGES INDUCED BY SUBCUTANEOUS INJECTION OF 2-AMINO-5-AZOTOLUENE [1]

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The carcinogenic property of 2-amino-5-azotoluene (o-amidoazotoluol) has received considerable attention since Yoshida (7), in 1933, reported the occurrence of hepatomas in rats which were fed a diet containing the compound. Yoshida (8) also recorded the induction of hepatomas in rats following subcutaneous injections of o-amidoazotoluol, and similar results with mice were obtained by Shear (6). Comprehensive reviews of the investigations have been published by Shear (6) and by Kinosita (5).

It was considered advisable to determine the susceptibility of various inbred strains of mice to the production of liver tumors following subcutaneous injections of the compound. Since inbred strains of

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mice show wide variations in susceptibility to subcutaneous and pulmonary tumors induced by carcinogenic hydrocarbons (*1*), and since the susceptibility to induced lung tumors is correlated with their spontaneous occurrence, it seemed of interest to ascertain the relative susceptibilities of the strains to induced liver tumors, in order to determine, if possible, whether the incidence of spontaneous hepatomas is correlated with the incidence of induced liver growths. The primary object of the investigation, however, was to find out which strains are most suitable for investigations in which 2-amino-5-azotoluene is used as a carcinogen.

EXPERIMENTAL

Ten strain A males, 10 strain C_3H males, 15 strain Y (6 females and 9 males), 20 strain I (10 females and 10 males), and 14 strain C female mice were used, all of which were raised in this laboratory. Mice of strains A and C are albino animals; strain I are pink-eyed mice and have a very light coat color, while strain C_3H (black agouti) and strain Y (black or brown) are dark colored animals. The C_3H, Y, and I mice were 6 weeks of age and the A and C mice were 3 months old. The animals were fed a diet of Purina dog chow throughout the experiment.

Cloudman, Bittner, and Little (*4*) record an incidence of 0 percent liver tumors in mice of strain A, and in an earlier publication from this laboratory (*2*) it was shown that approximately 25 percent of the males of strain C_3H have hepatomas when 1 year of age or older. The liver tumor incidence of strains C, I, and Y is not reported, but autopsy records obtained in this laboratory are of some assistance in this respect. Hepatoma was not observed in 47 (40 female and 7 male) mice of strain Y which were at least 1 year of age, while of 101 (76 females and 25 males) strain I mice over 1 year of age 6 (5 females and 1 male), or 6.0 percent, had liver growths. It is believed these data are sufficient to show that liver tumors are not common in mice of strains Y or I. Information concerning liver tumors in mice of strain C is not available.

The 2-amino-5-azotoluene was obtained from the Eastman Kodak Co. and was used without purification. Shear's technique (*6*) was used for administration; the compound was moistened with glycerol and injected subcutaneously in the right axilla. Each injection consisted of approximately 10 mg. of the compound. The injections were begun in October 1937, and were repeated at monthly intervals until a total of 11 injections had been given; thus, each animal living until the conclusion of the experiment received a total of 110 mg. of the compound.

All mice survived 18 weeks after the first injection. During the following 18 weeks, 6 animals (2 strain A, 1 strain C_3H, 2 strain Y males, and 1 strain I male) died without macroscopic changes in the livers. During the thirty-sixth week of the experiment a strain C mouse died and at autopsy 6 nodular masses were found in the liver. Beginning 36 weeks after the first injection all mice dying or sacrificed were necropsied, the degree of macroscopic liver change was noted, and portions of the liver were stained for histologic studies, which are still in progress.

Twenty-six mice (8 strain A, 8 strain C, 1 strain I male, 4 strain Y females, and 5 strain Y males) died or were killed between the thirty-sixth week and the termination of the experiment. Most of the strain A and strain C mice had palpable intra-abdominal masses before death and at autopsy all showed pronounced macroscopic liver changes, but it was not possible to state with certainty whether death was due to the toxic action of the compound or to the effects of liver growths. Most of the strain Y animals which died or were killed had severe ulceration of the skin which could not be associated with injections of the compound because the same condition occurs in normal untreated mice of this strain. The degree of liver change in the Y mice was less pronounced than in mice of strains A or C; of the 9 Y mice necropsied 4 showed no macroscopic changes in the livers.

The experiment was terminated on October 26, 1938, 1 year after the first injection. At that time 37 mice (6 strain C, 9 strain C_3H, 10 strain I females, 8 strain I males, 2 strain Y females, and 2 strain Y males) were living.

The results of the macroscopic examinations are summarized in table 1, which includes only the animals living 36 weeks after the first injection.

TABLE 1.—*Summary of macroscopic findings in livers of 5 strains of mice following subcutaneous injections of 2-amino-5-azotoluene*

Strain	Sex	Number injected	Number showing pronounced liver changes	Number showing moderate liver changes	Number showing no liver changes
C	Female	14	11	3	0
A	Male	8	3	4	1
I	Female	10	6	4	0
I	Male	9	1	5	3
C_3H	Male	9	1	8	0
Y	Female	6	0	3	3
Y	Male	7	0	2	5

In the fourth column of the table is listed the number of mice showing pronounced liver changes. There was marked enlargement of the liver, which was cirrhotic in appearance and contained masses, many of which protruded from the surface, while some were peduncu-

lated. The masses were multiple, from 10 to over 30 in each liver, were round or oval in shape, and measured from 4 to 20 mm. in diameter. Some were white or yellow and homogenous in color while others were red, probably owing to hemorrhage. The white masses were of firmer consistency than the yellow or red ones. The yellow masses had prominent surface blood vessels and many were pedunculated. A single liver often showed abnormalities of all 3 types.

In the fifth column of the table is given the number of animals showing only moderate liver changes. In the majority of these mice the livers were not noticeably enlarged and appeared normal when examined macroscopically, but contained from 1 to 6 definite masses. Some of the livers were diffusely mottled but contained no definite masses. In the last column is listed the number of mice which had macroscopically normal livers, that is, without any enlargement and completely free of abnormal areas or masses.

In table 1 the strains are arranged according to their degree of susceptibility to the induced growths. Strain C animals were the most susceptible, since most of them developed pronounced liver changes and none had a liver which appeared normal. Furthermore, 8 of the strain C mice died or were sacrificed because of ill health before receiving the entire series of injections.

Mice of strains A and I were next in order of susceptibility. The results suggest that the strain A animals were more susceptible than the strain I males but less susceptible than the strain I females. The 1 strain A animal which did not reveal any liver change died 37 weeks after the beginning of the experiment, while all 3 of the negative strain I males lived throughout the experiment. It is of interest to note that the strain I females developed more pronounced liver changes than did the strain I males, but the number of experimental animals is too small to justify definite conclusions.

The strain C_3H mice were less susceptible than those of strain A or the strain I females but were, apparently, more susceptible than the strain I males. All the C_3H animals lived throughout the experiment and only 1 developed a pronounced liver reaction.

The Y mice were more resistant than the other 3 strains. This is made evident by the fact that 8 died with macroscopically normal livers and none developed pronounced liver lesions.

Attention is directed to the small number of animals used as representatives of the various strains. Because of the small number, it is believed that generalizations should not be made on the basis of the results obtained, but there is good evidence that livers of mice of strain C are the most susceptible and those of mice of strain Y the most resistant to the carcinogenic activity of the compound. It is also believed that the results permit the conclusion that susceptibility to liver growths induced by 2-amino-5-azotoluene is not correlated

with susceptibility to spontaneous hepatoma, for, as mentioned previously in this report, the C_3H mice, especially males, are the strain most susceptible to spontaneous growths, but both the C and A strain animals were more susceptible to the induced liver growths. This may be of some significance, for it has been shown (3) that 2-amino-5-azotoluene induces lung tumors in mice of strains A and C, which are also the most susceptible to spontaneous pulmonary tumors.

A number of liver masses were dissected out and a piece implanted subcutaneously in the right axillary region of one or two mice of the same strain as the animal from which the mass was taken. A portion of every mass used for transplantation was fixed and stained for histologic study.

As shown in table 2, of 28 liver masses implanted into the subcutaneous tissues of normal mice, 7 showed evidence of growth within 7 months after inoculation. Of the 3 successful implants from strain C mice, 1 is still in the first transplant generation, and the other 2 have grown through 2 serial passages. Of the 4 growths obtained from strain I livers, 2 have undergone 2 serial passages and the remaining 2 are still in the second passage generation. Three masses from strain A livers failed to grow within 20 weeks after transplantation, when the inoculated animals were sacrificed.

TABLE 2.—*Summary of transplantation of liver masses arising in mice of strains C, I, and C_3H, following subcutaneous injections of 2-amino-5-azotoluene* [1]

Strain	Number of masses transplanted	Results	
		Number growing	Number showing no growth up to May 26, 1939
C	8	3	5
I	16	4	12
C_3H	4	0	4

[1] All inoculations made on Oct. 26, 1938.

Transplants from the primary liver growths as well as further serial passages have grown very slowly in the subcutaneous tissues of inoculated mice, and up to the present time successful growth has not occurred in all mice of the serial passage generations. This phase of the experiment is receiving further consideration.

SUMMARY

Mice of strains A, C, C_3H, I, and Y were injected subcutaneously with 10 mg. of commercial 2-amino-5-azotoluene each month for 11 months. According to the macroscopic appearance of the livers, mice of strain C were the most susceptible and mice of strain Y the most resistant to the action of the compound.

Mice of strain A were more susceptible than those of strain C_3H. Since strain C_3H animals are more susceptible to spontaneous hepatoma than those of strain A, the results suggest that in these strains susceptibility to liver growths induced by 2-amino-5-azotoluene is not correlated with susceptibility to spontaneous hepatoma.

REFERENCES

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COURT DECISION ON PUBLIC HEALTH

City ordinance regarding collection and removal of garbage upheld.—(Ohio Court of Appeals; *City of Canton* v. *Van Voorhis*, 22 N.E.2d 651; decided February 1, 1939.) Sections 60 and 61 of the revised ordinances of 1930 of the city of Canton provided:

No person other than the duly authorized employees of the city of Canton shall collect, remove, appropriate, convey, or transport any garbage which has heretofore been placed or put in such garbage can.

No person shall collect, remove, convey, or transport any garbage by any means whatsoever in, over, or upon any street or public highway in the city of Canton.

Under the State constitution cities had authority to exercise all powers of local self government and to adopt and enforce within their limits such local police, sanitary, and other similar regulations as were not in conflict with general laws. The only statute delegating power to cities concerning the collection and disposition of garbage was section 3649, General Code, which read as follows:

To provide for the collection and disposition of sewage, garbage, ashes, animal and vegetable refuse, dead animals and animal offal and to establish, maintain, and regulate plants for the disposal thereof.

On appeal by one found guilty of collecting and removing garbage in violation of the Canton ordinance, the court of appeals said that it was of the opinion that the ordinance in question did not conflict with the above quoted general law, but that on the other hand the ordinance was in compliance with that section. In affirming the judgment of the lower court the appellate court further stated:

It is quite clear to this court that the hauling of garbage over city streets is not an ordinary and customary street use, but rather a special use which the city of Canton has a legal right to entirely prohibit if it so feels inclined.

The courts of this country have been uniform in holding that ordinances passed for the collection and disposition of garbage, based upon reasonable grounds as a means for the protection of the public health, are not a taking of private property for public use without compensation within the meaning of the Federal constitution, even though such garbage and refuse may have some elements of value for certain purposes. [Case cited.]

"Property rights of individuals must be subordinated to the general good and if the owner of garbage suffers any loss by its destruction he is compensated therefor in the common benefit secured by the regulation requiring all garbage to be destroyed." [Case cited.]

The Supreme Court of Ohio, in the case of *State ex rel. Moock* v. *City of Cincinnati*, 120 Ohio St. 500, 166 N.E. 583, held: "The adoption of regulations pertaining to health and sanitation, including the process of collection and disposal of garbage, is within the proper exercise of the police powers of the State and of its municipalities."

DEATHS DURING WEEK ENDED OCTOBER 14, 1939

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

	Week ended Oct. 14, 1939	Corresponding week, 1938
Data from 88 large cities of the United States:		
Total deaths	7,596	7,982
Average for 3 prior years	[1] 7,856	
Total deaths, first 41 weeks of year	339,054	332,731
Deaths under 1 year of age	486	516
Average for 3 prior years	[1] 536	
Deaths under 1 year of age, first 41 weeks of year	20,551	21,631
Data from industrial insurance companies:		
Policies in force	66,584,285	68,266,941
Number of death claims	8,774	9,505
Death claims per 1,000 policies in force, annual rate	6.9	7.3
Death claims per 1,000 policies, first 41 weeks of year, annual rate	10.0	9.3

[1] Data for 86 cities.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

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

Cases of certain diseases reported by telegraph by State health officers for the week ended October 21, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median
NEW ENG.												
Maine	0	0	5	3	6	1	.....	.....	6	1	31	18
New Hampshire	0	0	0	0	.....	.....	.....	.....	51	5	0	1
Vermont	0	0	0	0	.....	.....	.....	.....	94	7	3	3
Massachusetts	8	7	3	3	.....	.....	.....	.....	83	71	71	38
Rhode Island	0	0	1	1	.....	.....	.....	.....	221	29	0	1
Connecticut	0	0	2	2	.....	.....	4	2	18	6	23	23
MID. ATL.												
New York	7	17	19	24	[1]8	[1]11	[1]6	[1]10	54	135	66	91
New Jersey	5	4	4	13	6	5	4	9	10	8	14	19
Pennsylvania	8	15	31	31	.....	.....	.....	.....	9	18	135	135
E. NO. CEN.												
Ohio	25	33	61	61	1	1	.....	4	7	9	11	31
Indiana	34	23	23	40	9	6	14	17	4	3	10	5
Illinois	18	27	30	38	1	2	8	10	7	11	13	15
Michigan [2][3]	5	5	27	13	.....	.....	.....	.....	0	0	39	36
Wisconsin	4	2	1	6	26	15	37	30	35	20	92	40
W. NO. CEN.												
Minnesota	8	4	14	14	2	1	1	1	16	8	54	10
Iowa	4	2	23	8	.....	.....	2	.....	16	8	13	3
Missouri	14	11	26	41	.....	.....	10	27	5	4	7	9
North Dakota	0	0	1	2	15	2	10	.....	7	1	116	9
South Dakota	8	1	0	1	.....	.....	.....	.....	210	28	18	7
Nebraska	4	1	5	6	.....	.....	1	.....	4	1	2	2
Kansas	22	8	10	10	25	9	4	.....	92	33	1	2

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 21, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median
SO. ATL.												
Delaware	0	0	1	1					0	0	0	0
Maryland [3]	25	8	9	16	22	7	6	10	3	1	16	10
Dist. of Col	65	3	1	6					8	1	0	2
Virginia [4]	150	80	150	77	62	33	110		11	6	4	9
West Virginia	48	18	20	47	40	15	15	15	8	3	2	5
North Carolina [3 4]	209	143	148	122	7	5	4	4	136	93	86	10
South Carolina [4]	87	32	34	25	571	209	256	169	0	0	6	3
Georgia [4]	88	53	50	54	56	34	34		0	0	3	0
Florida	9	3	11	13	6	2	4	2	57	19	5	2
E. SO. CEN.												
Kentucky	19	11	49	49	5	3	14	10	3	2	1	35
Tennessee [4]	71	40	60	67	39	22	53	19	21	12	11	8
Alabama [4]	72	41	45	43	72	41	38	25	0	0	4	4
Mississippi [3 4]	61	24	30	25								
W. SO. CEN.												
Arkansas	72	29	26	19	45	18	39	13	5	2	1	1
Louisiana [4]	68	28	30	26	2	1	3	6	2	1	65	8
Oklahoma	18	9	14	14	52	26	36	36	4	2	1	2
Texas [4]	23	28	48	48	116	140	78	123	31	38	4	4
MOUNTAIN												
Montana	122	13	1	1	140	15	19	1	122	13	98	27
Idaho	0	0	0	0			5	1	0	0	33	19
Wyoming	22	1	1	1			1		2, 138	98	1	1
Colorado	43	9	8	10	43	9	17		91	19	1	8
New Mexico	37	3	12	8	25	2	1	1	25	2	9	21
Arizona	37	3	5	5	650	53	54	34	0	0	3	1
Utah [3]	0	0	1	0	70	7	1		40	4	6	5
PACIFIC												
Washington	6	2	2	1					740	240	18	18
Oregon	5	1	1	1	20	4	5	15	85	17	5	5
California [4]	18	22	37	42	15	18	15	15	86	105	211	116
Total	31	769	1, 101	1, 101	34	717	909	654	44	1, 084	1, 313	1, 313
42 weeks	16	17, 053	21, 434	21, 434	175	156, 030	51, 626	108, 230	340	353, 771	767, 804	676, 125

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–32, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median
NEW ENG.												
Maine	6	1	1	0	0	0	0	1	48	8	16	15
New Hampshire	0	0	0	0	0	0	0	1	61	6	2	2
Vermont	0	0	0	0	0	0	0	0	40	3	4	5
Massachusetts	1.2	1	1	1	5	4	1	2	64	54	72	106
Rhode Island	8	1	0	0	0	0	0	0	15	2	7	14
Connecticut	0	0	1	0	8	1	0	1	42	14	23	24
MID. ATL.												
New York	0	0	8	8	25	63	5	14	47	117	187	206
New Jersey	0	0	0	0	11	9	1	1	63	53	39	51
Pennsylvania	3	6	2	3	14	28	0	6	91	179	208	230

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 21, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median
E. NO. CEN.												
Ohio	0.8	1	3	7	5	6	0	3	134	174	224	224
Indiana	1.5	1	1	1	6	4	1	3	153	103	120	120
Illinois	2.6	4	3	3	3	5	2	10	102	156	224	224
Michigan [2 3]	1.1	1	2	1	39	37	1	12	174	165	287	184
Wisconsin	0	0	3	1	12	7	0	3	158	90	130	130
W. NO. CEN.												
Minnesota	0	0	0	0	39	20	1	3	124	64	53	53
Iowa	2	1	0	0	24	12	1	7	105	52	59	66
Missouri	0	0	1	2	1.3	1	0	1	72	56	67	78
North Dakota	0	0	0	1	7	1	0	1	102	14	26	19
South Dakota	0	0	0	0	8	1	1	0	180	24	31	21
Nebraska	0	0	0	0	8	2	1	1	31	8	23	23
Kansas	2.8	1	0	0	6	2	0	1	210	75	85	80
SO. ATL.												
Delaware	0	0	0	0	20	1	0	0	98	5	10	6
Maryland [2]	0	0	1	2	6	2	2	2	126	41	28	44
District of Columbia	0	0	0	0	8	1	1	1	97	12	13	13
Virginia [4]	0	0	5	4	4	2	5	2	82	44	38	42
West Virginia	5	2	1	1	8	3	0	1	274	102	86	86
North Carolina [3 4]	1.5	1	2	2	13	9	0	2	123	84	100	95
South Carolina [4]	0	0	1	1	0	0	0	1	36	13	15	14
Georgia [4]	0	0	0	0	1.7	1	2	2	58	35	28	25
Florida	9	3	0	0	3	1	1	0	33	11	8	8
E. SO. CEN.												
Kentucky	1.7	1	2	2	43	25	0	4	90	52	94	85
Tennessee [4]	0	0	1	1	1.8	1	0	3	109	62	47	65
Alabama [4]	12	7	0	1	1.8	1	2	1	93	53	31	31
Mississippi [2 4]	0	0	1	1	0	0	0	1	25	10	18	18
W. SO. CEN.												
Arkansas	0	0	0	0	7	3	0	2	42	17	23	12
Louisiana [4]	0	0	2	1	0	0	0	1	19	8	8	9
Oklahoma	0	0	1	1	4	2	0	0	40	20	31	11
Texas [4]	0.8	1	2	2	9	11	0	3	22	27	45	45
MOUNTAIN												
Montana	0	0	0	0	0	0	0	0	262	28	19	19
Idaho	0	0	0	0	10	1	0	1	92	9	17	21
Wyoming	0	0	0	0	0	0	0	0	87	4	7	10
Colorado	0	0	0	2	58	12	0	1	144	30	27	27
New Mexico	0	0	0	0	111	9	1	1	99	8	27	16
Arizona	12	1	0	0	12	1	0	0	61	5	6	7
Utah [2]	0	0	0	0	50	5	2	1	169	17	5	25
PACIFIC												
Washington	3	1	0	0	6	2	3	3	89	29	20	39
Oregon	0	0	0	0	20	4	0	4	65	13	22	22
California [4]	1.6	2	0	3	28	34	2	17	99	121	156	156
Total	1.5	37	45	67	13	334	36	242	91	2,277	2,816	2,896
42 weeks	1.5	1,626	2,450	4,672	6	6,008	1,480	6,487	122	128,555	151,570	180,486

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 21, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases
NEW ENG.											
Maine	0	0	0	0	24	4	2	2	290	48	70
New Hampshire	0	0	0	0	0	0	1	1	0	0	10
Vermont	0	0	0	0	0	0	0	0	550	41	105
Massachusetts	0	0	0	0	1	1	2	4	89	76	109
Rhode Island	0	0	0	0	31	4	1	0	145	19	33
Connecticut	0	0	0	0	6	2	0	1	163	55	96
MID. ATL.											
New York	0	0	0	0	4	11	22	22	87	217	504
New Jersey	0	0	0	0	4	3	2	3	90	76	231
Pennsylvania	0	0	0	0	4	7	68	42	151	297	215
E. NO. CEN.											
Ohio	1	1	0	0	12	15	12	17	61	80	70
Indiana	12	8	4	1	6	4	3	6	55	37	46
Illinois	1	1	1	1	17	26	9	11	98	149	508
Michigan [2 3]	1	1	2	0	7	7	3	10	90	85	228
Wisconsin	2	1	0	1	0	0	1	3	192	109	314
W. NO. CEN.											
Minnesota	2	1	4	4	0	0	2	2	83	43	35
Iowa	2	1	0	2	6	3	1	7	26	13	12
Missouri	1	1	6	6	19	15	5	11	19	15	17
North Dakota	0	0	0	0	0	0	2	1	22	3	21
South Dakota	0	0	1	1	0	0	0	1	23	3	7
Nebraska	4	1	0	1	0	0	0	1	27	7	14
Kansas	0	0	0	0	3	3	2	2	8	3	26
SO. ATL.											
Delaware	0	0	0	0	79	4	2	1	59	3	2
Maryland [3]	0	0	0	0	19	6	19	11	114	37	12
District of Columbia	0	0	0	0	8	1	0	0	57	7	7
Virginia [4]	0	0	0	0	19	10	24	24	96	51	10
West Virginia	0	0	0	0	19	7	7	12	94	35	7
North Carolina [3 4]	0	0	0	0	7	5	8	9	98	67	108
South Carolina [4]	0	0	0	0	22	8	3	6	33	12	43
Georgia [4]	0	0	0	0	10	6	10	10	30	18	22
Florida	0	0	0	0	6	2	4	2	9	3	35
E. SO. CEN.											
Kentucky	0	0	0	0	19	11	12	19	45	26	8
Tennessee [4]	0	0	0	0	25	14	21	19	81	46	33
Alabama [4]	0	0	1	0	4	2	5	5	25	14	7
Mississippi [3 4]	0	0	1	0	5	2	7	7	------	------	------
W. SO. CEN.											
Arkansas	5	2	1	0	22	9	17	7	72	29	4
Louisiana [4]	0	0	0	0	29	12	19	14	19	8	17
Oklahoma	2	1	2	0	10	5	12	13	0	0	2
Texas [4]	0	0	1	1	22	27	21	31	22	27	60
MOUNTAIN											
Montana	0	0	14	3	9	1	11	3	75	8	22
Idaho	0	0	0	1	20	2	3	3	0	0	1
Wyoming	44	2	0	0	0	0	2	0	22	1	3
Colorado	5	1	4	1	10	2	10	3	39	8	25
New Mexico	0	0	0	0	74	6	15	18	284	23	8
Arizona	0	0	0	0	37	3	3	4	110	9	11
Utah [3]	0	0	0	0	0	0	0	0	477	48	18

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 21, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases	1934–38, median	Oct. 21, 1939, rate	Oct. 21, 1939, cases	Oct. 22, 1938, cases
PACIFIC											
Washington	3	1	0	4	19	6	1	4	31	10	24
Oregon	0	0	6	0	35	7	0	2	55	11	2
California [4]	4	5	3	2	12	15	5	10	91	111	152
Total	1	28	51	78	11	278	379	412	80	1,988	3,314
42 weeks	8	8,885	13,060	6,387	10	11,003	12,340	12,966	142	147,861	173,038

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Oct. 21, 1939, 2 cases as follows: Michigan, 1; North Carolina, 1.
[4] Typhus fever, week ended Oct. 21, 1939, 59 cases as follows: Virginia, 1; North Carolina, 3; South Carolina, 10; Georgia, 19; Tennessee, 4; Alabama, 9; Mississippi, 3; Louisiana, 3; Texas, 5; California, 2.

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	Diphtheria	Influenza	Malaria	Measles	Meningitis, meningococcus	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid and paratyphoid fever
September 1939										
Alabama	183	77	1,698	10	2	32	3	128	1	35
Colorado	36	41	----	23	2	----	48	70	18	32
District of Columbia	22	2	----	3	1	----	9	17	0	7
Idaho	2	----	----	14	0	----	2	6	0	10
Illinois	60	20	53	52	4	1	62	295	8	412
Indiana	67	24	9	19	0	----	12	204	5	54
Kentucky	60	9	17	39	6	1	26	146	0	108
Louisiana	50	12	50	2	3	5	1	24	0	58
Maryland	13	7	----	13	1	2	7	87	0	18
Michigan	18	12	7	66	4	----	251	320	0	23
Minnesota	17	7	2	34	1	----	204	135	2	9
Mississippi	95	1,595	7,053	84	2	314	3	46	1	24
Nebraska	9	----	----	4	1	----	9	45	4	2
New Mexico	10	1	4	1	2	----	35	26	0	16
New York	24	----	11	175	10	----	456	211	0	77
Ohio	70	25	8	45	7	----	46	318	----	96
Oklahoma	33	35	377	10	2	10	10	37	11	93
Vermont	0	----	----	21	0	----	14	12	0	2

Summary of monthly reports from States—Continued

September 1939

	Cases
Actinomycosis:	
Michigan	1
Anthrax:	
New York	1
Botulism:	
Idaho	1
Chickenpox:	
Alabama	7
Colorado	22
District of Columbia	2
Idaho	8
Illinois	157
Indiana	25
Kentucky	16
Louisiana	5
Maryland	18
Michigan	121
Minnesota	44
Mississippi	85
Nebraska	12
New Mexico	5
New York	191
Ohio	117
Oklahoma	6
Vermont	36
Dengue:	
Mississippi	3
Diarrhea:	
Maryland	40
Michigan (infant)	2
New Mexico	21
Ohio (under 2 years; enteritis included)	191
Dysentery:	
Colorado (amoebic)	1
Colorado (bacillary)	31
District of Columbia (amoebic)	1
Illinois (amoebic)	11
Illinois (amoebic carriers)	21
Illinois (bacillary)	47
Indiana (amoebic)	1
Indiana (bacillary)	72
Kentucky (amoebic)	1
Kentucky (bacillary)	45
Louisiana (amoebic)	3
Louisiana (bacillary)	2
Maryland (amoebic)	2
Maryland (bacillary)	34
Maryland (unspecified)	11
Michigan (amoebic)	3
Michigan (bacillary)	21
Michigan (unspecified)	3
Minnesota (amoebic)	1
Mississippi (amoebic)	163
Mississippi (bacillary)	492
New Mexico (amoebic)	4
New Mexico (bacillary)	18
New Mexico (unspecified)	10
New York (amoebic)	10
New York (bacillary)	682
Ohio (amoebic)	1
Ohio (bacillary)	13
Oklahoma (amoebic)	2
Oklahoma (bacillary)	39
Encephalitis, epidemic or lethargic:	
Alabama	3
Colorado	7
Illinois	4
Indiana	8
Michigan	1
Nebraska	2
New York	14
Ohio	5
Oklahoma	2

	Cases
Food poisoning:	
Illinois	7
New Mexico	1
German measles:	
Alabama	1
Idaho	5
Illinois	16
Maryland	5
Michigan	23
New Mexico	3
New York	39
Ohio	6
Hookworm disease:	
Louisiana	12
Mississippi	637
Impetigo contagiosa:	
Illinois	54
Maryland	43
Ohio	72
Oklahoma	15
Lead poisoning:	
Ohio	9
Leprosy:	
Louisiana	1
Mumps:	
Alabama	10
Colorado	19
Idaho	1
Illinois	76
Indiana	35
Kentucky	38
Louisiana	7
Maryland	21
Mississippi	111
Nebraska	12
New Mexico	11
Ohio	116
Oklahoma	14
Vermont	17
Ophthalmia neonatorum:	
Illinois	2
Mississippi	4
New York	10
Puerperal septicemia:	
Mississippi	40
Ohio	5
Rabies in animals:	
Alabama	15
Illinois	14
Indiana	46
Louisiana	9
Mississippi	10
New Mexico	6
New York [1]	10
Oklahoma	1
Vermont	1
Rabies in man:	
Alabama	1
Louisiana	1
Rocky Mountain spotted fever:	
Indiana	3
Kentucky	2
Maryland	2
Mississippi (August)	1
New York	2
Scabies: Oklahoma	2
Septic sore throat:	
Colorado	6
Idaho	1
Illinois	4
Kentucky	17
Louisiana	2
Maryland	14
Michigan	33
Minnesota	12
New Mexico	4
New York	158

	Cases
Septic sore throat—Con.	
Ohio	4
Oklahoma	42
Tetanus:	
Alabama	4
Illinois	10
Indiana	2
Louisiana	4
Maryland	3
Michigan	7
New York	14
Ohio	2
Oklahoma	1
Trachoma:	
Illinois	27
Indiana	9
Michigan	1
Mississippi	5
New Mexico	1
Ohio	13
Oklahoma	110
Trichinosis:	
Michigan	2
New York	6
Tularaemia:	
Alabama	1
District of Columbia	1
Illinois	5
Indiana	2
Kentucky	3
Louisiana	3
Minnesota	2
Typhus fever:	
Alabama	62
Louisiana	28
Mississippi	4
New York	4
Undulant fever:	
Alabama	6
Illinois	23
Indiana	3
Kentucky	4
Louisiana	6
Maryland	5
Michigan	11
Minnesota	7
Mississippi	3
Nebraska	1
New Mexico	1
New York	41
Ohio	10
Oklahoma	60
Vermont	2
Vincent's infection:	
Idaho	1
Illinois	19
Maryland	9
Michigan	9
New York [1]	59
Oklahoma	9
Whooping cough:	
Alabama	117
Colorado	89
District of Columbia	92
Idaho	6
Illinois	919
Indiana	260
Kentucky	188
Louisiana	71
Maryland	187
Michigan	579
Minnesota	320
Mississippi	373
Nebraska	18
New Mexico	108
New York	1,343
Ohio	620
Oklahoma	31
Vermont	121

[1] Exclusive of New York City.

PLAGUE INFECTION IN CALIFORNIA

IN FLEAS FROM GROUND SQUIRRELS IN ELDORADO COUNTY

Under date of October 16, 1939, Dr. W. M. Dickie, State Director of Public Health of California, reported plague infection proved, by animal inoculation, in a pool of 15 fleas from 13 golden mantled squirrels submitted to the laboratory on September 30 from property located at the west end of Emerald Bay, Eldorado County, Calif.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 14, 1939

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

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	192	82	24	217	422	701	4	340	60	910	------
Current week [1]	108	40	10	231	264	429	0	294	36	719	------
Maine:											
Portland	0	------	0	2	1	0	0	1	0	7	22
New Hampshire:											
Concord	0	------	0	1	1	0	0	0	0	0	14
Nashua	0	------	0	0	0	0	0	0	0	0	7
Vermont:											
Barre	0	------	0	0	0	0	0	0	0	0	1
Burlington	0	------	0	0	0	0	0	0	0	3	9
Rutland	0	------	0	0	0	0	0	0	0	0	1
Massachusetts:											
Boston	1	------	1	10	14	8	0	8	0	19	207
Fall River	1	------	0	0	0	0	0	2	1	1	31
Springfield	0	------	0	0	0	1	0	0	0	6	33
Worcester	0	------	0	0	0	1	0	1	0	4	40
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	17
Providence	0	------	0	7	0	2	0	3	0	5	53
Connecticut:											
Bridgeport	0	------	0	0	4	2	0	1	0	0	44
Hartford	0	------	0	0	1	0	0	3	0	29	30
New Haven	0	------	0	6	0	1	0	1	0	2	48
New York:											
Buffalo	0	------	0	4	2	4	0	2	0	4	103
New York	9	2	1	12	46	29	0	74	8	79	1,395
Rochester	0	1	0	1	0	0	0	2	1	1	48
Syracuse	0	------	0	0	2	4	0	0	0	14	53
New Jersey:											
Camden	0	------	0	0	1	6	0	1	0	0	25
Newark	0	1	0	4	3	11	0	3	0	21	91
Trenton	0	------	0	0	1	1	0	0	0	2	26
Pennsylvania:											
Philadelphia	2	1	1	5	14	14	0	17	1	60	413
Pittsburgh	3	1	2	3	15	21	0	10	0	10	183
Reading	0	------	0	0	3	0	0	2	0	0	27
Scranton	0	------	------	0	------	1	0	------	0	4	------
Ohio:											
Cincinnati	6	------	0	0	7	12	0	7	0	4	134
Cleveland	0	8	0	2	12	14	0	9	2	62	178
Columbus	11	------	0	0	1	5	0	1	0	1	70
Toledo	0	1	1	3	3	10	0	3	1	17	70
Indiana:											
Anderson	0	------	0	0	0	0	0	0	0	0	9
Fort Wayne	0	------	0	0	1	3	0	0	0	2	25
Indianapolis	1	------	0	3	4	12	0	4	0	18	90
Muncie	0	------	0	0	0	1	0	0	0	0	9
South Bend	0	------	0	0	2	0	0	0	0	2	19
Terre Haute	0	------	0	1	2	3	0	0	0	0	16

[1] Figures for Salt Lake City estimated; report not received.

City reports for week ended October 14, 1939—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								
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	0	10
Chicago	12	1	1	7	26	47	0	18	3	49	614
Elgin	0	------	0	0	0	3	0	0	0	1	13
Moline	0	------	0	0	0	1	0	0	0	2	9
Springfield	0	------	1	1	0	0	0	0	0	4	18
Michigan:											
Detroit	4	1	0	6	7	38	0	16	0	52	240
Flint	0	------	0	1	2	3	0	1	0	4	26
Grand Rapids	0	------	0	1	1	2	0	0	1	2	26
Wisconsin:											
Kenosha	0	------	0	0	0	3	0	0	0	1	5
Madison	0	------	0	0	1	0	0	0	0	9	21
Milwaukee	0	------	0	0	2	19	0	6	0	11	112
Racine	0	------	0	1	0	6	0	0	0	2	8
Superior	0	------	0	0	0	0	0	0	0	2	5
Minnesota:											
Duluth	0	------	0	1	2	0	0	0	0	2	26
Minneapolis	3	------	0	4	3	19	0	1	0	14	105
St. Paul	0	------	0	0	5	0	0	2	0	20	64
Iowa:											
Cedar Rapids	0	------	--------	1	-------	0	0	-------	0	3	--------
Davenport	0	------	--------	0	-------	4	0	-------	0	0	--------
Des Moines	0	------	0	1	0	14	0	0	0	0	29
Sioux City	0	------	--------	0	-------	0	0	-------	0	0	--------
Waterloo	1	------	--------	1	-------	1	0	-------	0	0	--------
Missouri:											
Kansas City	2	------	0	1	3	10	0	5	0	1	80
St. Joseph	0	------	0	1	1	2	0	0	0	0	23
St. Louis	1	------	0	2	2	11	0	4	2	13	174
North Dakota:											
Fargo	0	------	0	0	0	1	0	0	0	6	7
Grand Forks	0	------	--------	0	-------	1	0	-------	0	0	--------
Minot	0	------	0	0	0	0	0	0	0	0	5
South Dakota:											
Aberdeen	0	------	--------	0	-------	1	0	-------	0	0	--------
Sioux Falls	0	------	0	0	0	3	0	0	0	0	7
Nebraska:											
Lincoln	0	------	--------	0	-------	1	0	-------	0	1	--------
Omaha	1	------	0	0	3	1	0	4	1	1	45
Kansas:											
Lawrence	0	1	0	0	0	0	0	0	0	0	1
Topeka	0	------	0	0	0	1	0	0	0	0	2
Wichita	0	------	0	4	1	1	0	0	0	2	32
Delaware:											
Wilmington	0	------	0	0	0	0	0	0	0	1	24
Maryland:											
Baltimore	1	7	0	1	5	8	0	8	0	21	187
Cumberland	3	------	0	1	0	6	0	0	0	0	13
Frederick	0	------	0	0	0	0	0	0	0	0	2
Dist. of Col.:											
Washington	9	------	0	0	5	4	0	8	2	26	167
Virginia:											
Lynchburg	6	------	0	0	0	0	0	0	0	6	7
Norfolk	1	------	0	1	1	2	0	1	0	0	31
Richmond	0	------	0	0	4	1	0	2	1	0	45
Roanoke	0	------	0	0	0	1	0	0	0	0	18
West Virginia:											
Charleston	2	------	0	0	1	2	0	0	0	0	20
Huntington	3	------	--------	1	-------	0	0	-------	0	0	--------
Wheeling	0	------	0	1	1	1	0	1	1	11	22
North Carolina:											
Gastonia	1	------	--------	0	-------	0	1	-------	0	0	--------
Raleigh	2	------	0	0	1	0	0	0	0	0	10
Wilmington	0	------	0	0	1	0	0	0	0	1	15
Winston-Salem	0	------	0	1	0	1	0	0	0	0	12
South Carolina:											
Charleston	0	5	0	0	2	0	0	0	1	0	23
Florence	3	19	0	0	0	0	0	1	1	0	6
Greenville	1	------	0	0	0	0	0	0	0	0	5
Georgia:											
Atlanta	1	6	0	1	3	21	0	6	0	0	77
Brunswick	0	------	0	0	1	0	0	0	0	6	4
Savannah	3	------	0	0	1	6	0	1	0	0	40
Florida:											
Miami	0	------	0	1	0	1	0	3	0	0	30
Tampa	0	1	1	0	3	0	0	1	0	0	22

City reports for week ended October 14, 1939—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								
Kentucky:											
Ashland	0		0	0	0	1	0	0	0	0	4
Covington	0		0	0	0	6	0	1	0	0	11
Lexington	0		0	0	0	3	0	2	0	2	15
Tennessee:											
Knoxville	3		0	0	0	1	0	0	0	0	20
Memphis	0		0	1	1	7	0	4	1	14	80
Nashville	0		0	2	2	2	0	1	1	9	45
Alabama:											
Birmingham	1	1	0	1	1	3	0	4	0	0	68
Mobile	0		0	0	0	1	0	1	0	0	24
Montgomery	1			0		3	0		0	0	
Arkansas:											
Fort Smith	1			0		0	0		0	0	
Little Rock	1	1	0	0	2	0	0	1	0	0	
Louisiana:											
Lake Charles	2		0	0	0	0	0	0	0	0	5
New Orleans	5	1	1	0	9	0	0	6	2	46	123
Shreveport	0		0	0	3	2	0	2	0	0	30
Oklahoma:											
Oklahoma City	1	3		0	2	1	1	0	0	0	38
Tulsa	0			1		0	1		0	0	
Texas:											
Dallas	1		0	0	0	0	0	3	2	0	55
Fort Worth	0		0	0	3	1	0	2	1	2	37
Galveston	0		0	0	0	0	0	0	0	0	12
Houston	4		0	0	5	3	0	7	0	0	69
San Antonio	1		0	0	1	1	0	4	1	0	49
Montana:											
Billings	0		0	0	0	2	0	0	1	0	6
Great Falls	0		0	0	0	1	0	0	0	0	7
Helena	0		0	0	0	0	0	0	0	2	1
Missoula	0		0	0	0	0	0	0	0	0	2
Idaho:											
Boise	0		0	0	2	0	0	0	0	0	6
Colorado:											
Colorado Springs	0		0	0	1	1	0	0	0	1	8
Denver	2		1	4	4	4	0	1	1	8	78
Pueblo	4		0	0	1	3	0	1	0	0	10
Utah:											
Salt Lake City											
Washington:											
Seattle	0		0	7	1	3	0	4	0	0	71
Spokane	0		0	3	2	4	0	0	1	0	29
Tacoma	0		0	110	1	1	0	0	0	0	22
Oregon:											
Portland	0		0	4	0	7	0	1	0	3	77
Salem	0			0		0	0		0	0	
California:											
Los Angeles	4	2	0	5	2	20	0	12	0	13	258
Sacramento	1		0	0	0	1	0	0	0	0	23
San Francisco	0		0	2	4	2	0	7	1	5	140

City reports for week ended October 14, 1939—Continued

State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths	
Vermont:			
Burlington	0	0	3
Massachusetts:			
Fall River	0	0	1
Worcester	0	0	1
Connecticut:			
Bridgeport	0	1	2
New Haven	0	0	1
New York:			
Buffalo	0	0	16
New York	1	1	10
Rochester	0	0	4
New Jersey:			
Trenton	0	0	2
Pennsylvania:			
Philadelphia	0	0	10
Pittsburgh	2	0	3
Scranton	0	0	2
Ohio:			
Cincinnati	0	0	1
Indiana:			
Indianapolis	0	0	1
Illinois:			
Chicago	0	1	5
Michigan:			
Detroit	0	0	18
Flint	0	0	1
Grand Rapids	0	0	1
Minnesota:			
Duluth	0	0	2
Minneapolis	0	0	15
St. Paul	0	0	3
Iowa:			
Davenport	0	0	1
Des Moines	0	0	4
South Dakota:			
Aberdeen	0	0	1
Nebraska:			
Lincoln	0	0	1
Omaha	0	0	1
Maryland:			
Baltimore	0	0	2
West Virginia:			
Wheeling	1	0	0
Texas:			
Dallas	0	0	1
Fort Worth	0	0	2
Colorado:			
Pueblo	0	0	3
California:			
Los Angeles	0	0	7

Encephalitis, epidemic or lethargic.—Cases: New York, 2; Trenton, 1; Kansas City, Mo., 2; St. Louis, 2; Wichita, 2; Mobile, 1.

Pellagra.—Cases: Baltimore, 1; Charleston, S. C., 1; Florence, 4; Atlanta, 1; Los Angeles, 2.

Typhus fever.—Cases: Charleston, S. C., 1; Atlanta, 4; Savannah, 2; Tampa, 1; Nashville, 15; Mobile, 1; Montgomery, 2; New Orleans, 1; Dallas, 1; Fort Worth, 1; Houston, 1; Los Angeles, 2.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Weeks ended September 23 and 30, 1939.—During the weeks ended September 23 and 30, 1939, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Week ended Sept. 23, 1939

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1		2				1	4
Chickenpox				21	27	3	38	8	20	117
Diphtheria				38	3	2	11	3		57
Dysentery				10	1					11
Influenza		2			6				3	11
Measles		2		33	17	20		2	4	78
Mumps				7	26	4	2	2	5	46
Pneumonia		2			2		1		4	9
Poliomyelitis		1		8	17	2		5		33
Scarlet fever	10	5	5	79	59	15	17	12	9	211
Tuberculosis	1	27	14	116	51			1		210
Typhoid and paratyphoid fever			3	27	5		9	4	1	49
Whooping cough		36	7	113	75	30	37	2	7	307

Week ended Sept. 30, 1939

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1			1					2
Chickenpox		6		64	59	13	18	21	32	213
Diphtheria		1	5	57		12	15	2		92
Dysentery				6	1					7
Influenza		13			2				5	20
Lethargic encephalitis							1			1
Measles		1		16	20	9		1	28	75
Mumps				13	23	4	1	1	11	53
Pneumonia		1			8		1		4	14
Poliomyelitis				9	16	2				27
Scarlet fever		7	5	72	79	9	12	8	11	203
Tuberculosis	3	4	8	107	48	3	30			203
Typhoid and paratyphoid fever			3	23	5	5	1		2	39
Whooping cough		17		56	80	33	26	13	13	238

JAMAICA

Communicable diseases—4 weeks ended September 30, 1939.—During the 4 weeks ended September 30, 1939, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis	1		Puerperal sepsis		2
Chickenpox	5	4	Scarlet fever	1	
Diphtheria	3		Tuberculosis	29	77
Dysentery	1	2	Typhoid fever	11	112
Erysipelas		2			

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

NOTE.—A cumulative table giving current information regarding the world prevalence of quarantinable diseases for a six-month period appeared in the PUBLIC HEALTH REPORTS of October 27, 1939, pages 1950-1963. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Hamakua Mill Sector.—A rat found on September 25, 1939, in Hamakua Mill Sector, Hamakua District, Island of Hawaii, T. H., has been proved positive for plague.

United States—California—Eldorado County.—A report of plague infection in Eldorado County, Calif., appears on page 1999 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Colombia—Cartagena.—During the week ended October 7, 1939, 3 cases of smallpox were reported in Cartagena, Colombia.

Mexico.—During the month of July 1939, smallpox was reported in Mexico as follows: Mexico, D. F., 5 cases; Saltillo, Coahuila State, 7 cases; San Luis Potosi, San Luis Potosi State, 9 cases, 1 death.

Typhus Fever

Mexico.—For the month of July 1939, typhus fever was reported in Mexico as follows: Mexico, D. F., 31 cases, 5 deaths; Monterrey, Nuevo Leon State, 5 cases; Queretaro, Queretaro State, 1 case, 1 death; San Luis Potosi, San Luis Potosi State, 5 cases, 1 death.

Yellow Fever

Colombia—Antioquia Department—San Carlos.—For the week ended October 14, 1939, 1 death from yellow fever was reported in San Carlos, Antioquia Department, Colombia.

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