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FURTHER STUDY OF THE DURATION AND COST OF FEDERAL COMPENSATION CASES WITH DISEASE AS A COMPLICATING FACTOR

Cases Classified Into Accidental Injuries, Occupational Diseases, and Hernias¹

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INTRODUCTION

Analyses of compensation cases with reference essentially to duration and cost, and, in particular, analyses based on a classification of cases into those of accidental and nonaccidental origin, are of more than ordinary interest at the present time. The situation is thus, primarily, for the reason that the governing bodies of many States are confronted by the controversial question of whether a system of blanket or schedule coverage shall be adopted with respect to the compensation of injuries connected with occupational diseases. The Federal act providing for the compensation of the cases which form the subject matter of this inquiry was established in 1916 and has been continuously administered by the United States Employees' Compensation Commission. The act subscribes to blanket coverage in that the term *injury* as written into the act has been interpreted as including not only accidents as ordinarily defined, but also any bodily injury or disease due to the performance of duties and causing incapacity for work.

A previous paper (1), based on data made available by the United States Employees' Compensation Commission, dealt with the duration and cost of 1,337 compensation cases in which disease was a complicating factor. These cases occurring among civil employees of the United States Government were incomplete in the sense that they were still being compensated on December 31, 1935, and involved long-continued or permanent disability (both partial and total). In the present paper it is purposed to study the same collection of cases but with the use of a classification only casually introduced in the previous report, namely, a classification depending upon whether cases are of accidental or nonaccidental origin, the latter including those cases which involve what may be considered occupational diseases.

¹ From the Office of Industrial Hygiene and Sanitation, U. S. Public Health Service.

To familiarize the reader with the material, some of the results previously obtained are briefly summarized as follows: (1) Of the 1,337 incomplete cases with disease as a complicating factor, 71 per cent were partially disabled while the remainder were totally disabled. (2) Almost 50 percent of the cases were compensated for injuries that occurred 10 or more years ago. (3) The total duration of the cases amounted to nearly 2.7 million days and was approximately equally divided between the partially and totally disabled groups. (4) The total compensation paid was over 7 million dollars; the average compensation paid per case was \$5,343, and the estimated future cost of the cases was over 8 million dollars. (5) Regardless of the degree of disability, arthritis as a complicating factor easily ranked first with respect to the number of cases, total duration, and total compensation paid; general infections and tuberculosis ranked next as complicating factors. Particularly important in connection with the present paper is an additional finding; namely, of the 1,337 incomplete cases with disease as a complicating factor, 84 percent resulted from accidental injuries or were activated or aggravated by them; about 11 percent were of nonaccidental origin or involved what may be designated occupational diseases; and about 5 percent were accounted for by hernias.² The analyses to follow will be based on this classification, with emphasis principally on the relation of accidental to nonaccidental injuries with respect to severity of disability, duration, and cost. The relatively small number of hernias are included in the various tables for the sake of the completeness of the picture, and only occasionally will reference be made to them in the text.

With regard to the population exposed or the number of civil employees within the scope of the Compensation Act of 1916, it was estimated by the Commission that the number for a period of approximately 15 years prior to 1933 did not exceed 700,000. Since 1933 the number has increased to between 900,000 and 1,000,000.

Other pertinent information of an introductory and supplementary nature may be found in the recent paper to which reference has been previously made. Throughout the present paper it must be recognized that the data deal with incomplete cases in which disease is a complicating factor; *cases involving accidents only are not included.*

ANALYSIS OF THE DATA

Duration of cases and compensation paid.—The duration of the incomplete cases and the compensation paid, classified according to the kind of injury, are shown in table 1. The table, indicating the nature of the available material, is specific for the degree of severity

² "Hernia is, technically and medically speaking, a disease, but since it is usually compensated only as an accidental traumatic injury, it is an open question how it should be classified. It seems best to isolate it entirely in the list." (c)

of disability, and the injuries are classified into accidental injuries, occupational diseases, and hernias. Regardless of the degree of disability, the percentages for the three categories, accidental injuries, occupational diseases, and hernias, with respect to the total number of cases, total duration, and total compensation, are similar within each category. Thus, accidental injuries accounted for 84 percent of all cases, 81 percent of the total duration of all cases, and 80 percent of the total compensation paid for all cases; for occupational diseases the corresponding percentages are 11, 14, and 15, and for hernias, 5, 6, and 5. Infectious diseases accounted for approximately one-half of the occupational diseases, less than one-half of their total duration, and more than one-third of the compensation paid for them. A total of 69 (92 percent) of the 75 cases of infectious disease is associated with tuberculosis. Considering all 1,337 cases, the average compensation paid per case is \$5,343. The highest averages are \$9,432 and \$9,287 paid for cases involving fatigue, strain, posture, *and* lighting, and temperature, moisture, *and* air pressure, respectively. About one-half of the 30 cases constituting the former classification were equally divided between cases associated with tuberculosis and eye affections, while approximately two-thirds of the 30 cases of the temperature, moisture, and air-pressure group were associated with tuberculosis. The average compensation paid per case of occupational disease is \$6,964, which is 36 percent greater than the average for accidental injuries and 30 percent greater than the average for all 1,337 cases.

Details not given in table 1 but concerning the complicating agent associated with the groups entering the classification used are of sufficient importance to be included here. Only those complicating agents will be noticed that are associated with 10 or more percent of the cases of a particular category. Of the 825 cases representing diseases resulting from accidental injuries, 196 (24 percent) are accounted for by arthritis, 154 (19 percent) by general infections, 98 (12 percent) by bone infections, 97 (12 percent) by eye cases materially aggravated by infections, and 83 (10 percent) by neuroses. Of the 293 cases under diseases activated or aggravated by accidental injuries, 120 (41 percent) are accounted for by arthritis, 59 (20 percent) by venereal diseases, and 28 (10 percent) by tuberculosis. Of the 16 cases representing dusts, gases, and chemicals, 5 are associated with lead and 4 with tuberculosis.

Table 1 shows, moreover, that the partially disabled include 953 cases, or 71 percent of the total; those totally disabled include 384 cases, or 29 percent. The total duration of cases and the total compensation paid for all cases, respectively, are, however, similar in magnitude for both groups of disability. The average compensation paid per partially disabled case is generally less than the average paid

TABLE 1.—Incomplete cases with disease as a complicating factor as of Dec. 31, 1935: Number of cases, duration, and compensation paid, classified according to kind of injury

Kind of injury	Cases		Duration in days to Dec. 31, 1935		Compensation to Dec. 31, 1935			
	Number	Per cent	Number	Per cent	Amount	Per cent	Average per case	Average per case divided by average for all cases
Partial and total disability								
Total.....	1,337	100.0	2,685,684	100.0	\$7,143,884	100.0	\$5,343	1.0
Accidental injuries.....	1,118	83.7	2,171,044	80.8	5,706,851	79.9	5,105	1.0
Diseases resulting from accidental injuries.....	825	61.8	1,584,842	59.0	4,202,979	58.8	5,095	1.0
Diseases activated or aggravated by accidental injuries.....	293	21.9	586,202	21.8	1,503,872	21.1	5,133	1.0
Occupational diseases.....	151	11.2	367,355	13.7	1,051,505	14.7	6,964	1.3
Infectious diseases.....	75	5.6	141,669	5.3	394,227	5.5	5,256	1.0
Fatigue, strain, posture, lighting.....	30	2.2	96,546	3.6	282,957	4.0	9,432	1.8
Temperature, moisture, air pressure.....	30	2.2	96,997	3.6	278,608	3.9	9,287	1.7
Dusts, gases, chemicals.....	16	1.2	32,143	1.2	95,718	1.3	5,982	1.1
Hernias.....	68	5.1	147,185	5.5	385,528	5.4	5,670	1.1
Partial disability								
Total.....	953	100.0	1,383,623	100.0	\$3,822,558	100.0	\$4,011	0.8
Accidental injuries.....	836	87.7	1,219,181	88.1	3,334,731	87.2	3,989	.7
Diseases resulting from accidental injuries.....	637	66.8	941,856	68.1	2,604,505	68.1	4,069	.8
Diseases activated or aggravated by accidental injuries.....	199	20.9	277,325	20.0	730,226	19.1	3,669	.7
Occupational diseases.....	71	7.5	109,246	7.9	325,869	8.6	4,590	.9
Infectious diseases.....	40	4.2	48,352	3.5	133,502	3.5	3,338	.6
Fatigue, strain, posture, lighting.....	12	1.3	31,712	2.3	94,782	2.5	7,898	1.5
Temperature, moisture, air pressure.....	9	.9	17,253	1.2	55,011	1.5	6,112	1.1
Dusts, gases, chemicals.....	10	1.1	11,929	.9	42,574	1.1	4,257	.8
Hernias.....	46	4.8	55,196	4.0	161,958	4.2	3,521	.7
Total disability								
Total.....	384	100.0	1,301,961	100.0	\$3,321,326	100.0	\$8,649	1.6
Accidental injuries.....	282	73.4	951,863	73.1	2,372,120	71.4	8,412	1.6
Diseases resulting from accidental injuries.....	188	48.9	642,986	49.4	1,598,474	48.1	8,503	1.6
Diseases activated or aggravated by accidental injuries.....	94	24.5	308,877	23.7	773,646	23.3	8,230	1.5
Occupational diseases.....	80	20.9	258,109	19.8	725,636	21.9	9,070	1.7
Infectious diseases.....	35	9.1	93,317	7.2	260,725	7.9	7,449	1.4
Fatigue, strain, posture, lighting.....	18	4.7	64,834	5.0	188,175	5.7	10,454	2.0
Temperature, moisture, air pressure.....	21	5.5	79,744	6.1	223,597	6.7	10,647	2.0
Dusts, gases, chemicals.....	6	1.6	20,214	1.5	53,139	1.6	8,856	1.7
Hernias.....	22	5.7	91,989	7.1	223,570	6.7	10,162	1.9

for all 1,337 cases; the average compensation per totally disabled case, on the other hand, is between 1.5 and 2 times the average paid for all cases. While the occupational diseases accounted for approximately 8 percent of the number, total duration, and total cost, respectively, of the partially disabled cases, the corresponding percentage for the totally disabled cases is more than twice as great, namely about 20 percent; for the accidental injuries, the corresponding difference is of a smaller order of magnitude but in the opposite direction. For the partially and totally disabled groups, respectively, the average compensation paid per case of occupational disease is 15 and 8 percent greater than the corresponding average paid for accidental injuries.

Quinquennium in which injury occurred.—Table 2 shows the three categories, accidental injuries, occupational diseases, and hernias, of

TABLE 2.—*Incomplete cases with disease as a complicating factor as of Dec. 31, 1935: Accidental injuries, occupational diseases, and hernias, classified according to quinquennium of occurrence*

Kind of injury and quinquennium in which it occurred	Partial and total disability		Partial disability		Total disability	
	Number	Percent	Number	Percent	Number	Percent
Total						
Total.....	1,337	100.0	953	100.0	384	100.0
Before 1916.....	4	.3	0	0	4	1.0
1916-20.....	293	21.9	188	19.7	105	27.4
1921-25.....	337	25.3	219	23.1	118	30.8
1926-30.....	423	31.6	310	32.5	113	29.4
1931-35.....	280	20.9	236	24.7	44	11.4
Accidental injuries						
Total.....	1,118	100.0	836	100.0	282	100.0
Before 1916.....	3	.3	0	0	3	1.1
1916-20.....	247	22.0	170	20.3	77	27.3
1921-25.....	288	25.8	196	23.5	92	32.6
1926-30.....	356	31.8	277	33.1	79	28.0
1931-35.....	224	20.1	193	23.1	31	11.0
Occupational diseases						
Total.....	151	100.0	71	100.0	80	100.0
Before 1916.....	1	0.7	0	0	1	1.2
1916-20.....	22	14.5	7	9.8	15	18.7
1921-25.....	32	21.2	10	14.1	22	27.5
1926-30.....	48	31.8	18	25.3	30	37.6
1931-35.....	48	31.8	36	50.8	12	15.0
Hernias						
Total.....	68	100.0	46	100.0	22	100.0
Before 1916.....	0	0	0	0	0	0
1916-20.....	24	35.3	11	23.9	13	59.0
1921-25.....	17	25.0	13	28.2	4	18.2
1926-30.....	19	28.0	15	32.7	4	18.2
1931-35.....	8	11.7	7	15.2	1	4.6

different degrees of severity, classified according to the quinquennium in which the disability occurred. Regardless of the severity of disability, the percentage distribution of cases among the four 5-year periods in each of the three categories is obviously different. About one-half of the accidental injuries, 63 percent of the occupational diseases, and 40 percent of the hernias, respectively, were being compensated on December 31, 1935, for injuries that occurred less than 10 years ago. With respect to partial disability, the corresponding percentages for the three categories are 56, 76, and 48, while the cor-

TABLE 3.—*Incomplete cases with disease as a complicating factor as of Dec. 31, 1935: Accidental injuries and occupational diseases classified according to nature of injury*

Nature of injury	Partial and total disability		Partial disability		Total disability	
	Number	Percent	Number	Percent	Number	Percent
Total, inclusive of hernias						
Total.....	1,337	100.0	953	100.0	384	100.0
Fracture.....	507	37.9	398	41.7	109	28.4
Sprain, strain.....	207	15.5	155	16.2	52	13.5
Bruise, contusion, abrasion, blister.....	162	12.1	113	11.9	49	12.8
Cut, laceration.....	74	5.5	70	7.3	4	1.0
Puncture.....	56	4.2	42	4.4	14	3.6
Burn, scald.....	28	2.1	17	1.8	11	2.9
Concussion.....	28	2.1	12	1.3	16	4.2
Amputation.....	17	1.3	16	1.7	1	.3
Dislocation.....	14	1.0	13	1.4	1	.3
Miscellaneous.....	244	18.3	117	12.3	127	33.0
Accidental injuries						
Total.....	1,118	100.0	836	100.0	282	100.0
Fracture.....	503	45.0	394	47.1	109	38.6
Sprain, strain.....	135	12.1	108	12.9	27	9.6
Bruise, contusion, abrasion, blister.....	161	14.4	113	13.5	48	17.0
Cut, laceration.....	74	6.6	70	8.4	4	1.4
Puncture.....	55	4.9	42	5.0	13	4.6
Burn, scald.....	25	2.2	16	1.9	9	3.2
Concussion.....	28	2.5	12	1.5	16	5.7
Amputation.....	17	1.5	16	1.9	1	.4
Dislocation.....	14	1.3	13	1.6	1	.4
Miscellaneous.....	106	9.5	52	6.2	54	19.1
Occupational diseases						
Total.....	151	100.0	71	100.0	80	100.0
Fracture.....	1	.7	1	1.4	0	0
Sprain, strain.....	12	7.9	6	8.5	6	7.5
Bruise, contusion, abrasion, blister.....	1	.7	0	0	1	1.2
Cut, laceration.....	0	0	0	0	0	0
Puncture.....	1	.6	0	0	1	1.3
Burn, scald.....	3	2.0	1	1.4	2	2.5
Concussion.....	0	0	0	0	0	0
Amputation.....	0	0	0	0	0	0
Dislocation.....	0	0	0	0	0	0
Miscellaneous.....	133	88.1	63	88.7	70	87.5

1 Includes 46 cases of hernia.

2 Includes 22 cases of hernia.

3 Includes 100 cases associated with tuberculosis, 23 with the eye, and 22 with general infections.

4 Includes 22 cases associated with general infections and 20 cases associated with the eye.

5 Includes 99 cases associated with tuberculosis.

responding figures for total disability are 39, 53, and 23. The category of occupational diseases is the only one having the majority of its cases, with respect to either partial or total disability, occurring less than 10 years ago.

Nature of injury.—The distribution of the incomplete cases constituting accidental injuries and occupational diseases, according to the nature of the injury, is given in table 3. The category "hernias" has been omitted for obvious reasons. Fractures, bruises, and sprains account for 45, 14, and 12 percent, respectively, of the accidental injuries, the same order with approximately the same order of magnitude holding for the partially disabled as well as the totally disabled cases.

Of the occupational diseases, 133 cases (88 percent) are included in a miscellaneous group, the majority, 74 percent, being associated with tuberculosis.

Anatomical location of injury.—In table 4 the incomplete cases are classified according to the anatomical location of the injury. Hernias have been again omitted for obvious reasons. The percentage distributions concerned with the severity of disability resulting from accidental injuries are remarkably different. Considering those regions that are associated with 10 or more percent of the cases, the partial-disability cases lead with the lower extremities and are followed in order of magnitude by the trunk, upper extremities, head, and hand, while the total-disability cases lead with the head and are followed by the trunk and lower extremities. Thirty-eight percent of the partial-disability cases are associated with the lower extremities, while 35 percent of the total disability cases are associated with the head. The occupational diseases, on the other hand, are primarily associated with the trunk in each disability group.

Duration of cases, compensation paid, and estimated future cost by quinquennium of occurrence of injury.—Table 5 shows for the three categories—accidental injuries, occupational diseases, and hernias—the duration of the cases, the compensation paid, and the estimated future cost, classified according to the quinquennium in which the injury occurred. Data on hernias are included for the sake of completeness.

The percentage distributions of the cases were referred to previously under table 2. Regardless of the degree of severity, it will be observed (table 5) that in connection with accidental injuries approximately one-third of the total duration and total compensation paid, respectively, are accounted for by injuries that occurred less than 10 years ago; for occupational diseases the corresponding fraction is nearer one-half. With respect to the estimated future cost, injuries that occurred less than 10 years ago account for approximately one-half of the total associated with accidental injuries, and nearly 60 percent

of the total associated with occupational diseases. Thus, in all three instances, duration, compensation paid, and future cost, the percentages for the occupational diseases are sensibly greater than the corresponding ones for the accidental injuries.

With regard to partial disability connected with accidental injuries, approximately 40 percent of the total duration and total compensation paid, respectively, are accounted for by injuries that occurred less than 10 years ago. The corresponding percentage for occupational diseases is 55. With respect to the estimated future cost, injuries that occurred less than 10 years ago account for 55 percent of the total associated with accidental injuries, and for 62 percent of the total estimated for the occupational diseases. The corresponding picture presented by the cases involving total disability is clearly

TABLE 4.—*Incomplete cases with disease as a complicating factor as of December 31, 1935: Accidental injuries and occupational diseases classified according to anatomical region affected*

Anatomical region affected	Partial and total disability		Partial disability		Total disability	
	Number	Percent	Number	Percent	Number	Percent
Total, inclusive of hernias						
Total.....	1,337	100.0	1,953	100.0	2,384	100.0
Trunk.....	399	29.9	249	26.1	150	39.1
Lower extremities.....	377	28.2	319	33.5	58	15.1
Head.....	238	17.8	128	13.4	110	28.6
Upper extremities.....	153	11.4	135	14.2	18	4.7
Hand.....	111	8.3	103	10.8	8	2.1
Multiple regions.....	37	2.8	10	1.1	27	7.0
Face and neck.....	4	.3	2	.2	2	.5
Miscellaneous.....	18	1.3	7	.7	11	2.9
Accidental injuries						
Total.....	1,118	100.0	836	100.0	282	100.0
Trunk.....	229	20.5	151	18.1	78	27.7
Lower extremities.....	371	33.2	316	37.8	55	19.5
Head.....	223	19.9	124	14.8	99	35.1
Upper extremities.....	151	13.5	135	16.2	16	5.7
Hand.....	104	9.3	98	11.7	6	2.1
Multiple regions.....	32	2.8	9	1.1	23	8.1
Face and neck.....	4	.4	2	.2	2	.7
Miscellaneous.....	4	.4	1	.1	3	1.1
Occupational diseases						
Total.....	151	100.0	71	100.0	80	100.0
Trunk.....	105	69.6	53	74.7	52	65.0
Lower extremities.....	6	4.0	3	4.2	3	3.7
Head.....	15	9.9	4	5.6	11	13.8
Upper extremities.....	2	1.3	0	0	2	2.5
Hand.....	7	4.6	5	7.0	2	2.5
Multiple regions.....	3	2.0	1	1.4	2	2.5
Face and neck.....	0	0	0	0	0	0
Miscellaneous.....	13	8.6	5	7.1	8	10.0

¹ Includes 46 cases of hernia.

² Includes 22 cases of hernia.

different. While the percentages with respect to duration, compensation, and future cost, respectively, are larger for the occupational diseases than the corresponding ones for the accidental injuries, whether or not the cases are specific for degree of disability, the percentages for total disability are lower, and considerably lower in most instances, than the corresponding percentages for partial disability in the same category of injury.

Cases of different quinquennia: Number, duration, compensation paid, and estimated future cost, by kind of injury.—The previous table presented data specific for degree of severity on the duration, compensation paid, and estimated future cost, for the cases of each of the three categories, accidental injuries, occupational diseases, and hernias, classified according to the quinquennium in which the injury occurred. This arrangement of the material made it possible to show within each category, specific for degree of severity, the distribution of the cases with respect to duration, compensation paid, and estimated future cost, respectively, according to the quinquennium of occurrence of the injury, and to make intercategory comparisons of these distributions as well as comparisons of them within a particular category.

A number of pertinent questions now logically arise. They may be briefly stated as follows:—Of the incomplete cases with disease as a complicating factor that arose in a particular quinquennium, what proportion was accounted for by accidental injuries, occupational diseases, and hernias, respectively? What proportion of the total duration, compensation paid, and estimated future cost, respectively, associated with cases arising in a particular quinquennium was accounted for by accidental injuries, occupational diseases, and hernias, respectively? In other words, what are the time changes in the percentage distribution of accidental injuries, occupational diseases, and hernias, with respect to number of cases, duration, compensation paid, and estimated future cost, respectively?

To facilitate the investigation of the questions raised, the data have been reclassified as shown in table 6, with the cases involving partial and total disability, respectively, combined within each category. It will be observed that the percentage of cases in each of the four quinquennia associated with accidental injuries is approximately constant, varying from 80 to 85 percent. Thus, of all of the incomplete cases with disease as a complicating factor that originated in a particular quinquennium, approximately the same proportion in each quinquennium involved accidental injuries. Occupational diseases, on the other hand, show increasing percentages from 8 percent in 1916–20 to 17 percent in 1931–35, the percentage for 1931–35 being about 50 percent greater than the corresponding one for 1926–30. The percentages for hernias gradually decrease from 8 to 3 percent.

TABLE 5.—Incomplete cases with disease as a complicating factor as of Dec. 31, 1935: Accidental injuries, occupational diseases, and hernias; duration of cases, compensation paid, and estimated future cost, classified according to quinquennium of occurrence of the injury

Quinquennium in which injury occurred	Partial and total disability						Partial disability						Total disability								
	Duration in days to Dec. 31, 1935			Compensation to Dec. 31, 1935			Estimated future cost			Duration in days to Dec. 31, 1935			Compensation to Dec. 31, 1935			Estimated future cost					
	Num-ber of cases	Per-cent	Amount	Per-cent	Amount	Per-cent	Num-ber of cases	Per-cent	Amount	Per-cent	Amount	Per-cent	Num-ber of cases	Per-cent	Amount	Per-cent	Amount	Per-cent			
																			Num-ber	Per-cent	Amount
TOTAL																					
Total.....	1,337	2,685,584	100.0	\$7,143,884	100.0	\$3,221,841	100.0	933	1,383,623	100.0	\$3,822,558	100.0	\$3,030,865	100.0	384	1,301,961	100.0	\$3,321,323	100.0	\$5,190,976	100.0
Before 1916.....	4	9,604	4	19,748	3	37,209	4	0	0	0	0	0	0	0	4	9,604	7	19,748	6	37,209	7
1916-20.....	293	938,058	34.8	2,374,780	33.2	1,724,595	21.0	188	429,152	30.9	1,125,776	29.4	602,778	19.9	105	508,908	30.1	1,249,004	37.6	1,121,817	21.6
1921-25.....	337	868,981	32.0	2,253,653	31.6	2,164,614	26.3	219	403,994	29.2	1,137,328	29.7	757,335	25.0	118	454,987	35.0	1,116,325	33.6	1,407,279	27.1
1926-30.....	423	662,512	24.7	1,914,065	26.8	2,752,840	33.5	310	391,802	28.4	1,139,024	29.8	896,220	30.8	113	270,710	20.8	775,041	23.4	1,816,620	35.0
1931-35.....	280	216,429	8.1	681,638	8.2	1,542,563	18.8	236	158,675	11.6	420,430	11.1	734,532	24.3	44	57,764	4.4	161,208	4.8	808,051	15.6
ACCIDENTAL INJURIES																					
Total.....	1,118	2,171,044	100.0	\$5,706,851	100.0	\$3,191,787	100.0	836	1,219,181	100.0	\$3,334,731	100.0	\$2,586,887	100.0	282	951,863	100.0	\$2,372,120	100.0	\$3,594,950	100.0
Before 1916.....	3	7,702	4	14,469	3	29,621	5	0	0	0	0	0	0	0	3	7,702	8	14,469	6	29,621	8
1916-20.....	247	755,825	34.9	1,875,712	32.9	1,295,852	20.8	170	388,290	31.9	995,944	30.0	516,404	20.5	8	367,587	38.6	883,373	37.3	779,448	21.6
1921-25.....	268	711,035	32.8	1,963,764	32.9	1,684,624	27.2	196	359,128	29.4	1,011,330	30.4	663,350	25.5	92	351,907	37.0	852,458	35.9	1,021,274	28.4
1926-30.....	356	530,925	24.4	1,509,505	26.4	2,020,787	32.7	277	345,370	28.4	904,038	29.7	814,040	31.3	79	185,555	19.5	515,417	21.7	1,206,727	33.6
1931-35.....	224	165,516	7.5	436,396	7.7	1,160,923	18.8	193	126,384	10.3	330,393	9.9	603,043	23.3	31	38,132	4.1	106,003	4.5	557,880	15.6
OCCUPATIONAL DISEASES																					
Total.....	151	367,355	100.0	\$1,051,505	100.0	\$1,726,718	100.0	71	109,246	100.0	\$325,869	100.0	\$321,127	100.0	80	283,109	100.0	\$725,636	100.0	\$1,406,591	100.0
Before 1916.....	1	1,902	5	5,270	5	7,588	4	0	0	0	0	0	0	0	1	1,902	7	5,270	7	7,588	5
1916-20.....	22	96,825	26.9	275,712	26.2	270,279	15.7	7	21,020	19.2	68,924	21.5	50,182	15.7	15	77,805	30.1	205,788	28.4	220,097	15.7
1921-25.....	32	113,550	31.0	308,696	29.4	442,644	25.7	10	27,772	25.4	71,120	22.1	71,120	22.1	22	55,778	33.3	231,172	31.9	371,624	26.4
1926-30.....	48	107,024	29.1	329,840	31.3	640,932	37.0	18	31,405	28.6	93,367	30.2	80,959	25.2	30	75,619	29.3	231,473	31.8	559,973	39.9
1931-35.....	48	46,054	12.5	131,978	12.6	365,275	21.2	36	29,049	26.6	80,064	24.5	118,866	37.0	12	17,005	6.6	51,924	7.2	248,409	17.5

HERNIAS

Total-----	68	147,186	100.0	\$885,628	100.0	\$308,336	100.0	46	55,196	100.0	\$181,969	100.0	\$112,901	100.0	22	91,989	100.0	\$222,570	100.0	\$190,435	100.0
Before 1916----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1916-20-----	24	83,307	56.7	216,351	56.1	168,404	52.2	11	19,833	35.9	56,908	36.1	36,192	32.0	13	63,534	69.1	159,443	71.3	122,272	64.2
1921-25-----	17	34,396	23.3	81,193	21.2	37,340	12.4	13	17,094	31.0	48,498	29.0	22,865	20.4	4	17,302	18.7	32,695	14.6	14,481	7.6
1926-30-----	19	24,563	16.7	74,720	19.3	91,141	30.0	15	15,027	27.2	46,599	28.8	41,221	36.4	4	9,536	10.4	28,151	12.6	49,920	26.2
1931-35-----	8	4,859	3.3	13,234	3.4	16,335	5.4	7	3,242	5.9	9,983	6.2	12,623	11.2	1	1,617	1.8	3,281	1.5	3,762	2.0

TABLE 6.—Incomplete cases with disease as a complicating factor as of Dec. 31, 1935: Cases of different quinquennia; number of cases, duration, compensation paid, and estimated future cost, classified according to kind of injury

Kind of injury	Cases		Duration in days to Dec. 31, 1935		Compensation to Dec. 31, 1935		Estimated future cost	
	Number	Per cent	Number	Per cent	Amount	Per cent	Amount	Per cent
Total, 1916-35								
Total.....	1,333	100.00	2,675,980	100.00	\$7,124,136	100.00	\$8,184,632	100.00
Accidental injuries.....	1,115	83.65	2,163,342	80.84	5,692,382	79.90	6,162,166	75.29
Occupational diseases.....	150	11.25	365,453	13.66	1,046,226	14.69	1,719,130	21.00
Hernias.....	68	5.10	147,185	5.50	385,528	5.41	303,336	3.71
1916-20								
Total.....	293	100.00	938,056	100.00	\$2,374,780	100.00	\$1,724,595	100.00
Accidental injuries.....	247	84.30	755,866	80.58	1,882,717	79.28	1,295,852	75.14
Occupational diseases.....	22	7.51	96,825	10.53	275,712	11.61	270,279	15.67
Hernias.....	24	8.19	83,367	8.89	216,351	9.11	158,464	9.19
1921-25								
Total.....	337	100.00	858,961	100.00	\$2,253,653	100.00	\$2,164,614	100.00
Accidental injuries.....	288	85.46	711,035	82.78	1,863,764	82.70	1,684,624	77.83
Occupational diseases.....	32	9.50	113,550	13.22	306,696	13.70	442,644	20.45
Hernias.....	17	5.04	34,396	4.00	81,193	3.60	37,346	1.72
1926-30								
Total.....	423	100.00	662,512	100.00	\$1,914,065	100.00	\$2,752,840	100.00
Accidental injuries.....	356	84.16	530,925	80.14	1,509,505	78.87	2,020,767	73.41
Occupational diseases.....	48	11.35	107,024	16.15	329,840	17.23	640,932	23.28
Hernias.....	19	4.49	24,563	3.71	74,720	3.90	91,141	3.31
1931-35								
Total.....	280	100.00	216,429	100.00	\$581,638	100.00	\$1,542,583	100.00
Accidental injuries.....	224	80.00	165,516	76.48	436,396	75.03	1,160,923	75.26
Occupational diseases.....	48	17.14	46,064	21.28	131,978	22.69	365,275	23.68
Hernias.....	8	2.86	4,859	2.24	13,264	2.28	16,385	1.06

¹ Excludes 4 cases involving injuries which occurred prior to 1916.

With respect to duration, approximately 80 percent of the total duration of all cases specific for quinquennium of origin are accounted for by accidental injuries. The percentages for occupational diseases gradually increase from 11 to 21 percent, and for hernias there is a gradual decrease from 9 to 2 percent.

Accidental injuries claimed from 75 to 83 percent of the total compensation paid for all injuries occurring in specific quinquennia. For occupational diseases the corresponding percentages increase from 12 percent for 1916-20 to a percentage for 1931-35 almost again as large,

namely, 23 percent. Hernias show percentages declining from 9 to 2 percent.

The percentage of the estimated future cost of all injuries occurring in particular quinquennia is approximately constant for accidental injuries, varying in magnitude from 73 to 78 percent. The corresponding percentages for occupational diseases increase from 16 to 24 percent, while hernias fluctuate from 9 to 1 percent.

The data upon which the foregoing remarks are based are shown graphically in figure 1. All of the data involve cases that are incom-

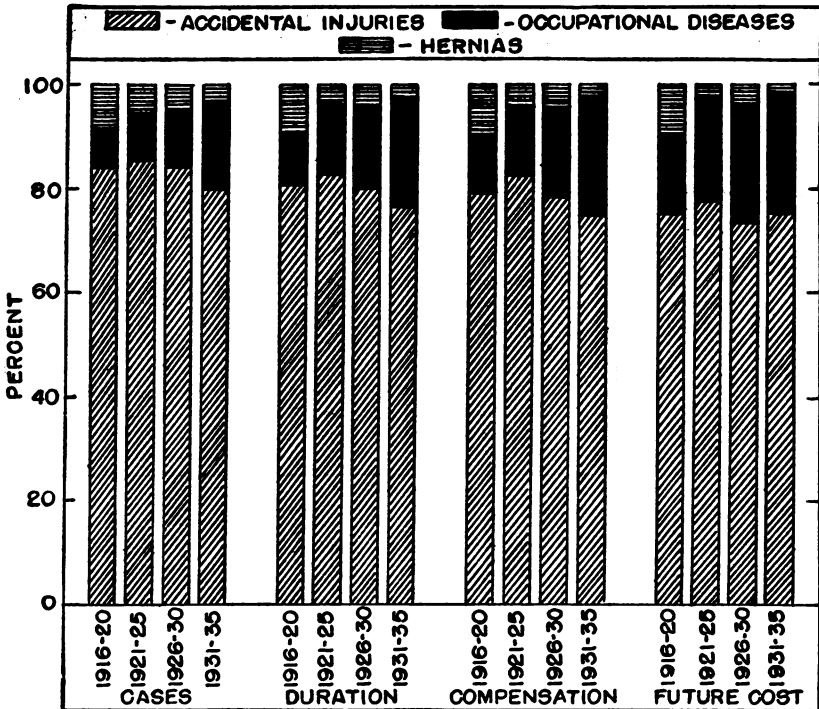


FIGURE 1.—Percentage distribution of the number of cases, duration, compensation paid, and estimated future cost, respectively, according to kind of injury by quinquennium of occurrence of injury. Percentage distributions of the number of cases, duration, compensation paid, and estimated future cost, respectively, grouped for all quinquennia. N. B. All cases are incomplete as of December 31, 1935, and involve disease as a complicating factor.

plete as of December 31, 1935, and disease is present in each case as a complicating factor.

To show the relation existing among cases, duration, compensation paid, and estimated future cost, for each quinquennium, the bars of figure 1 have been reordered with results as shown in figure 2. Of importance is the fact that for each quinquennium the category embracing the occupational diseases is the only one with percentages that gradually increase when the percentage distributions of cases, duration, compensation paid, and estimated future cost are succes-

sively observed. Indeed, with the exception of 1931-35, each of the quinquennia shows percentages for estimated future cost that are at least twice as large as the percentages for number of cases; the quinquennium 1931-35 shows an increase of approximately 40 percent. Thus, for the quinquennium 1916-20, the percentages increase from

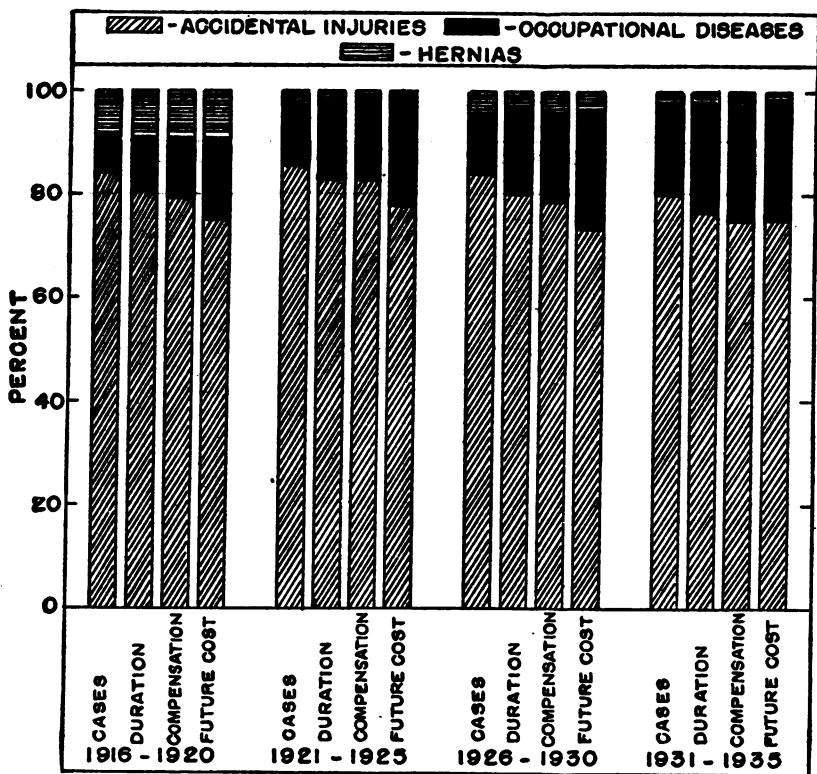


FIGURE 2.—Percentage distribution of the number of cases, duration, compensation paid, and estimated future cost, respectively, according to kind of injury by quinquennium of occurrence of injury. Percentage distributions of the number of cases, duration, compensation paid, and estimated future cost, grouped by quinquennium of occurrence of injury. N. B. All cases are incomplete as of December 31, 1935, and involve disease as a complicating factor.

8 to 16 percent; for 1921-25, from 10 to 20 percent; for 1926-30, from 11 to 23 percent; and for 1931-35, from 17 to 24 percent.

SUMMARY

This paper deals with the duration and cost of 1,337 incomplete cases in which disease is a complicating factor, the cases being classified into accidental injuries, occupational diseases, and hernias. The cases occurred among civil employees of the United States Government, and are incomplete in the sense that they were still being compensated on December 31, 1935. The disability involved is long-continued or permanent, both partial and total.

The Federal act providing for this compensation was approved in 1916 and has been administered by the United States Employees' Compensation Commission. The estimated number of employees within the scope of the act for a period approximately 15 years prior to 1933 did not exceed 700,000. Since 1933 the number has increased to between 900,000 and 1,000,000.

The various percentages given below, and associated, for example, with occupational diseases, are based on incomplete cases with disease as a complicating factor; had the study also included cases with no disease, the percentages, obviously, would have been lower than those given.

A recent report (1) based on the present collection of cases offers material of an introductory as well as of a supplementary nature.

The results of the analyses may be summarized as follows:

(1) Accidental injuries accounted for 84 percent of the cases, 81 percent of the total duration of all cases, 80 percent of the total compensation paid, and 75 percent of the estimated future cost; for the occupational diseases the corresponding percentages are 11, 14, 15, and 21, and for hernias, 5, 6, 5, and 4.

(2) Infectious diseases, principally tuberculosis, accounted for approximately one-half the occupational diseases, less than one-half of their total duration, and more than one-third of the compensation paid for them.

(3) The average compensation paid per case of occupational disease was \$6,964, which is 36 percent greater than the average paid for accidental injuries and 30 percent greater than the average, \$5,343, for all 1,337 cases.

(4) Of the total number of cases, 71 percent were partially disabled; the remainder were totally disabled. While the occupational diseases accounted for approximately 8 percent of the number, total duration, and total cost, respectively, of the partially disabled cases, the corresponding percentage for the totally disabled cases was more than twice as great; for the accidental injuries, the corresponding difference was of a smaller order of magnitude but in the opposite direction.

(5) About one-half of the accidental injuries, 63 percent of the occupational diseases, and 40 percent of the hernias, respectively, were being compensated on December 31, 1935, for injuries that occurred less than 10 years ago.

(6) Fractures, bruises, and sprains accounted for 45, 14, and 12 percent, respectively, of the accidental injuries.

(7) Of the accidental injuries resulting in partial disability, 38 percent were associated with the lower extremities; of those resulting in total disability, 35 percent were associated with the head. The occupational diseases were primarily associated with the trunk in each disability group.

(8) The percentage of cases originating in each of the 4 quinquennia between 1916 and 1935 due to accidental injuries varied between 80 and 85 percent; for occupational diseases the percentages increased from 8 percent in 1916-20 to 17 percent in 1931-35.

ACKNOWLEDGMENTS

The author is indebted to Chairman Jewell W. Swofford, of the United States Employees' Compensation Commission, for making possible the preparation of this paper, to Dr. F. M. Phillips for providing the basic data, and to Secretary William McCauley for helpful interpretations.

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STUDIES IN CHEMOTHERAPY

II. CHEMOTHERAPY OF EXPERIMENTAL PNEUMOCOCCUS INFECTIONS

By SANFORD M. ROSENTHAL, *Senior Pharmacologist, National Institute of Health, United States Public Health Service*

In 1934 it was found (1) that formaldehyde sulphoxylate was capable of curing mice infected with a strain of type I pneumococcus (NIH strain). Although highly effective on this strain, negative results were obtained with all other cultures tested. Many strains (types I to XXXII) were studied with negative results.

An analysis of the action of sulphoxylate *on the susceptible strain* (NIH type I) has shown the following:

(1) The action is highly specific. A large number of other compounds, either chemically related or possessing a reducing action, were found devoid of chemotherapeutic effect. Dr. Raymond M. Hann, of this Institute, prepared some related sulphoxylates and sulphinates. The only compound that possessed activity was amino methyl sulphoxylic acid. This is evidence that the chemotherapeutic effect is related to the sulphoxylate portion of the molecule and is not dependent upon the formaldehyde.

(2) Oxidation of sulphoxylate with H_2O_2 , at low temperature, destroys its curative action.

(3) The organisms grow abundantly in 0.5 to 1.0 percent solutions of sulphoxylate in broth, but under such conditions the culture becomes avirulent within a few days.

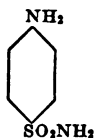
(4) Peritoneal smears of mice inoculated intraperitoneally with the NIH strain show a marked increase in phagocytosis of pneumococci in these animals treated with sulphoxylate.

(5) Animals cured of infection with the Institute strain were found to be immune to many lethal doses of type I pneumococci even when strains were employed which were not of themselves affected by sulphoxylate therapy.

THE EFFECT OF SULPHONAMIDE COMPOUNDS

In 1935 it was announced by Domagk (2) (3) that in certain azo dyes, the presence of a sulphonamide group decreased the antiseptic action but caused them to protect or cure mice infected with fatal doses of hemolytic streptococci. The most effective of these were 4-sulphonamide-2,4 diaminobenzol (Prontosil) and 4-sulphonamide-phenyl-2-azo-7-acetylamino-1-hydroxy-naphthalene-3, 6-sodium disulphonate (Prontosil soluble).

Trefouel, Nitti, and Bovet (4) found that the azo linkage was not essential for the chemotherapeutic activity and that p-aminobenzene sulphonamide was equally effective.



p-aminobenzene sulphonamide

These observations have been confirmed and extended by Goissedet (5), Levaditi (6, 7, 8, 9), and Fourneau (10) in France, and by Buttle, Grey, and Stephenson (11) and Colebrook and Kenny (12) in England. Most of their experiments were carried out with oral administration of the drugs, as Domagk originally found this method gave better results. However, Levaditi demonstrated that a single subcutaneous injection of Prontosil in oil (50 mg per mouse) would protect mice for 25 days against lethal doses of streptococci. Nitti and Bovet (13) have shown that streptococci of low virulence are affected little or not at all by Prontosil. We have carried out preliminary experiments which confirm the above results.

While Domagk originally claimed some effect of Prontosil against type III pneumococcus, subsequent investigators have found no appreciable action upon experimental pneumococcus infections (11) (13). In their experiments the drugs were usually administered by mouth.

We have conducted experiments with mice on the effect of some sulphonamide and related compounds on pneumococci infections.

Prontosil¹ in oil and aqueous solutions of Prontosil soluble¹ have yielded slight or negative results. Sulphonamide² (p-aminobenzene sulphonamide) has shown consistent chemotherapeutic activity on seven strains of pneumococci (types I, II, and III). In all cases there has been a marked prolongation of life, from 3 to 12 days (the control animals usually die from 18 to 36 hours after infection). With the strains most favorably affected, a considerable percentage of the animals permanently survived.

METHOD

Eighteen-hour broth cultures of pneumococci were used. As far as possible, the infective dose was adjusted so that 10 to 100 lethal doses were injected. Dilutions of the organisms were made in broth, and 0.5 cc of the diluted culture was injected intraperitoneally. Treatment was begun within an hour after inoculation and was administered subcutaneously in all cases. The p-aminobenzene sulphonamide and Prontosil were finely powdered with a mortar and pestle, and triturated with olive oil to make a 20- to 30-percent emulsion.

We have obtained the most favorable results with sulphonamide by two daily injections of the drug. Treatment must be continued for 5 to 8 days.

RESULTS

With the Institute strain (NIH type I) susceptible to sulphoxylate therapy equally striking results were obtained with sulphonamide (table 1). From 86 to 100 percent cures were effected. This was true with a culture that had not been passed through mice for several months and was of low virulence, as well as with a culture whose virulence had been raised to 10^{-6} by mouse passage. No effect was observed from Prontosil soluble therapy.

TABLE 1.—Effect of subcutaneous therapy upon type I pneumococcus (NIH strain) infection produced by intraperitoneal inoculation. Tests were conducted upon cultures of both low and high virulence

Pneumococcus strain	Dilution	Number of mice	Therapy, subcutaneous	Deaths in days							Percent survived
				1	2	3	4	5	6	7	
NIH, type I...	10 ⁻³	5	None.....	4	1						0
		30	Sulphoxylate, 1.8 g per kilo 1st day, 1.4 g 2d day, 1 g 3d day.			1					97
NIH, type I...	10 ⁻³	9	None.....	8	1						0
		7	Sulphonamide, 1 g per kilo daily for 3 days.				1				86
NIH, type I...	10 ⁻³	7	None.....	6	1						0
		5	Prontosil soluble, 0.7 g per kilo.....	5							0
NIH, type I...	10 ⁻⁴	12	None.....	2	9						12
		12	Sulphonamide, 1 g per kilo B. D. for 2 days, once on 3d day.								100
		6	Sulphoxylate, 1 g per kilo B. D. for 2 days.								100

B. D. in the tables=twice daily.

¹ Obtained through the courtesy of the Winthrop Chemical Co.

² Prepared by Dr. James M. Johnson, of this Institute.

Tests were run upon highly virulent strains of pneumococcus types I, II, and III obtained from Lederle Laboratories. Control animals died within 18 to 48 hours. In animals treated with sulphonamide none died until the 3d to 5th day, and at the end of a week 25 to 42 percent were alive. With type III these surviving animals remained permanently well, while with types I and II most of them died within 10 days after inoculation (table 2). Two of six animals treated with Prontosil survived type III inoculation, otherwise there was no appreciable influence from Prontosil or Prontosil soluble.

TABLE 2.—Effect of sulphonamide, Prontosil, and Prontosil soluble on types I, II, and III pneumococcus infections (Lederle strains)

Pneumococcus strain	Dilution	Number of mice	Therapy, subcutaneous	Deaths in days							Percent survived
				1	2	3	4	5	6	7	
Lederle, type I...	10 ⁻⁷	12	None.....	8	4						0
		12	Sulphonamide, 0.8 g per kilo B. D. for 2 days, 0.5 B. D. 2 days, 0.7 g daily for 2 days.				2	3		3	125
		6	Prontosil, 1.3 g per kilo B. D.	2	4						0
		6	Prontosil soluble, 0.8 g per kilo B. D.	1	5						0
Lederle, type II...	10 ⁻⁶	12	None.....	12							0
		12	Sulphonamide, 0.8 g per kilo B. D. 1st day, 0.7 g B. D. 2d day, 0.5 g B. D. 3d day, 0.7 g daily 4th and 5th days.			3	4		1	1	125
	10 ⁻⁷	6	Prontosil, 1.6 g per kilo B. D.	6							0
		6	Prontosil soluble, 1 g per kilo B. D.	3	3						0
		3	None.....	3							0
		2	None.....	1							50
Lederle, type III.	10 ⁻⁶	12	None.....	2	8				1		8
		12	Sulphonamide, 1 g per kilo B. D. 1st day, 0.7 g B. D. 2d day, 0.5 g B. D. 3d and 4th days, 0.7 g daily 5th and 6th days.				2	3	2		42
	10 ⁻⁷	6	Prontosil, 1.6 g B. D. 2 days, 0.8 B. D. 2 days.	1	3						33
		6	Prontosil soluble, 1 g per kilo B. D.		6						0
		2	None.....		2						0
		2	None.....								100

¹ Two died on 8th day.

² One died on 8th day.

Similar experiments were carried out with type I, II, and III cultures obtained from the Mulford Laboratories. Essentially the same results were obtained (table 3). Prolongation of life from 4 to 8 days occurred in all animals receiving sulphonamide, with a small percentage of each group surviving permanently. With Prontosil soluble no appreciable effect was observed; with Prontosil 1 animal of 6 survived the inoculation with type II pneumococcus, while little or no prolongation of life was observed among the remaining animals.

The animals in which prolongation of life is brought about as a result of sulphonamide therapy show at autopsy much more marked localization of the infection. With the controls the bacteremia is intense, while in the treated animals fewer organisms are present in the blood, but there is usually present peritonitis with a purulent exudate.

TABLE 3.—Effect of sulphonamide, Prontosil, and Prontosil S on types I, II, and III pneumococcus infections (Mulford strains)

Pneumococcus strain	Dilution	Number of mice	Therapy, subcutaneous	Deaths in days							Percent survived	
				1	2	3	4	5	6	7		
Mulford, type I.	10 ⁻⁸	12	None.....	12								0
		12	Sulphonamide, 1 g per kilo B. D. for 2 days, 0.6 g B. D. for 2 days.				6	3	1	1		8
		6	Prontosil, 1.6 g per kilo, B. D.	6								0
	10 ⁻⁶ 10 ⁻⁷	6	Prontosil soluble, 1 g per kilo B. D.	4	2							0
		2	None.....	1	1							0
		2	None.....	1	1							0
Mulford, type II.	10 ⁻⁶	12	None.....	11	1							0
		12	Sulphonamide, 1 g per kilo B. D. for 2 days, 0.5 g per kilo B. D. for 2 days.				6	1	2			25
		6	Prontosil, 1.6 g per kilo B. D. for 2 days.	2	3							16
	10 ⁻⁶	6	Prontosil soluble, 1 g per kilo B. D.	4	2							0
		2	None.....	1	1							0
		2	None.....	1	1							0
Mulford, type III.	10 ⁻⁶	12	None.....	12								0
		12	Sulphonamide, 1 g. per kilo B. D. for 2 days, 0.7 g B. D. 3d day, 1 g per kilo daily 4th day, 0.5 g per kilo 5th and 6th days.				7	3	1			8
		6	Prontosil, 1 g per kilo B. D.	6								0
	10 ⁻⁷ 10 ⁻⁸	6	Prontosil soluble, 1 g per kilo B. D.	6								0
		2	None.....	1	1							0
		2	None.....	1	1							50

¹ 2 died on 8th day.

TOXICITY

The toxicity of sulphonamide (p-aminobenzene sulphonamide) is quite low. The minimum lethal dose following single subcutaneous injections in olive oil is 6 grams per kilo body weight (table 4). With doses of 2 grams per kilo characteristic symptoms are produced. Within 3 or 4 hours there is observed marked spasticity of the extremities, occurring at first only when the animals are picked up. The extremities are held rigidly extended, and the lower half of the body is flexed so that the hind legs point anteriorly. With larger doses there is increasing spasticity, excitability, and incoordination. These symptoms disappear within 12 hours and the animals appear normal the next day.

TABLE 4.—The toxicity of p-aminobenzene sulphonamide following single subcutaneous injections

Number of mice	30 percent sulphonamide in oil subcutaneously	Deaths	Percent mortality
4.....	3 g per kilo.....	0	0
5.....	4 g per kilo.....	0	0
4.....	6 g per kilo.....	3	75

The toxicity following repeated administration of sulphonamide has also been studied. Doses of 1 g per kilo twice a day for 2 days followed by 0.5 g per kilo twice a day for 3 days were borne without symptoms. With 1.5 g per kilo twice daily for 2 days followed by 0.75 g per kilo for 3 days there was loss of weight for the first few days but no deaths. With 2 g per kilo twice a day for 2 days followed by

1 g per kilo twice a day for 3 days there was 50 percent mortality (table 5).³

TABLE 5.—*The toxicity of sulphonamide following repeated subcutaneous injections*

Number of mice	20 percent sulphonamide in oil, subcutaneously	Deaths	Percent mortality
	<i>Grams per kilo</i>		
4.....	0.5 g B. D. for 2 days, then once a day for 4 days.....	0	0
4.....	1 g B. D. for 2 days, once a day for 4 days.....	0	0
4.....	1.5 g B. D. for 2 days, once a day for 4 days.....	0	0
4.....	2 g B. D. for 2 days, once a day for 4 days.....	2	50

In our experiments we have accordingly employed doses approaching the maximum that can be tolerated without symptoms. The highest individual doses represented one-sixth of the minimum lethal dose.

COMPOUNDS RELATED TO SULPHONAMIDE

Studies are in progress to obtain a more effective compound against pneumococcus infections.

The following substances have been found devoid of chemotherapeutic activity:

Ortho-, meta-, and para-aminobenzene sulphonic acids. Meta-aminobenzene sulphonamide,⁴ meta-nitrobenzene sulphonamide,⁴ p-aminobenzene sulphonic⁴ acid, p-acetyl aminobenzene sulphonamide,⁴ p-aminobenzene sulphonyl chloride,⁴ benzoylsulphimide.

CONCLUSIONS

p-aminobenzene sulphonamide has been found to possess chemotherapeutic activity against pneumococcus types I, II, and III infections in mice.

Work is in progress to obtain compounds of increased effectiveness for this purpose.

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- (11) Buttle, G. A., Grey, W. H., and Stephenson, D.: Lancet, **I**; 1286 (1936).
- (12) Colebrook, L., and Kenny, M.: Ibid., 1279 (1936).
- (13) Nitti, F., and Bovet, D.: Compt. Rend. Soc. Biol., **119**; 1277 (1935).

³ Histologic examination of these animals by Passed Assistant Surgeon L. L. Ashburn, of this Institute, revealed no significant lesions other than slight toxic splenitis.

⁴ Prepared by Dr. James M. Johnson of this Institute.

PREVALENCE OF INFLUENZA IN EUROPE AND THE UNITED STATES

Under date of January 5, 1937, Dr. F. G. Boudreau, of the Health Section of the League of Nations, informed the Surgeon General of the Public Health Service that influenza was showing an unusually early seasonal tendency to assume epidemic proportions in Central and Northwestern Europe, especially in Berlin, Copenhagen, and London. Dr. Boudreau will keep the Public Health Service informed by cable concerning the further course of the disease in Europe.

Although there has been a slight seasonal increase in the prevalence of influenza in recent weeks, the situation is favorable in all sections of the United States at the present time. For the week ended January 2, 1937, 3,993 cases of influenza were reported to the Public Health Service by the health officers of 41 States, as compared with 1,786 cases for the corresponding week last year. For the week ended December 26, 1936, these States reported 2,088 cases, and for the corresponding week of last year 1,469 cases. The average number of cases reported by the 41 States for the last week of the year during the last 8 years is 29,800. This average, however, includes data for the years 1929 and 1932, when influenza was epidemic at the close of the year.

COURT DECISION ON PUBLIC HEALTH

Refusal to grant licenses as common victualers upheld.—(Supreme Judicial Court of Massachusetts; *Liggett Drug Co., Inc., et al. v. Board of License Com'rs of City of North Adams; J. J. Newberry v. Same*, 4 N. E. (2d) 628; decided Nov. 16, 1936.) The petitioners, owners of a chain of drug stores and a chain of 5- and 10-cent stores, respectively, brought this action to compel the licensing authorities of the city of North Adams to grant them licenses as common victualers. The laws of Massachusetts provided that the licensing authorities could grant licenses to persons to be common victualers but did not require such authorities to grant such licenses "if, in their opinion, the public good does not require it." Evidence was introduced to show that the places in which the food was prepared by the petitioners were insanitary, that the food was served for immediate consumption in rooms where merchandise was sold, and that it was the opinion of the licensing authorities that too many places had been licensed for public eating houses. The lower court refused to grant the relief requested by the petitioners. On appeal, this decision was affirmed. In the course of its opinion the court said:

The evidence already narrated warranted the single justice in finding that the places of business of the petitioners were insanitary and not suitable for the preparation and sale of food. His general finding in favor of the respondents may

have rested on that ground. It is too clear for discussion that such a finding would be ample justification for denial by the respondents of the applications of the petitioners for licenses. The single justice may also have found that it was detrimental to the public health to serve food for immediate consumption in the room where the sale of merchandise was in progress. The opinion was expressed in *Re Interrogatories of the Governor*, 97 Colo. 587, 52 P. (2d) 663, 667, 668, that a determination that "the preparation and service of meals, in the same room where the sale of merchandise is actively carried on, is inimical to the public health" could not be pronounced an unreasonable exercise of the police power. The single justice may further have found that the decision of the respondents was supported by the facts that too many places had been licensed for public eating houses and that the welfare of the community would be promoted by diminishing that number, and that the methods of business of the petitioners conduced to impair the quality of food dispensed at all such places. It cannot be held that any of these findings was without support in evidence. Therefore the decision of the single justice in dismissing the petitions cannot be reversed. *Andrews v. Registrars of Voters of Easton*, 246 Mass. 572, 576, 141 N. E. 507; *Swift v. Registrars of Voters of Quincy*, 281 Mass. 271, 284, 183 N. E. 730. Each one of them appears to be a reasonable and nondiscriminatory test. No one of them appears to be designed to operate against the petitioners on grounds of prejudice, or whim, or caprice. The record does not show that the respondents were actuated by any unworthy motives. No inference of that nature is permissible in view of the action of the single justice in dismissing the petitions.

DEATHS DURING WEEK ENDED DECEMBER 19, 1936

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

	Week ended Dec. 19, 1936	Correspond- ing week, 1935
Data from 86 large cities of the United States:		
Total deaths.....	9,247	8,807
Deaths per 1,000 population, annual basis.....	12.9	12.3
Deaths under 1 year of age.....	559	550
Deaths under 1 year of age per 1,000 estimated live births.....	50	50
Deaths per 1,000 population, annual basis, 51 weeks of year.....	12.0	11.4
Data from industrial insurance companies:		
Policies in force.....	68,924,487	67,826,231
Number of death claims.....	13,208	13,014
Death claims per 1,000 policies in force, annual rate.....	10.0	10.0
Death claims per 1,000 policies, 51 weeks of year, annual rate.....	9.7	9.5

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for Weeks Ended Dec. 26, 1936, and Dec. 28, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 26, 1936, and Dec. 28, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935
New England States:								
Maine.....	3		6	2	21	129	0	0
New Hampshire.....					2	25	0	0
Vermont.....	1					169	0	0
Massachusetts.....	4	15			438	122	0	3
Rhode Island.....		1			28	42	0	1
Connecticut.....	1	1	4	6	119	48	1	0
Middle Atlantic States:								
New York.....	23	39	136	119	160	444	8	8
New Jersey.....	7	16	10	8	119	27	1	3
Pennsylvania.....	12	31			9	150	0	4
East North Central States:								
Ohio.....	20	47	4	11	16	60	4	3
Indiana.....	19	36	93	45	7	1	5	6
Illinois.....	30	52	164	35	7	22	4	11
Michigan.....	17	11	4		29	16	0	2
Wisconsin.....	18	2	116	55	30	84	2	1
West North Central States:								
Minnesota.....	5				8	32	3	1
Iowa.....	4	12	28		1	2	1	3
Missouri.....	19	33	50	97	2	12	1	2
North Dakota.....	2					1	0	1
South Dakota.....		2	1	1	1	2	0	3
Nebraska.....	2	2			2	65	0	0
Kansas.....	3	15	1	1	7	7	0	1
South Atlantic States:								
Delaware.....	3	1			52	28	0	0
Maryland.....	21	8	14	8	77	39	2	4
District of Columbia.....	5	17	1		5		2	4
Virginia.....	23	47			38	50	1	4
West Virginia.....	24	11	47	113	20	8	5	4
North Carolina.....	39	22	14	12	5	2	1	1
South Carolina.....	10	3	206	162	15		0	1
Georgia.....	24	18	86	86			2	2
Florida.....	8	6		2	1	2	3	1
East South Central States:								
Kentucky.....	13	33	15	10	17	12	8	7
Tennessee.....	28	16	45	63	21	1	1	1
Alabama.....	23	26	53	110	2	8	1	0
Mississippi.....	6	7					2	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 26, 1936, and Dec. 28, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935
West South Central States:								
Arkansas.....	7	9	35	36	3	-----	2	1
Louisiana.....	13	23	7	13	2	21	1	1
Oklahoma.....	11	12	98	111	5	-----	3	11
Texas.....	67	110	756	324	137	15	5	13
Mountain States:								
Montana.....	1	4	35	7	2	5	0	0
Idaho.....	-----	-----	5	-----	63	21	1	0
Wyoming.....	-----	-----	-----	2	-----	1	1	0
Colorado.....	4	6	-----	-----	5	9	0	0
New Mexico.....	-----	3	6	3	22	3	0	0
Arizona.....	2	3	78	51	4	-----	0	1
Utah.....	-----	1	-----	-----	4	4	0	0
Pacific States:								
Washington.....	3	-----	-----	-----	16	174	0	2
Oregon.....	-----	3	25	36	3	310	1	0
California.....	43	40	45	40	19	217	3	3
Total.....	568	744	2,088	1,469	1,544	2,390	75	115
52 weeks.....	28,779	38,034	157,823	118,416	284,791	721,872	7,392	5,591
Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935	Week ended Dec. 26, 1936	Week ended Dec. 28, 1935
New England States:								
Maine.....	0	2	19	26	0	0	1	3
New Hampshire.....	0	0	4	12	0	0	0	0
Vermont.....	0	0	8	5	0	0	0	0
Massachusetts.....	0	3	153	236	0	0	1	2
Rhode Island.....	0	2	5	23	0	0	0	0
Connecticut.....	0	1	49	50	0	0	0	0
Middle Atlantic States:								
New York.....	0	2	402	485	21	0	5	12
New Jersey.....	0	6	71	137	0	0	0	4
Pennsylvania.....	0	5	85	302	0	0	3	12
East North Central States:								
Ohio.....	0	0	215	365	5	3	5	2
Indiana.....	0	0	128	168	5	5	1	0
Illinois.....	1	3	327	499	0	5	0	4
Michigan.....	1	0	301	201	0	3	7	1
Wisconsin.....	0	0	258	416	7	16	0	2
West North Central States:								
Minnesota.....	0	0	114	254	8	17	3	1
Iowa.....	0	2	102	141	7	2	4	0
Missouri.....	0	0	104	121	9	4	6	4
North Dakota.....	0	0	60	31	13	5	2	1
South Dakota.....	0	0	62	35	5	8	0	1
Nebraska.....	0	0	46	170	10	61	0	0
Kansas.....	0	0	234	116	6	17	1	0
South Atlantic States:								
Delaware.....	0	0	8	5	0	0	0	0
Maryland.....	0	1	59	56	0	0	4	12
District of Columbia.....	0	0	12	14	0	0	1	3
Virginia.....	1	1	26	48	0	0	5	5
West Virginia.....	0	0	63	77	0	0	7	2
North Carolina.....	0	1	31	53	0	0	2	6
South Carolina.....	0	0	8	9	0	0	0	0
Georgia.....	1	0	20	27	0	0	5	3
Florida.....	1	0	1	9	0	0	0	1
East South Central States:								
Kentucky.....	0	0	58	53	0	0	2	3
Tennessee.....	3	0	38	36	0	0	11	5
Alabama.....	1	4	15	11	0	0	7	7
Mississippi.....	0	0	10	11	0	0	0	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 26, 1936, and Dec. 23, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 26, 1936	Week ended Dec. 23, 1935	Week ended Dec. 26, 1936	Week ended Dec. 23, 1935	Week ended Dec. 26, 1936	Week ended Dec. 23, 1935	Week ended Dec. 26, 1936	Week ended Dec. 23, 1935
West South Central States:								
Arkansas.....	1	1	16	8	0	0	1	8
Louisiana ¹	1	0	12	14	0	0	2	4
Oklahoma ⁴	3	0	36	31	0	0	5	12
Texas ²	3	2	112	117	3	1	13	9
Mountain States:								
Montana.....	0	0	39	243	16	14	0	0
Idaho.....	0	0	26	53	3	1	0	0
Wyoming.....	0	0	6	89	0	2	0	1
Colorado.....	0	0	24	143	1	2	0	0
New Mexico.....	0	0	17	50	0	0	10	4
Arizona.....	0	0	8	13	0	0	0	0
Utah.....	0	0	8	83	0	0	0	0
Pacific States:								
Washington.....	0	0	80	66	4	23	1	1
Oregon.....	0	0	27	45	18	1	0	1
California.....	4	4	214	234	11	3	8	10
Total.....	21	40	3,721	5,391	152	193	123	149
52 weeks.....	4,493	107,32	233,944	251,583	7,459	7,490	14,611	17,491

¹ New York City only.

² Week ended earlier than Saturday.

³ Typhus fever, week ended Dec. 26, 1936, 47 cases, as follows: South Carolina, 2; Georgia, 18; Alabama, 14; Louisiana, 1; Texas, 12.

⁴ Exclusive of Oklahoma City and Tulsa.

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	Menin- gococ- cus menin- gitis	Diph- theria	Influ- enza	Mala- ria	Meas- les	Pel- lagra	Polio- mye- litis	Scarlet fever	Small- pox	Ty- phoid fever
<i>October 1936</i>										
New Hampshire.....	2	2					2	28	0	0
<i>November 1936</i>										
Alabama.....	5	203	223	722	4	5	7	106	0	33
Illinois.....	23	148	55	7	47		70	1,271	3	70
Indiana.....	6	121	44		25		6	436	7	5
Kansas.....	8	66	5		19	2	11	726	41	21
Minnesota.....	2	103	6		88		5	576	9	8
Mississippi.....	4	75	3,628	2,819	93	190	13	98	0	22
Montana.....	3	8	44		12		0	227	87	6
North Dakota.....		7	75		5		3	206	50	4
Oklahoma ¹	8	56	260	27	19	2	64	90	2	55
Oregon.....	4	2	110	1	29		3	144		11
Tennessee.....	17	174	185	51	12	7	23	242		53
Texas.....	6	178	367	1,308	71	13	10	198	1	58
Virginia.....	19	245	532	34	96	6	7	235	0	36
Washington.....	5	6	33		35		7	200	9	9

¹ Exclusive of Oklahoma City and Tulsa.

Summary of monthly reports from States—Continued

November 1936

	Cases		Cases		Cases
Actinomycosis:		Impetigo contagiosa:		Tetanus—Continued.	
Minnesota.....	1	Oregon.....	96	Oklahoma ¹	2
Chicken pox:		Tennessee.....	2	Tennessee.....	4
Alabama.....	49	Lead poisoning:		Virginia.....	1
Illinois.....	1,106	Illinois.....	1	Washington.....	1
Indiana.....	413	Mumps:		Trachoma:	
Kansas.....	396	Alabama.....	78	Illinois.....	122
Minnesota.....	682	Illinois.....	189	Mississippi.....	7
Mississippi.....	345	Indiana.....	48	Montana.....	5
Montana.....	343	Kansas.....	320	Oklahoma ¹	5
North Dakota.....	91	Mississippi.....	143	Tennessee.....	32
Oklahoma ¹	40	Montana.....	348	Virginia.....	1
Oregon.....	210	North Dakota.....	90	Washington.....	1
Tennessee.....	132	Oklahoma ¹	102	Tularemia:	
Texas.....	65	Oregon.....	42	Illinois.....	8
Virginia.....	179	Tennessee.....	77	Kansas.....	7
Washington.....	847	Texas.....	44	Minnesota.....	2
Dysentery:		Virginia.....	89	Virginia.....	6
Alabama (amoebic).....	4	Washington.....	160	Typhus fever:	
Illinois (amoebic).....	8	Ophthalmia neonatorum:		Alabama.....	29
Illinois (amoebic car-		Alabama.....	1	Mississippi.....	2
riers).....	18	Illinois.....	3	Tennessee.....	1
Illinois (bacillary).....	17	Mississippi.....	4	Texas.....	18
Kansas (amoebic).....	1	Oklahoma ¹	1	Undulant fever:	
Kansas (bacillary).....	2	Tennessee.....	1	Alabama.....	2
Minnesota (amoebic).....	7	Paratyphoid fever:		Illinois.....	8
Minnesota (bacillary).....	12	Kansas.....	5	Indiana.....	1
Mississippi (amoebic).....	81	Oregon.....	2	Kansas.....	22
Mississippi (bacillary).....	398	Texas.....	1	Minnesota.....	8
Montana (amoebic).....	1	Puerperal septicemia:		Mississippi.....	1
Montana (unspecified).....	1	Mississippi.....	22	Oklahoma ¹	3
Oklahoma ¹	14	Tennessee.....	2	Oregon.....	1
Tennessee (amoebic).....	3	Rabies in animals:		Tennessee.....	4
Tennessee (bacillary).....	14	Alabama.....	68	Texas.....	1
Texas (amoebic).....	1	Illinois.....	25	Washington.....	1
Texas (bacillary).....	14	Indiana.....	41	Vincant's infection:	
Virginia (amoebic).....	1	Mississippi.....	27	Illinois.....	46
Virginia (bacillary, diar-		Texas.....	5	Kansas.....	7
rhea included).....	125	Washington.....	11	North Dakota.....	4
Washington (bacillary).....	5	Scabies:		Oklahoma ¹	5
Encephalitis, epidemic or		Kansas.....	2	Oregon.....	10
lethargic:		Oklahoma ¹	4	Tennessee.....	4
Alabama.....	3	Oregon.....	60	Washington.....	2
Illinois.....	7	Tennessee.....	5	Whooping cough:	
Kansas.....	4	Washington.....	1	Alabama.....	24
Oklahoma ¹	2	Septic sore throat:		Illinois.....	774
Oregon.....	1	Illinois.....	3	Indiana.....	82
Tennessee.....	1	Kansas.....	5	Kansas.....	78
Virginia.....	1	Minnesota.....	6	Minnesota.....	147
Washington.....	2	Montana.....	2	Mississippi.....	203
German measles:		Oklahoma ¹	27	Montana.....	68
Alabama.....	10	Oregon.....	5	North Dakota.....	1
Illinois.....	37	Tennessee.....	4	Oklahoma ¹	1
Kansas.....	3	Virginia.....	15	Oregon.....	97
Montana.....	3	Washington.....	1	Tennessee.....	111
Tennessee.....	3	Tetanus:		Texas.....	267
Washington.....	22	Illinois.....	4	Virginia.....	263
Hookworm disease:		Kansas.....	2	Washington.....	83
Mississippi.....	278				

¹ Exclusive of Oklahoma City and Tulsa.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 19, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Maine:											
Portland	0		0	0	6	4	0	0	0	5	42
New Hampshire:											
Concord	0		0	0	1	0	0	0	0	0	13
Manchester	0		0	0	3	0	0	0	0	0	15
Nashua	0			0		0			0	0	
Vermont:											
Barre	0		0	0	0	0	0	0	0	0	3
Burlington	0		0	0	0	0	0	0	0	0	13
Rutland	0		0	0	0	1	0	0	0	0	7
Massachusetts:											
Boston	2		1	17	30	70	0	9	1	184	237
Fall River	0		0	1	3	3	0	2	0	2	37
Springfield	0		0	2	0	2	0	0	0	10	36
Worcester	0		0	17	12	1	0	2	0	21	59
Rhode Island:											
Fawtucket	0		0	1	0	2	0	0	0	0	22
Providence	0		0	17	3	18	0	2	0	13	59
Connecticut:											
Bridgeport	0	1	1	21	4	3	0	2	0	4	40
Hartford	0		0	0	4	7	0	0	0	12	49
New Haven	0	1	0	1	1	3	0	0	0	1	59
New York:											
Buffalo	0	1	1	48	13	16	0	3	0	12	135
New York	24	23	4	46	122	172	0	84	4	96	1,586
Rochester	0		2	0	12	5	0	2	0	5	69
Syracuse	1		0	22	4	19	0	0	0	35	57
New Jersey:											
Camden	4		1	0	1	4	0	0	0	5	44
Newark	0	1	0	82	12	7	0	9	0	29	115
Trenton	0		0	1	4	2	0	2	0	2	59
Pennsylvania:											
Philadelphia	4		1	3	43	96	0	27	0	118	521
Pittsburgh	5		3	0	29	68	0	11	0	40	172
Reading	0		0	0	6	4	0	1	0	31	40
Scranton	0			0		12	0		0	0	
Ohio:											
Cincinnati	4		2	5	16	16	0	11	0	0	160
Cleveland	7	9	1	1	13	42	0	17	0	31	200
Columbus	3	1	1	1	8	8	0	2	1	12	94
Toledo	3		0	1	3	14	0	3	1	33	75
Indiana:											
Anderson	0		1	0	0	17	0	1	0	3	7
Fort Wayne	2		0	0	4	5	0	2	0	0	23
Indianapolis	2		3	3	10	16	0	2	0	8	108
Muncie	1		0	0	3	2	0	0	0	0	11
South Bend	0		0	0	1	2	0	0	0	6	13
Terre Haute	1		0	0	0	2	0	0	0	0	23
Illinois:											
Alton	2		0	0	1	3	0	0	0	1	11
Chicago	9	110	8	22	97	204	0	45	1	66	947
Elgin	0		0	0	1	1	0	1	0	21	8
Moline	0		0	0	2	0	0	0	0	0	10
Springfield	0	2	0	0	3	4	0	0	0	18	25
Michigan:											
Detroit	8	4	3	3	23	178	0	15	4	104	288
Flint											
Grand Rapids	0		0	0	2	13	0	0	3	25	24
Wisconsin:											
Kenosha	0		0	0	0	9	0	0	0	4	13
Madison	0		0	0	3	12	0	1	0	2	24
Milwaukee	0		0	3	6	39	0	4	0	42	90
Racine											
Superior	0		0	0	3	8	0	0	0	1	11

City reports for week ended Dec. 19, 1936—Continued

State and city	Diph- theria cases	Influenza		Mea- sles cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths all causes
		Cases	Deaths								
Minnesota:											
Duluth.....	0		0	0	2	26	0	0	0	6	24
Minneapolis.....	5		0	3	11	9	0	0	0	17	90
St. Paul.....	0		0	2	12	4	0	2	0	35	71
Iowa:											
Cedar Rapids.....	0		0	0		0	0	0	0	0	
Des Moines.....	1		0	0	0	11	0	0	0	1	34
Sioux City.....	0		0	0		11	2	0	0	0	
Waterloo.....	2		0	0		1	0	0	0	12	
Missouri:											
Kansas City.....	2		0	2	9	37	1	8	0	3	109
St. Joseph.....											
St. Louis.....	8	2	0	3	12	19	0	14	1	24	224
North Dakota:											
Fargo.....	0		0	0	1	0	0	0	0	0	10
Grand Forks.....	0		0	0		0	0	0	0	0	
Minot.....	0		0	0	0	0	0	0	0	0	5
South Dakota:											
Aberdeen.....	0		0	0		8	0	0	0	0	
Sioux Falls.....	0		0	0	0	5	0	0	0	0	8
Nebraska:											
Omaha.....	4		0	3	5	6	0	1	0	1	62
Kansas:											
Lawrence.....	0		0	0	1	0	0	0	0	0	6
Topeka.....	0		1	1	3	3	0	1	0	0	22
Wichita.....	0		0	0	8	2	0	1	1	0	29
Delaware:											
Wilmington.....	0		0	38	2	0	0	0	0	1	22
Maryland:											
Baltimore.....	5	9	3	120	21	23	0	21	0	108	237
Cumberland.....	0		0	0	3	3	0	0	0	0	14
Frederick.....	0		0	1	1	0	0	0	0	0	5
Dist. of Col.:											
Washington.....	10		0	6	13	16	0	9	3	33	156
Virginia:											
Lynchburg.....	3		0	0	3	0	0	1	0	3	14
Richmond.....	0		1	0	7	9	0	5	1	0	62
Roanoke.....	0		0	0	0	2	0	0	0	0	27
West Virginia:											
Charleston.....											
Huntington.....	2		0	0		5	0	0	0	0	
Wheeling.....	0		0	1	3	0	0	0	0	4	11
North Carolina:											
Gastonia.....	0		0	0	0	0	0	0	0	0	
Raleigh.....	2		0	0	0	1	0	0	0	0	9
Wilmington.....	1	0	0	0	1	0	0	0	0	0	14
Winston-Salem.....	2	1	0	0	7	0	0	0	2	0	20
South Carolina:											
Charleston.....	0	28	0	0	0	2	0	1	0	0	25
Columbia.....	0		0	0	2	0	0	0	0	0	13
Florence.....	0		0	0	2	6	0	0	0	0	12
Georgia:											
Atlanta.....	6	14	1	0	16	11	0	0	0	0	113
Brunswick.....	0		0	1	1	0	0	0	0	0	3
Savannah.....	2	11	1	0	3	0	0	0	2	1	27
Florida:											
Miami.....	0	1	0	2	1	2	0	3	0	1	45
Tampa.....	3		0	0	2	0	0	2	0	1	29
Kentucky:											
Ashland.....	0		1	0	7	1	0	1	0	0	36
Covington.....	1		0	0	4	2	0	0	0	0	
Lexington.....	0		0	0	3	0	0	2	0	0	26
Tennessee:											
Knoxville.....	0		0	1	2	2	0	3	0	0	18
Memphis.....	2		1	0	7	9	0	4	0	2	84
Nashville.....	2		0	0	9	2	0	4	1	0	61
Alabama:											
Birmingham.....	2	9	1	2	6	5	0	4	0	4	67
Mobile.....	0	4	1	2	3	2	0	0	0	0	29
Montgomery.....	1	3		0		2	0		0	6	
Arkansas:											
Fort Smith.....	0			0		6	0		0	0	
Little Rock.....	0		0	1	2	1	0	2	0	0	4
Louisiana:											
Lake Charles.....	1		0	0	1	0	0	0	0	0	8
New Orleans.....	8		4	0	22	9	0	9	0	0	188
Shreveport.....	0		0	0	6	1	0	2	0	0	36

City reports for week ended Dec. 19, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Oklahoma:											
Oklahoma City.....	0		1	0	10	6	0	1	0	0	42
Tulsa.....	0			1		0	0		0		
Texas:											
Dallas.....	2		0	1	8	7	0	5	0	2	63
Fort Worth.....	2		0	40	2	3	0	2	0	0	24
Galveston.....	0		0	0	5	1	0	2	0	0	18
Houston.....	12		0	0	10	4	0	8	0	3	86
San Antonio.....	4		4	0	5	1	0	6	0	0	57
Montana:											
Billings.....	0		0	0	2	0	0	0	0	0	8
Great Falls.....	0		0	0	2	1	1	0	0	1	5
Helena.....	0		0	0	0	6	0	0	0	0	0
Missoula.....	0		0	0	2	0	0	0	0	0	6
Idaho:											
Boise.....	0		1	0	2	3	0	0	0	0	12
Colorado:											
Colorado Springs.....	0		0	0	3	2	0	1	0	0	14
Denver.....	3		3	0	12	6	0	8	1	50	90
Pueblo.....	0		0	0	3	4	0	0	0	1	11
New Mexico:											
Albuquerque.....	0		0	1	3	3	0	2	1	0	13
Utah:											
Salt Lake City.....	0		1	5	4	13	0	1	0	7	42
Nevada:											
Reno.....											
Washington:											
Seattle.....	1		1	3	5	3	0	4	1	9	90
Spokane.....	0		0	2	9	4	0	1	0	1	34
Tacoma.....	0		0	1	2	5	0	0	0	0	24
Oregon:											
Portland.....	1	1	1	0	12	5	0	2	0	10	95
Salem.....	0	2		1		0	0		0	0	
California:											
Los Angeles.....	9	16	0	4	33	30	0	21	1	45	349
Sacramento.....	0	1	1	0	7	27	0	6	0	0	42
San Francisco.....	4		3	3	13	17	0	7	0	14	182

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Georgia:			
Boston.....	2	3	0	Atlanta.....	2	1	0
New York:				Florida:			
New York.....	7	2	0	Tampa.....	0	1	0
Pennsylvania:				Tennessee:			
Philadelphia.....	2	1	0	Knoxville.....	1	0	0
Ohio:				Memphis.....	0	1	0
Cincinnati.....	3	0	0	Alabama:			
Cleveland.....	2	0	1	Birmingham.....	1	0	0
Toledo.....	0	1	0	Arkansas:			
Illinois:				Fort Smith.....	1	0	0
Chicago.....	5	3	0	Louisiana:			
Iowa:				New Orleans.....	0	1	0
Des Moines.....	2	0	0	Shreveport.....	0	3	0
Missouri:				Oklahoma:			
Kansas City.....	1	0	0	Oklahoma City.....	1	0	0
St. Louis.....	1	0	0	Tulsa.....	0	0	4
Kansas:				Texas:			
Wichita.....	0	0	1	Houston.....	2	0	1
Maryland:				Oregon:			
Baltimore.....	4	1	0	Portland.....	0	0	2
District of Columbia:				Salem.....	1	0	0
Washington.....	3	1	0	California:			
South Carolina:				Los Angeles.....	3	2	1
Charleston.....	1	1	0				

Pellagra.—Cases: Atlanta, 1; Savannah, 3; Birmingham, 2; New Orleans, 1; Los Angeles, 4; San Francisco, 1.

Typhus fever.—Cases: Savannah, 3; Montgomery, 1; Shreveport, 1; Galveston, 1; Houston, 1.

FOREIGN AND INSULAR

CANADA

Vital statistics—Second quarter 1936.—The Bureau of Statistics of the Dominion of Canada has published the following preliminary statistics for the second quarter of 1936. The rates are computed on an annual basis. There were 20.4 live births per 1,000 population during the second quarter of 1936 and 21.5 per 1,000 population in the same quarter of 1935. The death rate was 9.8 per 1,000 population for the second quarter of 1936 and 11.1 per 1,000 population for the same quarter of 1935. The infant mortality rate for the second quarter of 1936 was 66 per 1,000 live births and 73 per 1,000 live births in the corresponding quarter of 1935. The maternal death rate was 5.7 per 1,000 live births for the second quarter of 1936 and 5.3 per 1,000 live births for the same quarter of 1935.

The accompanying tables give the numbers of births, deaths, and marriages by Provinces for the second quarter of 1936, and deaths from certain causes in Canada for the second quarter of 1936, and the corresponding quarter of 1935, and by Provinces for the second quarter of 1936.

Number of births, deaths, and marriages, second quarter 1936

Province	Live births	Deaths (exclusive of still births)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada ¹	56,060	26,852	3,693	318	20,841
Prince Edward Island.....	503	240	24	4	116
Nova Scotia.....	2,761	1,320	208	9	928
New Brunswick.....	2,725	1,211	194	20	709
Quebec.....	19,564	8,200	1,604	128	6,139
Ontario.....	15,923	9,451	853	84	7,692
Manitoba.....	3,300	1,424	172	15	1,320
Saskatchewan.....	4,738	1,545	242	21	1,068
Alberta.....	3,876	1,626	267	24	1,337
British Columbia.....	2,670	1,835	129	13	1,517

¹ Exclusive of Yukon and the Northwest Territories.

Number of deaths, Canada, second quarter of 1935 and 1936, and by Provinces for second quarter of 1936

Cause of death	Canada ¹ (second quarter)		Province, second quarter 1936								
	1935	1936	Prince Edward	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents.....	241	259	2	13	10	73	110	10	8	11	22
Cancer.....	2,871	2,849	27	127	121	758	1,069	180	164	162	241
Diarrhea and enteritis.....	514	478	-----	8	19	262	93	21	18	40	17
Diphtheria.....	50	47	1	6	4	28	5	1	2	-----	-----
Diseases of the arteries.....	2,122	2,342	18	107	74	416	1,255	117	92	112	151
Diseases of the heart.....	4,117	4,098	36	178	183	953	1,804	216	232	194	302
Homicides.....	49	33	-----	1	-----	7	14	2	2	1	6
Influenza.....	961	814	8	55	26	269	172	39	74	121	50
Measles.....	174	108	1	2	11	26	30	19	6	6	5
Nephritis.....	1,637	1,625	16	76	47	745	436	66	65	52	92
Pneumonia.....	2,104	1,882	28	100	109	537	668	107	113	108	112
Poliomyelitis.....	15	7	-----	-----	-----	4	1	2	-----	-----	-----
Puerperal causes.....	308	318	4	9	20	128	84	15	21	24	13
Scarlet fever.....	60	55	3	3	-----	23	19	5	2	8	-----
Suicides.....	225	253	1	5	5	36	115	15	26	21	29
Tuberculosis.....	1,872	1,938	18	121	101	824	428	107	82	97	160
Typhoid fever.....	53	64	-----	1	2	38	3	5	5	7	3
Other violent deaths.....	1,093	1,044	10	39	26	273	387	57	80	90	92
Whooping cough.....	219	153	2	18	12	28	28	2	14	22	7

¹ Exclusive of Yukon and the Northwest Territories.

CZECHOSLOVAKIA

Communicable diseases—September 1936.—During the month of September 1936, certain communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax.....	9	1	Paratyphoid fever.....	28	3
Cerebrospinal meningitis.....	13	3	Poliomyelitis.....	41	2
Chicken pox.....	66	-----	Puerperal fever.....	48	23
Diphtheria.....	2,140	114	Scarlet fever.....	2,453	40
Dysentery.....	130	21	Trachoma.....	105	-----
Influenza.....	44	4	Typhoid fever.....	1,014	60
Lethargic encephalitis.....	1	1	Typhus fever.....	1	-----
Malaria.....	221	1			

ITALY

Communicable diseases—4 weeks ended October 11, 1936.—During the 4 weeks ended October 11, 1936, certain communicable diseases were reported in Italy as follows:

Disease	Sept. 14-20		Sept. 21-27		Sept. 28-Oct. 4		Oct. 5-11	
	Cases	Com-munes affected	Cases	Com-munes affected	Cases	Com-munes affected	Cases	Com-munes affected
Anthrax.....	40	34	29	28	44	32	30	29
Cerebrospinal meningitis.....	9	9	11	11	10	10	11	11
Chicken pox.....	61	44	69	52	123	59	69	53
Diphtheria and croup.....	541	272	519	288	572	297	544	306
Dysentery.....	34	24	32	27	27	20	36	19
Hookworm disease.....	8	6	9	9	14	8	8	4
Lethargic encephalitis.....	2	1	1	1	2	2	1	1
Measles.....	236	105	345	105	212	85	235	84
Mumps.....	74	40	59	44	54	33	61	37
Paratyphoid fever.....	140	98	161	120	122	94	151	110
Poliomyelitis.....	72	52	48	41	40	38	55	46
Puerperal fever.....	31	26	34	32	52	50	29	26
Scarlet fever.....	298	158	292	146	258	138	308	154
Typhoid fever.....	979	499	967	492	863	466	811	431
Undulant fever.....	33	30	27	25	38	33	29	26
Whooping cough.....	282	105	327	120	320	121	293	106

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

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for December 25, 1936, pages 1803-1815. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued January 29, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

Indochina—Cochinchina—Vinlong.—During the week ended December 19, 1936, 1 case of cholera was reported in Vinlong, Cochinchina, Indochina.

Yellow Fever

Senegal—Khombole.—On November 2, 1936, 1 case of yellow fever was reported in Khombole, Senegal.

X