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CROSS REACTIONS BETWEEN THE SEVERAL PNEUMOCOCCIC TYPES AND THEIR SIGNIFICANCE IN THE PREPARATION OF POLYVALENT ANTISERUM[1]

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In discussing 68 pneumococcic types, Mørch (*1*) stated that it would be impractical to produce antiserums for all types. She advocated the production of polyvalent antiserums for therapeutic and diagnostic use by immunization with mixed vaccines composed of pneumococci belonging to the groups which she described.

The preparation and distribution of the 32 types of antiserums now on the market involves much time and effort, some of which might be eliminated if certain types were combined. However, consideration must be given to the production and standardization of polyvalent antiserums, and to the prevalence and severity of the infections due to the pneumococci used for the preparation of these antiserums.

Björneboe (*2*), studying type 7 and three types related to 7, demonstrated that the homologous type antiserum gave the greatest protection in mice while antiserums prepared from related types exerted less and varying protection depending upon the components of the antigen used. Also, Björneboe (*3*) reported that rabbits were able to produce antibodies against two and three pneumococcic types at the same rate and in the same amount as against one type. When four or five types were used, less antibodies were produced, and against six and eight types considerably less antibodies resulted. The specific types used were not given and no statement was made concerning whether the types were immunologically related. Potent antiserum may be made for two antigenically different types. There has been on the market in this country for many years bivalent antipneumococcic horse serum for types 1 and 2, and in more recent years for types 4 and 8, and 5 and 7.

It has been shown previously (*4*) that there are all degrees of cross reactions among the pneumococcic types. Some cross reactions are so weak that they are shown only by highly potent concentrated antiserums. Others are so strong that an antiserum prepared with one

[1] From the Division of Biologics Control, National Institute of Health.

type of pneumococcus is effective for one or more related types. Between the two extremes are many types showing different degrees of cross reaction.

For the selection of types for the preparation of polyvalent antiserums, information on the interrelationship and incidence of the pneumococcic types is important. To make polyvalent diagnostic antiserums specific with the fewest possible absorptions not only should types be chosen which cross regularly but there should be some similarities in the cross reactions with other heterologous types. For types which are very closely related, such as types 6 and 26, it is doubtful if any advantage would accrue if animals were immunized with pneumococci of both types. Type 6 antiserums are also effective for type 26. Also, the production and standardization of a polyvalent antiserum for types like 7, 48, and 50 might involve time and labor out of all proportion to its worth. Type 7 is a frequent causative agent of severe infections, while types 48 and 50, at present, appear to be rare types of questionable importance.

Many different type combinations are possible. A study of cross reactions given by antiserums of different types and potencies, and reports of type incidence among many pneumococcic infections *(5, 6, 7)* are the basis for the present discussion of type combination for the preparation of polyvalent antiserums.

The methods for carrying out the tests for cross reactions *(8)*, the source of the cultures and antiserums *(4)*, and the terminology for the types *(9)* are described elsewhere. Subtypes or other names of strains which have been reported in the literature are given in parentheses after the type numbers in all the tables. Comparisons of the related pneumococcic types are shown in the tables; all of the cross reactions found in antiserums of the different types are shown in table 5 of the preceding paper *(4)*.

Group 1. Types 1, 2, 5, 6, 7, 26, and 51. Group 2. Types 3, 4, 8, 14, 19, and 57.—The pneumococci in these two groups are combined principally because of the frequency of their occurrence *(5)* although there are cross reactions among some of them. Only by actual trial can it be determined if potent polyvalent therapeutic antiserums for the two groups can be prepared. If polyvalent antiserums cannot be made for all the types in the groups, it is possible that antiserums could be made for some of the types in each group—for instance, for types 1 and 2 and for types 5, 6, 7, 26, and 51 in group 1 and for types 3, 8, 19, and 57 and for types 4 and 14 in group 2. As has been shown *(4)* immunization with pneumococci of types 26, 51, and 57 would be unnecessary. Type 6 antiserums react almost equally well with pneumococci of types 6 and 26, type 7 antiserums with types 7 and 51, and type 19 antiserums with types 19 and 57.

Groups 1 and 2 diagnostic antiserums could be made which would

make possible the typing of a great percentage of pneumococci by examining them with two, instead of the present six, diagnostic group antiserums. Pneumococci not falling in one of the two groups could be identified by testing them with antiserums for the remaining groups.

Group 3. Types 9, 33, 49, and 68 (see table 1).—Types related to 9 have been the subject of considerable study. In 1939 Vammen (*10*)

TABLE 1.—*Cross reactions of heterologous type antiserums with pneumococci, types 9, 33, 49, and 68*

Antiserums			Capsular swelling titers for types—				
Use	Type	Lot	Homologous	9 (9N)	49 (9L)	33 (9A)	68 (9VT)
Therapeutic	1	101	1:128+	0	0	T	T
Do	5	501	1:128	P	0	0	0
Do	8	807	1:64+	0	0	T	T
Do	9	901	1:128+	1:128+	1:128	1:8+	1:8+
Diagnostic	9	906	1:32+	1:32+	1:32	0	0
Do	9	[1] 909	1:16+	1:16+	1:16+	<1:4	<1:4
Therapeutic	11	1106	1:128	P	P	0	0
Do	15	1501	1:128	0	0	P	0
Do	16	1603	1:128+	T	T	0	0
Do	18	1802	1:128+	T	0	0	0
Do	19	1901	1:128+	T	T	0	0
Do	33	3301	1:128+	1:4	1:8+	1:128+	1:128
Do	33	3302	1:64	<1:4	<1:4	1:64	1:32+
Diagnostic	33	[2] 3304	1:32	0	0	1:32	1:16+
Do	33	[3] 3306	1:32+	0	1:4+	1:32+	1:32
Do	33	[3] 3307	1:32	0	1:4+	1:32	----
Do	33	[2] 3309	1:32+	0	0	1:32+	----
Experimental	44	(4)	1:16	T	T	0	0
Do	53	(4)	1:16	0	0	T	0

[1] Antiserum not absorbed with type 33 pneumococci.
[2] Antiserum absorbed with type 49 pneumococci.
[3] Antiserum absorbed with type 9 pneumococci.
[4] Unabsorbed antiserums prepared at the New York City Laboratories.

The figures state the capsular swelling titers of the antiserums. "P" indicates that undiluted antiserum caused capsular swelling but that less than 90 percent of the organisms had capsules with distinct outlines, "T" that there was perceptible swelling but none of the pneumococci had capsules with distinct outlines, and "0" that no capsular swelling occurred.

described three serologic variants, types 9L, 9N, and 9V, of which the first two correspond to types 49 and 9, respectively. The next year, in 1940, Walter and her associates (*11*) reported on type 33 as being immunologically related to type 9. Mørch (*1*), investigating this type, found it to be closely related to 9V and renamed it type 9A. A known culture of the type 9V pneumococcus was not included in this study but the pneumococcus type 68 is closely related to type 33 and it is possibly the same as 9V. Types 9 and 49 as well as types 33 and 68 are much alike and the two groups are related to each other. It is possible that an antiserum can be prepared and standardized with types 9 and 33 which will be effective for all four types.

Group 4. Types 10, 34, and 69, and types 13 and 21 (see table 2).—Types 10 and 34 exhibit strong cross reactions and type 34 antiserums react regularly with type 69. Of the three types of pneumococci, type 69 shows capsular swelling with more heterologous type antiserums than type 10 or 34. It is possible that an effective antiserum

can be prepared for the three types although whether type 69 is prevalent enough to warrant its inclusion in the group must await further study.

It will further reduce the number of antiserums on the market if types 13 and 21 can also be included in the group with types 10, 34,

TABLE 2.—*Cross reactions of heterologous type antiserums with pneumococci, types 10, 13, 21, 34, and 69*

Antiserums			Capsular swelling titers for types—					
Use	Type	Lot	Homologous	10	34 (10A)	69 (39)	13	21
Therapeutic	6	602	1:128+	0	0	T	0	0
Do	7	704	1:128+	0	0	P	0	0
Do	7	705	1:64+	T	0	0	0	0
Do	10	1001	1:128	1:128	1:16+	P	<1:4	0
Diagnostic	10	1007	1:16	1:16	0	0	0	
Therapeutic	13	1301	1:256	<1:4	0	T	1:256	0
Do	14	1406	1:128	0	0	T	0	0
Do	15	1501	1:128	0	0	T	0	0
Do	16	1605	1:128	0	0	0	0	T
Do	17	1701	1:128	0	0	0	T	0
Do	19	1901	1:128	0	0	T	<1:4	0
Do	20	2002	1:128+	1:4	0	T	P	0
Do	21	2102	1:128	0	P	1:8	0	1:128
Diagnostic	21	2106	1:32+		T	<1:4		1:32+
Therapeutic	22	2201	1:128+	0	0	T	0	P
Do	24	2401	1:128	0	0	0	0	P
Do	25	2501	1:128	0	P	T	0	T
Do	27	2701	1:128	0	0	T	0	0
Do	29	2901	1:128	T	T	1:8	P	0
Do	33	3301	1:128+	0	0	T	0	0
Do	34	3402	1:64+	1:16+	1:64+	1:16+	0	T
Diagnostic	34	3404	1:16+	0	1:16+	1:8+		
Do	34	3407	1:16+	0	1:16+	P	0	0
Experimental	41	(1)	1:8+	0	T	0	0	0
Do	52	5202	1:16+	T	0	0	0	T
Do	62	(2)	1:32	T	0	T	0	0
Do	66	(2)	1:32+	T	0	T	0	0
Do	70	(2)	1:16+	P	P	0	0	0
Do	74	(2)	1:16	0	0	0	P	0
Do	75	(2)	1:32+	0	0	<1:4	0	0

[1] Diagnostic antiserum prepared at Lederle Laboratories, Inc.
[2] Unabsorbed antiserum prepared at the New York City Laboratories.

and 69. Like types 10 and 34, they are relatively unimportant types. Types 10 and 13 exhibit some of the same serological reactions and type 21 antiserums show strong cross reactions with type 69 and weak reactions with type 34.

Group 5. Types 11, 43, and 53, and types 16, 28, and 72 (see table 3).—Antiserums for either type 11 or 43 are effective for both types and both show cross reactions with type 53. In addition, pneumococci of the three types exhibit swollen capsules with some of the same heterologous type antiserums. Information on type 53 as a cause of disease is lacking but it is antigenically related to the two more well-known types.

Also crossing with type 43 is type 16 and, in turn, type 16 is related to types 28 and 72. Commercial monovalent antiserums now are prepared for types 16 and 28 but because of cross reactions between these two types, they could likely be combined for the production of a

bivalent antiserum. It is possible that they could also be combined with type 72 and with types 11 or 43 and 53.

TABLE 3.—*Cross reactions of heterologous type antiserums with pneumococci, types 11, 16, 28, 43, 53, and 72*

Antiserums			Capsular swelling titers for types—						
Use	Type	Lot	Homologous	11	43 (11A)	53 (11B?)	16	28	72 (T)
Therapeutic	6	604	1:64+	1:4+	0	T	0	P	T
Do	7	703	1:128+	T	T	T	0	T	0
Do	9	904	1:128+	P	P	0	P	0	0
Do	11	1102	1:128	1:128	1:128	1:8+	T	T	0
Diagnostic	11	1109	1:16	1:16	1:16	<1:4	0		
Therapeutic	15	1501	1:128	1:4	1:8	0	0	0	0
Diagnostic	15	1506	1:32	0	0				
Therapeutic	16	1601	1:128+	0	1:4+	<1:4	1:128+	1:4	P
Diagnostic	16	1608	1:32	0	<1:4	P	1:32	0	T
Therapeutic	18	1802	1:128+	0	P	P	P	0	T
Do	20	2003	1:128	P	<1:4	T	0	0	0
Do	23	2301	1:128	0	0	0	0	T	0
Do	24	2402	1:128	0	0	0	0	T	0
Do	25	2501	1:128	0	0	0	0	T	0
Do	28	2801	1:128	0	0	0	1:8+	1:128	0
Do	33	3301	1:128+	0	T	P	0	0	0
Experimental	43	(1)	1:32+	1:16+	1:32+	1:4+	<1:4	0	0
Do	44	(2)	1:16+	0	T	T	T	0	T
Do	52	5204	1:64+	T	<1:4	0	0	0	0
Diagnostic	53	(2)	1:16	1:4+	T	1:16	0	0	0
Experimental	64	(2)	1:32	0	0	0	0	<1:4	0
Do	72	(2)	1:8+	0	T	T	P	0	1:8+
Do	73	(2)	1:8	0	0	0	0	T	0

[1] Diagnostic antiserum prepared at Lederle Laboratories, Inc.
[2] Unabsorbed antiserum prepared at the New York City Laboratories.
[3] Submitted for release as a type 11 antiserum.

Group 6. Types 12, 25, and 71 (see table 4).—Types 12 and 25 are similar in their clinical manifestations of disease in that a large percentage of the cases of pneumonia due to these types have been reported to have positive blood cultures (*7*). The two types are not related antigenically and, moreover, they are among the most specific of the pneumococcic types. Highly potent types 12 and 25 antiserums give few cross reactions, and few heterologous antiserums cause capsular swelling with either type. The only cross reaction shown regularly was by type 25 antiserums for type 71. Kauffmann (*12*) noted cross reactions between types 10 and 71. None of the type 10 antiserums employed in this study caused capsular swelling

TABLE 4.—*Cross reactions of heterologous type antiserums with pneumococci, types 12, 25, and 71*

Antiserums			Capsular swelling titers for types—			
Use	Type	Lot	Homologous	12	25	71 (25) (25)
Therapeutic	5	501	1:128	T	0	0
Do	12	1201	1:128	1:128	0	0
Do	25	2501	1:128	0	1:128	P
Diagnostic	25	2504	1:32		1:32	P
Do	25	2506	1:32		1:32	T

TABLE 5.—*Cross reactions of heterologous type antiserums with pneumococci, types 15, 18, 23, 30, 44, 46, 54, 55, 56, and 64*

Antiserums			Capsular swelling titers for types—										
Use	Type	Lot	Homologous	15	30 (15A)	54 (15B)	18	44 (18A)	55 (18B)	56 (18C)	23	46 (23A)	64 (23B)
Therapeutic	3	304	1:32	0	0	0	0	0	0	0	0	0	0
Do	4	401	1:128+	0	0	0	0	0	0	0	0	0	0
Do	6	603	1:64+	0	0	0	0	0	0	0	0	0	0
Do	7	704	1:128+	0	0	0	0	0	0	0	0	0	0
Do	8	804	1:64+	0	0	0	0	0	0	0	0	0	0
Do	9	901	1:128+	0	0	0	0	0	0	0	0	0	0
Do	11	1102	1:128	0	0	0	0	0	0	0	0	0	0
Do	13	1301	1:256	0	0	0	0	0	0	0	0	0	0
Do	14	1401	1:128+	0	P	1:4	0	0	0	P	0	0	0
Do	15	1501	1:128	1:128	1:32+	1:128	0	0	0	0	0	1:4+	0
Diagnostic	15	1507	1:16+	1:16+	1:4+	1:8+	P	T	T	P	P	1:4	P
Do	15	1510	1:32+	1:32+	1:8+	1:32	0	P	P	0	0	T	0
Therapeutic	16	1601	1:128+	0	T	0	P	0	P	P	0	0	0
Do	17	1703	1:16+	0	0	0	T	P	0	T	0	P	T
Do	18	1805	1:128	0	0	0	1:128	1:16	1:16	1:128	0	0	0
Diagnostic	18	1817	1:16				1:16	1:4	1:4	1:16	0	P	0
Do	18	[1] 1818	1:16+				1:16+	0	P	1:16+	0	0	0
Therapeutic	19	1901	1:128+			0	0	T	0	T	0	0	0
Do	20	2001	1:128	0	0	V	0	0	0	0	0	0	0
Do	21	2101	1:128	T	T	1:4	0	0	0	0	0	0	0
Do	23	2302	1:128+	T	T	P	V	T	V	V	1:128+	T	0
Diagnostic	23	2305	1:32			T	1:4	0	1:4	1:4	1:32	1:32	1:16+
Therapeutic	27	2701	1:128	0	P	0	0	0	0	0	0	V	V
Do	28	2801	1:128	0	T	0	0	0	0	0	0	T	1:4+
Diagnostic	28	2805	1:16										V
Therapeutic	29	2901	1:128	P	T	T	0	0	0	0	0	0	0
Do	31	3102	1:32+	T	0	0	0	0	0	0	P	0	0
Do	32	3201	1:128	0	0	0	0	T	0	0	0	T	0
Do	33	3301	1:128+	T	0	0	0	1:8+	T	0	P	0	0
Experimental	44	[2]	1:8+	0	0	0	1:4+	1:16+	1:8+	1:4+	0	0	0
Do	44	[3]	1:16+	T	0	0	0	0	0	T	0	0	0
Do	62	[3]	1:32+	0	0	0	0	0	T	T	0	0	0
Do	64	[3]	1:32	0	0	0	0	0	0	0	0	0	1:32
Do	72	[3]	1:8+	0	0	0	0	0	0	0	0	0	0

[1] Antiserum absorbed with type 44 pneumococci.
[2] Diagnostic antiserum prepared at Lederle Laboratories, Inc.
[3] Unabsorbed antiserums prepared at the New York City Laboratories.

of the type 71 pneumococcus. Unlike many of the types above 34 the culture of type 71 tested was highly virulent for mice. Its role as a causative agent of disease in man is unknown, but if it were to be combined with any other types for the production of antiserum, the most logical would seem to be with types 12 and 25.

Group 7. Types 15, 30, and 54; types 18, 44, 55, and 56; and types 23, 46, and 64 (see table 5).—Types 15, 18, and 23 are representatives of three groups of pneumococci which show relatively weak cross reactions but which are of about equal importance as causes of bronchopneumonia (*5*) and pneumonias in infants and children (*7*). An effective polyvalent antiserum for the three groups would be of use for a large number of cases of the same general prognosis.

Types 15 and 54 are closely related and have been discussed elsewhere (*4*). Type 15 antiserums also show strong cross reactions with type 30 so that the inclusion of the latter with type 15 or 54 for the production of an antiserum should insure an antiserum useful for all three types.

Types 18 and 56 are similar and type 18 antiserums give titers as high for type 56 as for the homologous type 18. There are strong cross reactions with types 44 and 55, and some of the same heterologous type antiserums cause capsular swelling of pneumococci of all four types. Because of these antigenic similarities it would be logical to group type 18 or 56 with types 44 and/or 55 for the production of a polyvalent antiserum. However, the prevalence and importance of types 44 and 55 as causes of disease should be taken into account.

Type 23 antiserums regularly exhibit strong cross reactions with types 46 and 64. Antiserums for the two latter types could possibly be prepared in combination for type 23 although type 46 is also antigenically related to type 15 and type 64 to type 28.

Type 15 antiserums give cross reactions with types 44 and 46, type 18 antiserums with types 23 and 64, and type 23 antiserums with types 15, 18, 30, 44, 54, 55, and 56. There are also antigenic components in common with additional types. However, these latter types differ from types 15, 18, or 23 either in prevalence or in cross reactions with other heterologous types.

Group 8. Types 17, 22, and 63 (see table 6).—No cross reactions between types 17 and 22 were observed but antiserums for both types regularly show cross reactions with type 63. Types 22 and 63 are closely related and antiserums for type 22 yield titers for type 63 which are almost as high as for the homologous type 22. Since antiserums are prepared commercially for both types 17 and 22, it is possible that a bivalent antiserum for types 17 and 22 or 63 could be made more economically.

TABLE 6.—*Cross reactions of heterologous type antiserums with pneumococci, types 17, 22, and 63*

Antiserums			Capsular swelling titers for types—			
Use	Type	Lot	Homologous	17	22	63 (22A)
Therapeutic	10	1091	1:128	T	0	0
Do	11	1104	1:128	P	0	0
Do	13	1301	1:256	T	0	0
Do	14	1401	1:128+	P	T	0
Do	15	1504	1:32	<1:4	0	0
Do	17	1701	1:128	1:128	0	1:8+
Diagnostic	17	1704	1:32	1:32	0	<1:4
Therapeutic	22	2201	1:128+	0	1:128+	1:128
Diagnostic	22	2206	1:16+	----------	1:16+	1:8+
Therapeutic	23	2302	1:128+	0	P	T
Do	24	2401	1:128	0	P	T
Do	29	2901	1:128	0	1:4	<1:4
Do	31	3102	1:32+	0	P	<1:4
Diagnostic	31	3109	1:4+	----------	0	T
Do	31	3114	1:8+	----------	0	P

Group 9. Types 20, 31, 40, 47, 61, and 62; types 29 and 66; and types 35 and 52 (see table 7).—Pneumococci of these types have more complicated antigenic structure than any of the other types thus far studied. They show strong cross reactions with each other and with many other types as well. Type 20 therapeutic antiserums yield titers for types 40, 47, 61, and 62 that are one-half or more the titers for the homologous type 20 and each gives a strong cross reaction with type 31. Also, type 31 therapeutic antiserums show strong cross reactions with types 20, 40, 47, 61, and 62. However, diagnostic antiserums for either type 20 or 31 yield very low titers for any of the related types, in no instance higher than 1:4. A possible explanation for this is that absorption of cross reactions from diagnostic types 20 and 31 antiserums with some heterologous type of pneumococcus removes most of the antibodies for these organisms. How many of the six types of pneumococci are necessary to produce an antiserum effective for all of the types for both therapeutic and diagnostic use must await actual trial though it is possible that types 20 and 31 will suffice.

Types 29 and 66 are closely related and antiserums for type 29 regularly show titers for type 66 that are almost as high as for the homologous type. Of the two types, 66 appears to have broader antigenic components. One type 66 antiserum produced capsular swelling titers for six of nine heterologous types in these groups that were from one-fourth to one-half the titer for type 66. Forster and his coworkers (*13*) noted a type 66 antiserum that was highly effective in protecting mice against a type 29 culture and in less degree against pneumococci of types 10 and 20. Type 66 pneumococci are reacted upon by more heterologous type antiserums than type 29, and some of these antiserums also manifest cross reactions with type 20 and its closely related types and with types 35 and 52.

TABLE 7.— *Cross reactions of heterologous type antiserums with pneumococci, types 20, 29, 31, 35, 40, 47, 52, 61, 62, and 66*

Antiserums			Capsular swelling titers for types—										
Use	Type	Lot	Homologous	20	31	40	47 (35A)	61 (42?) (Weingart)	62	29	66 (35B) (Hoge)	35	52 (Odd)
Therapeutic	2	201	1:256	P	0	0	0	0	0	0	0	0	0
Do	5	501	1:128	0	0	0	0	0	0	0	0	0	0
Do	6	602	1:128+	P	P	P	0	0	0	0	0	0	P
Do	6	604	1:64+	0	0	0	0	0	0	0	1:4+	P	1:4+
Do	10	1001	1:128	1:4+	0	0	1:4	1:4+	1:4+	<1:4	<1:4	<1:4	<1:4
Diagnostic	10	1004	1:16+	0	----------	----------	<1:4	<1:4	----------	0	<1:4	----------	----------
Do	10	1008	1:16+	0				<1:4	<1:4	0	<1:4		
Therapeutic	11	1102	1:128	0	0	0	0	0	0	0	0	0	0
Do	13	1301	1:256	<1:4	0	0	0	0	0	0	<1:4	0	0
Do	15	1501	1:128	0	0	0	0	0	0	0	0	0	0
Do	17	1701	1:128	0	0	0	0	0	0	0	0	0	0
Do	18	1801	1:128	0	0	0	0	0	0	0	0	0	0
Do	19	1903	1:128+	0	<1:4	0	0	0	0	0	0	0	0
Do	20	2001	1:128	1:128	1:32	1:64+	1:64	1:64	1:64	0	1:4+	<1:4	0
Diagnostic	20	2008	1:16+	1:16+	0	P	P	<1:4	<1:4	0	<1:4	0	0
Therapeutic	21	2101	1:128	0	0	0	0	0	0	0	<1:4	0	0
Do	21	2102	1:128	0	0	0	0	0	0	0	0	0	0
Do	22	2201	1:128+	0	1:8	0	0	0	0	0	0	0	0
Do	23	2301	1:128	0	0	0	0	0	0	0	0	0	0
Do	29	2901	1:128	0	0	0	1:8	0	0	1:128	1:64+	1:4	1:4
Diagnostic	29	2905	1:32	----------	----------	----------	<1:4	<1:4	<1:4	1:32	1:16+	P	P
Therapeutic	31	3101	1:128	1:32+	1:128	1:32+	1:32+	1:32+	1:32+	0	0	0	<1:4
Diagnostic	31	3104	1:16+	0	1:16+	P	<1:4	<1:4	<1:4	----------	----------	----------	----------
Therapeutic	32	3202	1:128+	0	<1:4	0	0	0	P	0	0	0	P
Do	34	3401	1:64	0	0	0	0	0	0	0	0	<1:4	<1:4
Experimental	41	(1)	1:8+	0	0	0	0	<1:4	1:8	0	1:8	1:8+	1:16+
Do	44	(2)	1:16	0	0	0	0	1:8	1:32	0	1:16+	1:4+	1:8
Do	52	5202	1:16+	0	0	0	<1:4	1:32	0	P	1:32+	0	0
Do	62	(2)	1:32+	<1.4	<1:4	<1:4	1:32+	1:32	1:32+	1:16	P	1:8+	1:8+
Do	64	(2)	1:32	0	0	0	0	1:16	0	0	0	0	0
Do	66	(2)	1:32+	0	0	0	1:16	0	1:16	1:16	P	1:8+	1:8+
Do	70	(2)	1:16+	0	0	0	<1:4	0	P	0	0	0	0
Do	73	(2)	1:8	0	0	0	0	0	0	0	0	0	0
Do	75	(2)	1:32+	0	0	0	0	0	0	0	0	0	0

[1] Diagnostic antiserum prepared at Lederle Laboratories, Inc.
[2] Unabsorbed antiserum prepared at the New York City Laboratories.

Types 35 and 52 show many serologic reactions in common, and pneumococci of the two types are reacted upon by many of the antiserums which cause capsular swelling of other organisms in the groups with types 20 and 29. From previous reports (*14*, *15*) it appears that both types 35 and 52 are important as causes of disease. If pneumococci of one or both types can be combined with types 29 and 66 and with type 20 and/or any of the types closely related to 20 for the production of one antiserum, much laborious standardization of diagnostic monovalent antiserums will be eliminated and infections due to many types of pneumococci can be treated with a single polyvalent antiserum.

Group 10. Types 24, 45, 65; types 48 and 50; and types 58, 59, and 60 (see table 8).—With the exception of type 24, little information is

TABLE 8.—*Cross reactions of heterologous type antiserums with pneumococci, types 24, 45, 48, 50, 58, 59, 60, and 65*

Antiserums			Capsular swelling titers for types—								
Use	Type	Lot	Homologous	24	45 (24A) (40)	65 (24A)	48 (7B)	50 (7C)	58 (19B)	59 (19C)	60
Therapeutic	2	201	1:256	0	1:4	0	0	0	0	0	0
Do	6	604	1:64+	T	0	P	0	0	T	T	T
Do	7	701	1:128+	0	T	0	1:16	1:8+	T	T	0
Diagnostic	7	707	1:16+				<1:4	<1:4			
Therapeutic	8	803	1:256	0	0	0	T	T	0	0	0
Do	8	804	1:64+	0	T	0	T	0	0	0	0
Do	9	904	1:128	0	0	0	0	0	T	T	0
Do	17	1701	1:128	0	0	0	0	0	T	T	1:8+
Do	19	1901	1:128	0	0	0	0	0	1:8+	1:8+	0
Diagnostic	19	1907	1:32						<1:4	<1:4	
Therapeutic	20	2001	1:128	0	1:8	0	0	1:4+	0	0	0
Diagnostic	20	2010	1:16		<1:4			<1:4			
Therapeutic	24	2401	1:128	1:128	1:16	1:32+	1:4+	1:8+	<1:4	1:4+	1:8+
Diagnostic	24	2406	1:16+	1:16+	1:4	1:8+	1:4	1:4+	<1:4	<1:4	P
Therapeutic	29	2901	1:128	0	0	0	T	0	0	0	0
Do	33	3301	1:128+	0	0	0	0	0	T	T	0
Experimental	59	(1)	1:16+	T	T	0	<1:4	<1:4	1:4+	1:16+	1:16
Do	66	(1)	1:32+	0	0	0	T	0	0	0	0

[1] Unabsorbed antiserums prepared at the New York City Laboratories.

available on the prevalence of any of the pneumococci in this group (*14*). Types 24 and 65 are much alike and type 24 antiserums yield titers for type 65 that are approximately one-half as high as the titers for the homologous type. They also regularly give cross reactions with type 45 and weaker cross reactions with types 48, 50, 58, 59, and 60. Antiserums for certain other types also cause capsular swelling of these pneumococci. For instance, type 7 antiserums evince cross reactions with types 48 and 50, type 17 antiserums with type 60, type 19 antiserums with types 58 and 59, type 20 antiserums with types 45 and 50, and one type 59 antiserum with types 24, 45, 48, 50, 58, and 60. Mørch (*1*) reported that type 45 (the Danish type 40) crossed with types 20, 24, 48, 50, 58, and 59. Types 48 and 50 have been classified as subtypes of 7 (*12*) and types 58 and 59 as subtypes

of 19 (*1*). However, based upon cross reactions, there is as much reason to group them tentatively with type 24 as with types 7 and 19.

Group 11. Types 27, 32, and 67 (see table 9).—Type 32 antiserums yield almost identical titers for the homologous types 32 and 67,

TABLE 9.—*Cross reactions of heterologous type antiserums with pneumococci, types 27, 32, and 67*

Antiserums			Capsular swelling titers for types—			
Use	Type	Lot	Homologous	27	32	67 (32A)
Therapeutic	7	702	1:256+	T	0	0
Do	15	1502	1:128	T	0	0
Do	17	1701	1:128	0	T	T
Do	19	1903	1:128+	0	T	T
Do	23	2302	1:128+	T	1:4	1:8
Do	27	2701	1:128	1:128	P	0
Diagnostic	27	2705	1:16+	1:16+	0	0
Therapeutic	32	3202	1:128+	0	1:128+	1:128+
Diagnostic	32	3205	1:32	----------	1:32	1:16+
Experimental	74	(1)	1:16	0	T	T

[1] Unabsorbed antiserum prepared at the New York City Laboratories.

and pneumococci of type 32 manifest capsular swelling with highly potent antiserum of type 27. Types 27 and 32 are among the least prevalent types for which commercial antiserums are manufactured and for this reason, more than because of their cross reactions, an antiserum for the combined types might be advisable.

Group 12. Types 36, 38, and 74 (see table 10).—Pneumococci of types 38 and 74 appear to be more closely related to each other than to type 36. However, type 36 pneumococci show capsular swelling

TABLE 10.—*Cross reactions of heterologous type antiserums with pneumococci, types 36, 38, and 74*

Antiserums			Capsular swelling titers for types—			
Use	Type	Lot	Homologous	36	38	74
Therapeutic	2	202	1:256	0	T	0
Do	5	505	1:128+	T	T	0
Do	6	604	1:64+	P	0	T
Do	7	703	1:128+	T	0	0
Do	9	904	1:128	P	T	0
Do	10	1001	1:128	T	0	0
Do	12	1202	1:128	T	T	0
Do	13	1302	1:64+	0	1:4	1:8
Do	15	1502	1:128	0	T	0
Do	20	2002	1:128+	T	0	0
Do	21	2102	1:128	0	T	0
Do	22	2201	1:128+	<1:4	<1:4	1:4
Diagnostic	22	2209	1:32+	0	P	<1:4
Therapeutic	23	2302	1:128+	T	T	<1:4
Diagnostic	23	2307	1:32+	0	0	P
Therapeutic	29	2901	1:128	<1:4	0	0
Do	32	3202	1:128+	0	T	P
Do	33	3301	1:128+	0	T	T
Experimental	52	5202	1:16+	0	P	0
Do	74	(1)	1:16	T	1:8	1:16

[1] Unabsorbed antiserum prepared at the New York City Laboratories.

TABLE 11.—*Cross reactions of heterologous type antiserums with pneumococci, types 39, 42, and 70*

Antiserums			Capsular swelling titers for types—			
Use	Type	Lot	Homologous	39 (33C)	42 (30) (33B)	70 (40A) (33)
Therapeutic	10	1001	1:128	0	T	0
Do	13	1301	1:256	0	0	P
Do	21	2101	1:128	<1:4	0	0
Do	29	2901	1:128	0	T	0
Diagnostic	42	4201	1:32	<1:4	1:32	1:4+
Experimental	52	5202	1:16+	0	0	T
Do	64	(1)	1:32	T	0	0
Do	66	(1)	1:32	0	0	P
Do	70	(1)	1:16+	<1:4	<1:4	1:16+
Do	73	(1)	1:8	0	0	T

[1] Unabsorbed antiserum prepared at the New York City Laboratories.

with many of the heterologous type antiserums which give cross reactions with type 38 or 74. A polyvalent antiserum probably can be made for all three types.

Group 13. Types 39, 42, and 70 (see table 11).—These types were described by Mørch (*1*) as belonging to group 33. The fourth type in group 33 was the present type 40, which in this study appears to be closely related to type 20. Antiserums for types 1 to 34, inclusive, did not show strong cross reactions with any of the three types nor did a single heterologous type antiserum react with all of them. However, one antiserum each for types 42 and 70 yielded relatively strong cross reactions for each of the remaining two types and it appears likely that they can be combined for the production of a polyvalent antiserum.

Remaining unrelated types.—Of the pneumococci included in this study there are only four types, 37, 41, 73, and 75, which show few serologic reactions or characteristics in common with other types. It is not known whether these types are prevalent enough to justify the manufacture of antiserums. If they are, they might be combined in a new group, or possibly they can be combined with some of the previously described groups. Type 37 showed no capsular swelling with any of the heterologous type antiserums and it might be grouped with types 27, 32, and 67 since none of the latter types cross with many heterologous types.

Type 41 shows slight cross reactions with types 33 and 34 and if included in any group it might be with types 9 and 33. Type 73 gives a very slight cross reaction with type 12 and it is more virulent for mice than many of the higher types of pneumococci. It would appear logical to group it with types 12, 25, and 71. There are slight cross reactions between type 75 and types 34, 69, and 32, but the three latter types are more closely related to a number of other types. Further study of this type with potent antiserums of the newer types

may reveal relationships to other types. If not, it might be included in the group with types 36, 38, and 74, or with types 39, 42, and 70.

A résumé of the pneumococcic types comprising the different groups is shown in table 12.

TABLE 12.—*Résumé of the tentative grouping of pneumococcic types*

Group	Types included in the group	Types of antigens necessary to produce antiserum for the group	Types which may be disregarded	Remarks
1	1, 2, 5, 6, 7, 26, 51	1, 2, 5, 6, 7	26, 51	
2	3, 4, 8, 14, 19, 57	3, 4, 8, 14, 19	57	
3	9, 33, 49, 68	9, 33	49, 68	
4	10, 13, 21, 34, 69	10, 13, 21, 34 and/or 69	Possibly 34 or 69	Further study is required. There is a strong cross between 34 and 69.
5	11, 16, 28, 43, 53, 72	11 or 43, 16, 28, 53, 72	11 or 43	Types 53 and 72 could be omitted from the group.[1]
6	12, 25, 71	12, 25, 71	None	Type 71 could be omitted from the group.[1]
7	15, 18, 23, 30, 44, 46, 54, 55, 56, 64.	15 or 54, 18 or 56, 23, 30, 44 and/or 55, 46, 64.	15 or 54, 18 or 56, possibly 44 or 55.	Types 44, 46, 55, and 64 could be omitted from the group.[1]
8	17, 22, 63	17, 22	63	
9	20, 29, 31, 35, 40, 47, 52, 61, 62, 66.	20, 29 or 66, 31, 35 and/or 52.	29 or 66, possibly also 35 or 52, and 40, 47, 61, 62.	Further study is required. Types 20 and 31 antiserums show cross reactions for 40, 47, 61, and 62 which are too strong to be absorbed easily.
10	24, 45, 48, 50, 58, 59, 60, 65.	24 or 65, 45, 48 and/or 50, 58 and/or 59, 60.	24 or 65, possibly also 48 or 50, 58, 59 or 60.	Types 45, 48, 50, 58, 59, and 60 could be omitted from the group.[1]
11	27, 32, 67	27, 32	67	
12	36, 38, 74	36, 38 and/or 74	Possibly 38 or 74	
13	39, 42, 70	39, 42, 70	None	
14	37, 41, 73, 75	37, 41, 73, 75	None	This is a miscellaneous group. Type 37 could also be included in group 11, type 41 in group 3, type 73 in group 6, and type 75 in group 12 or 13.

[1] If omitted, diagnostic antiserum for the group would have to have cross reactions for these types removed.

DISCUSSION

This study of cross reactions among the pneumococcic types has confirmed in many instances the relationship of different types as noted by other investigators (*1, 10, 12, 14, 15, 16*). Since particular attention has been given to the extent or degree of cross reactions and to the epidemiology of the related types, changes have been suggested in the types making up some of the groups.

It is reported that pneumococci differ in the immune response they evoke in animals (*17*). For this reason, all groups must be regarded as tentative until it is ascertained by practice that the types used as

immunogens stimulate the production of antibodies sufficient to meet the minimum requirements for satisfactory antiserums. Less change in the established group mixtures of diagnostic antiserums would be necessary if polyvalent therapeutic antiserums were produced first. Groups of types which prove satisfactory for the production of therapeutic antiserums could then be used for diagnostic antiserums. In order to reduce to a minimum the time and effort spent on the preparation of specific diagnostic antiserums or effective therapeutic antiserums, it must be emphasized that combinations of types cannot be made arbitrarily. Also, caution must be exercised in the use of the mouse protective tests to compare the effectiveness of an antiserum for different types. Closely related types often differ greatly in their power to kill mice and these differences must be taken into account.

SUMMARY

Tentative combinations of types of pneumococci for the production of polyvalent antiserums, based upon cross reactions and reports of type incidence, are discussed.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

February 27–March 25, 1944

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State for each week are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended March 25, 1944, the number reported for the corresponding period in 1943, and the median number for the years 1939–43.

DISEASES ABOVE MEDIAN PREVALENCE

Measles.—The number of cases of measles dropped from approximately 142,000 during the preceding 4-week period to 130,483 during the 4 weeks ended March 25. The current incidence was, however, 1.5 times the median seasonal expectancy. Each section of the country contributed to the high incidence of this disease. The largest number of cases was reported from the East North Central region, but the increases in other sections of the country ranged from 1.1 times the median in the Pacific region to almost 3 times the median in the Middle Atlantic States.

Meningococcus meningitis.—The incidence of this disease continued at a relatively high level. For the 4 weeks ended March 25 there were 2,150 cases reported, as compared with 2,272 cases in 1943, but the 1939–43 median for this period was only 201 cases. The disease has been unusually prevalent in all sections of the country. States reporting a high incidence were New York (243 cases), California (158), Illinois (144), Pennsylvania (138), Michigan (120), Ohio (119), Missouri and Tennessee (99 each), and Virginia (98); more than one-half of the total cases occurred in these nine States

Number of reported cases of 9 communicable diseases in the United States during the 4-week period Feb. 27–Mar. 25, 1944, the number for the corresponding period in 1943 and the median number of cases reported for the corresponding period, 1939–43

Division	Current period	1943	5-year median	Current period	1943	5-year median	Current period	1943	5-year median
	Diphtheria			Influenza[1]			Measles[2]		
United States	936	957	1,075	16,532	17,615	32,019	130,483	87,789	86,495
New England	40	10	25	83	35	48	7,567	8,422	6,153
Middle Atlantic	95	140	178	95	110	245	21,783	25,237	7,552
East North Central	142	116	199	777	430	1,940	35,573	13,993	7,891
West North Central	117	79	80	396	183	518	13,665	7,699	6,092
South Atlantic	133	169	205	4,540	7,324	11,085	24,834	5,222	11,873
East South Central	75	88	105	1,609	1,213	2,777	3,863	6,189	1,898
West South Central	194	204	209	6,913	6,921	10,377	8,982	5,634	4,502
Mountain	36	52	71	1,566	949	1,257	5,131	6,924	3,501
Pacific	104	99	99	553	450	1,141	9,085	8,469	8,469
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	2,150	2,272	201	68	92	74	28,659	16,287	18,079
New England	147	281	12	4	6	1	2,424	2,631	1,406
Middle Atlantic	460	479	44	5	12	7	6,093	3,953	5,269
East North Central	457	199	25	5	9	11	7,590	4,203	5,430
West North Central	167	137	11	8	5	5	3,401	1,718	1,718
South Atlantic	347	464	43	3	10	10	2,959	1,082	1,031
East South Central	219	226	27	3	7	7	722	541	768
West South Central	124	166	19	12	17	10	570	414	414
Mountain	24	65	7	5	8	5	1,447	848	552
Pacific	205	255	15	23	18	13	3,453	897	897
	Smallpox			Typhoid and paratyphoid fever			Whooping cough[2]		
United States	39	90	183	241	229	299	7,644	16,081	16,081
New England	0	0	0	8	6	11	717	1,445	1,465
Middle Atlantic	0	0	0	33	45	45	1,236	3,841	3,841
East North Central	6	38	58	32	31	32	1,293	3,383	3,383
West North Central	9	12	77	17	19	14	433	794	632
South Atlantic	2	14	8	54	59	66	1,570	1,972	1,972
East South Central	5	5	8	18	13	31	485	666	566
West South Central	13	16	39	50	34	47	787	1,982	907
Mountain	2	3	7	9	7	16	437	501	863
Pacific	2	2	15	20	24	26	686	1,497	1,497

[1] Mississippi and New York excluded; New York City included.
[2] Mississippi excluded.

which represented every section of the country except the West South Central and Mountain regions. The smallest increase (3.4 times the median) was in the Mountain section, and the largest increase (18.3 times the median) occurred in the East North Central region.

Scarlet fever.—There were 28,659 cases of scarlet fever reported for the current 4-week period. In 1943 there were 16,287 cases reported for the corresponding period, and the 1939–43 median was approximately 18,000 cases. An increase of this disease is normally expected at this season of the year, but the rate of increase during this period was somewhat higher than in preceding years, and the current incidence was the highest for this period in 7 years. Each section of the country except the East South Central contributed to the current excess of cases.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The incidence of diphtheria was the lowest on record for this period, the number of reported cases (936) being slightly below the previous year, during which 957 cases were reported. The 1939–43 median for this period was 1,075 cases. The New England and West North Central regions each reported an excess of approximately 45 percent over the median seasonal expectancy; a slight increase over the median was also reported from the Pacific region, but in all other sections the incidence was comparatively low.

Influenza.—The number of cases of influenza reported for the 4 weeks ended March 25 was 16,532, as compared with 17,615 for the corresponding period in 1943, and a preceding 5-year median of 32,019 cases. The current incidence was somewhat above the normal seasonal expectancy in the New England and Mountain regions, but all other sections reported a relatively low incidence.

Poliomyelitis.—The number of cases (68) of poliomyelitis reported during the current 4-week period was about 30 percent below the number reported during the corresponding period in 1943, and 10 percent below the 1939-43 median for this period. In the West North Central and Pacific regions the numbers of cases were almost twice the median incidence in each region, and 4 cases in the New England region compared with a 1939-43 median of 1 case; in other regions the situation compared very favorably with the experience of preceding years.

Smallpox.—The incidence of smallpox reached a new low level for this season of the year. For the 4 weeks ended March 25 there were 39 cases reported as compared with 90 in 1943 and a median of 183 cases for the corresponding period in 1939-43. The situation was favorable in all sections of the country, the numbers of cases in the various regions either closely approximating the medians or falling considerably below them.

Typhoid and paratyphoid fever.—Due largely to a rather high incidence (30 cases) of typhoid fever in the State of Texas, the number of cases of these diseases for the country as a whole was about 10 percent above the incidence for the corresponding period in 1943. The total number of cases reported (241) was, however, only about 80 percent of the 1939-43 median for this period. In the New England, North Central, and West South Central regions the incidence stood at about the normal seasonal level, but other regions reported very significant reductions from the 1939-43 medians.

Whooping cough.—For the 4 weeks ended March 25 there were 7,644 cases of whooping cough reported, as compared with 16,081 cases during the corresponding period in 1943; the 1939-43 median was represented by the 1943 figure. In each section of the country the incidence

was below that of 1943, as well as considerably below the seasonal median level.

MORTALITY, ALL CAUSES

An average of 9,661 deaths from all causes per week was reported by 93 large cities of the United States during the 4 weeks ended March 25. The number of deaths reported for these cities was 2.2 percent more than the average for the corresponding weeks of the years 1940-43. By weeks, the number of deaths was higher than the average for the first week of the current period, and lower than the average in the second week, but in the third and fourth weeks the deaths were 1.6 and 2.8 more, respectively, than the average for the same weeks in the 3 preceding years. The largest excesses in the number of deaths were reported from cities in the East North Central and Pacific sections of the country, with minor increases in all other sections except the New England, Middle Atlantic, and West South Central regions. In the Middle Atlantic region the number of deaths stood at the level of the preceding 3-year average, and in the New England and West South Central regions the numbers of deaths were slightly below the average.

DEATHS DURING WEEK ENDED APRIL 1, 1944

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

	Week ended Apr. 1, 1944	Corresponding week, 1943
Data for 92 large cities of the United States:		
Total deaths	9,476	9,995
Average for 3 prior years	9,139	
Total deaths, first 13 weeks of year	132,285	132,498
Deaths under 1 year of age	617	631
Average for 3 prior years	547	
Deaths under 1 year of age, first 13 weeks of year	8,205	9,355
Data from industrial insurance companies:		
Policies in force	66,382,840	65,472,549
Number of death claims	13,927	13,792
Death claims per 1,000 policies in force, annual rate	11.0	11.0
Death claims per 1,000 policies, first 13 weeks of year, annual rate	11.4	10.7

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

REPORTS FROM STATES FOR WEEK ENDED APRIL 8, 1944

Summary

A total of 499 cases of meningococcus meningitis was reported for the current week, as compared with 523 last week, 550 for the next earlier week, 587 for the corresponding week last year, and 68 for the comparable 5-year (1939–43) median. Nine States reporting currently 18 or more cases each (last week's figures in parentheses) are as follows: *Increases*—Massachusetts 25 (16), Pennsylvania 38 (37), Illinois 30 (28), Virginia 18 (5), North Carolina 18 (3), Colorado 30 (12); *decreases*—New York 53 (63), New Jersey 22 (24), Ohio 24 (30) (corrected report). The cumulative total to date is 7,659, as compared with 6,432 for the same period last year and a 5-year median of 719.

The incidence of both measles and scarlet fever also declined—30,462 cases of measles and 7,298 cases of scarlet fever were reported as compared with 34,092 and 7,727, respectively, for the preceding week. However, the cumulative figures for these diseases are 47 percent and 50 percent, respectively, above the corresponding 5-year medians.

The current figures for diphtheria, influenza, poliomyelitis, typhoid fever, and whooping cough are below those for the preceding week and for the corresponding 5-year medians. The cumulative totals to date for all of these diseases except influenza are below the corresponding 5-year medians.

Cumulative figures to date for other diseases included in the following table (last year's figures for the corresponding period in parentheses) are as follows: Anthrax 16 (22), dysentery (all forms) 4,078 (3,797), infectious encephalitis 139 (155), leprosy 9 (7), Rocky Mountain spotted fever 4 (5), tularemia 139 (245), endemic typhus fever 528 (679).

A total of 9,268 deaths was recorded for the week in 92 large cities of the United States, as compared with 9,450 for the preceding week and a 3-year (1941–43) average of 9,019. The cumulative total to date is 141,181, as compared with 141,790 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended April 8, 1944, and comparison with corresponding week of 1943 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43
	Apr. 8, 1944	Apr. 10, 1943		Apr. 8, 1944	Apr. 10, 1943		Apr. 8, 1944	Apr. 10, 1943		Apr. 8, 1944	Apr. 10, 1943	
NEW ENGLAND												
Maine	0	0	1	8	1	1	315	10	151	1	9	0
New Hampshire	0	0	0	0	0	------	26	27	27	2	2	0
Vermont	0	0	0	3	0	------	212	430	56	1	1	0
Massachusetts	6	1	2	0	0	------	643	1,746	949	25	38	3
Rhode Island	0	0	0	17	1	------	256	14	44	1	16	1
Connecticut	1	0	0	0	4	5	400	341	341	9	13	1
MIDDLE ATLANTIC												
New York	11	21	18	[1] 5	[1] 13	[1] 13	2,784	2,756	1,563	53	48	6
New Jersey	3	10	7	6	19	11	1,411	1,754	907	22	28	1
Pennsylvania	12	15	15	3	2	------	860	2,041	1,068	38	39	7
EAST NORTH CENTRAL												
Ohio	0	9	9	11	13	13	1,611	925	376	24	8	0
Indiana	7	4	6	12	19	19	226	226	134	7	8	2
Illinois	1	19	22	18	12	16	932	1,391	753	30	17	2
Michigan [2]	3	5	5	3	34	21	848	1,370	409	28	14	1
Wisconsin	3	3	1	49	40	103	2,541	1,627	731	7	4	1
WEST NORTH CENTRAL												
Minnesota	3	1	2	2	2	2	941	141	160	4	1	0
Iowa	2	0	9	0	0	4	235	245	221	3	0	0
Missouri	3	0	5	7	2	4	314	623	268	26	33	1
North Dakota	0	0	0	0	11	11	77	120	33	1	2	1
South Dakota	0	1	1	0	0	1	19	66	16	2	0	0
Nebraska	3	2	3	1	7	1	146	392	173	1	0	0
Kansas	3	3	3	0	5	13	566	797	582	5	2	1
SOUTH ATLANTIC												
Delaware	1	0	0	0	0	------	3	93	8	2	2	0
Maryland [2]	6	2	1	9	3	14	982	91	344	10	18	5
District of Columbia	0	0	1	0	0	3	155	57	134	0	7	0
Virginia	9	8	10	246	323	378	1,223	559	479	18	29	4
West Virginia	2	5	5	3	5	38	556	79	79	1	5	1
North Carolina	5	1	15	10	7	33	2,315	202	810	18	20	2
South Carolina	2	8	8	376	618	552	500	207	200	5	25	3
Georgia	0	3	4	15	52	164	177	224	194	5	7	1
Florida	3	2	5	2	33	11	196	69	160	6	6	0
EAST SOUTH CENTRAL												
Kentucky	3	4	6	3	4	13	112	455	146	6	12	1
Tennessee	5	0	5	57	61	96	252	398	129	12	13	2
Alabama	6	7	5	107	198	172	493	118	169	9	12	3
Mississippi [3]	2	0	4	0	0	------	------	------	------	7	15	2
WEST SOUTH CENTRAL												
Arkansas	4	1	3	76	42	134	361	169	149	6	0	1
Louisiana	5	0	5	10	16	16	247	170	151	12	15	1
Oklahoma	8	2	5	137	89	89	175	66	66	7	[3] 3	1
Texas	17	40	36	731	1,372	1,232	2,958	1,150	1,127	16	29	6
MOUNTAIN												
Montana	0	1	2	11	0	8	116	295	76	1	0	0
Idaho	0	3	1	2	0	------	28	318	52	0	20	0
Wyoming	0	0	1	1	19	1	82	140	72	1	3	0
Colorado	7	14	12	16	33	35	293	1,082	298	30	6	0
New Mexico	0	1	2	0	2	2	46	22	50	1	0	0
Arizona	0	5	2	83	98	125	386	60	98	0	0	0
Utah [3]	0	0	0	2	13	26	50	239	239	0	1	0
Nevada	0	0	0	24	0	0	1	24	0	2	0	0
PACIFIC												
Washington	3	1	1	3	0	2	349	564	564	3	4	2
Oregon	2	1	1	31	12	16	123	452	404	2	14	0
California	33	16	16	48	74	151	2,920	1,032	1,032	29	38	2
Total	184	219	271	2,148	3,304	3,412	30,462	25,377	24,006	499	[4] 587	68
14 weeks	3,396	3,898	4,262	322,715	60,738	123,386	336,879	235,785	228,957	7,659	6,432	719

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended April 8, 1944, and comparison with corresponding week of 1943 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43
	Apr. 8, 1944	Apr. 10, 1943		Apr. 8, 1944	Apr. 10, 1943		Apr. 8, 1944	Apr. 10, 1944		Apr. 8, 1944	Apr. 10, 1943	
NEW ENGLAND												
Maine	0	0	0	33	18	11	0	0	0	0	0	0
New Hampshire	1	0	0	7	2	3	0	0	0	0	0	0
Vermont	0	0	0	11	15	13	0	0	0	0	0	0
Massachusetts	0	0	0	475	619	220	0	0	0	0	1	1
Rhode Island	0	0	0	21	24	12	0	0	0	0	0	0
Connecticut	0	0	0	107	93	93	0	0	0	0	2	2
MIDDLE ATLANTIC												
New York	1	0	0	667	567	610	0	0	0	7	6	6
New Jersey	0	0	0	266	158	202	0	0	0	4	0	2
Pennsylvania	1	0	1	715	337	394	0	0	0	2	2	7
EAST NORTH CENTRAL												
Ohio	0	0	1	433	254	361	0	0	1	3	3	3
Indiana	1	0	0	257	68	161	0	0	2	1	0	0
Illinois	1	3	2	519	180	466	1	0	1	2	3	1
Michigan [3]	0	0	0	291	128	301	0	0	0	1	3	3
Wisconsin	1	0	0	482	343	154	1	1	1	0	0	1
WEST NORTH CENTRAL												
Minnesota	1	0	0	162	76	74	0	0	2	0	0	0
Iowa	0	1	0	222	41	42	6	1	2	0	0	1
Missouri	0	0	0	138	192	111	0	1	1	1	0	1
North Dakota	0	0	0	25	5	12	0	0	0	0	0	1
South Dakota	0	0	0	39	17	18	0	0	1	0	0	0
Nebraska	0	0	0	111	56	34	0	0	0	0	0	0
Kansas	0	0	0	119	62	62	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	18	7	7	0	0	0	0	1	0
Maryland [3]	0	0	0	232	139	50	0	0	0	0	2	2
District of Columbia	0	0	0	149	26	17	0	0	0	0	0	0
Virginia	0	0	1	164	56	56	0	0	0	3	0	2
West Virginia	0	0	1	116	24	32	1	0	0	3	1	1
North Carolina	0	1	0	41	30	31	0	0	0	1	0	1
South Carolina	1	1	0	4	4	3	0	0	0	0	0	0
Georgia	0	1	0	7	10	10	0	0	0	3	5	2
Florida	0	0	1	9	11	7	0	0	0	1	3	5
EAST SOUTH CENTRAL												
Kentucky	0	1	0	38	43	89	0	0	0	4	1	3
Tennessee	0	0	1	51	35	68	1	4	0	3	2	2
Alabama	0	1	0	8	21	18	0	0	0	0	1	1
Mississippi [3]	1	1	1	6	5	6	1	0	0	1	0	1
WEST SOUTH CENTRAL												
Arkansas	0	0	0	7	6	6	0	6	1	0	0	1
Louisiana	1	0	0	9	8	8	0	0	0	2	4	3
Oklahoma	0	0	0	34	39	21	0	0	3	0	0	1
Texas	3	1	2	134	76	60	0	6	3	6	3	5
MOUNTAIN												
Montana	0	0	0	44	6	12	0	0	0	0	1	1
Idaho	0	1	1	43	61	17	0	0	0	0	0	0
Wyoming	0	0	0	24	60	16	0	0	0	0	0	0
Colorado	0	0	0	61	50	40	1	0	0	0	2	2
New Mexico	0	0	0	7	4	4	0	0	0	1	3	2
Arizona	0	0	0	14	20	7	0	0	0	3	1	0
Utah [3]	0	2	0	113	45	22	0	1	0	0	0	0
Nevada	0	0	0	7	3	0	0	0	0	0	0	0
PACIFIC												
Washington	0	0	0	379	25	37	0	0	2	0	0	1
Oregon	1	0	0	139	33	20	0	0	0	2	0	0
California	2	5	1	290	144	124	0	1	1	4	1	2
Total	16	19	23	7,298	4,246	4,355	12	21	34	58	51	77
14 weeks	311	359	353	84,112	55,284	55,893	174	371	639	1,012	743	1,065

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended April 8, 1944, and comparison with corresponding week of 1943 and 5-year median—Con.

Division and State	Whooping cough			Week ended April 8, 1944								
	Week ended		Median 1939–43	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Apr. 8, 1944	Apr. 10, 1943			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	0	35	35	0	0	0	0	0	0	0	0	0
New Hampshire	5	0	1	0	0	0	0	0	0	0	0	0
Vermont	19	65	40	0	0	0	0	0	0	0	0	0
Massachusetts	50	149	188	0	0	0	0	0	0	0	0	0
Rhode Island	3	45	45	0	0	0	0	0	0	0	0	0
Connecticut	29	47	72	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	137	373	401	0	2	5	0	1	0	0	0	0
New Jersey	47	202	202	1	0	0	0	0	0	0	0	0
Pennsylvania	92	289	270	2	1	1	0	0	0	0	1	0
EAST NORTH CENTRAL												
Ohio	46	155	155	0	0	0	0	0	0	0	0	0
Indiana	10	81	32	0	0	0	0	2	0	0	0	0
Illinois	31	139	148	0	0	0	0	1	0	0	0	0
Michigan [2]	69	216	176	0	0	0	0	0	0	0	0	0
Wisconsin	38	224	132	0	0	0	0	1	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	9	93	45	0	1	0	0	0	0	0	0	0
Iowa	4	24	11	0	0	0	0	0	0	0	0	0
Missouri	18	39	33	0	0	0	0	0	0	0	0	0
North Dakota	9	17	16	0	0	0	0	0	0	0	0	0
South Dakota	5	1	2	0	0	0	0	0	0	0	0	0
Nebraska	7	13	8	0	0	0	0	0	0	0	0	0
Kansas	36	95	34	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	3	3	6	0	0	0	0	0	0	0	0	0
Maryland [3]	44	111	93	0	0	0	1	0	0	0	0	0
District of Columbia	5	26	18	0	0	0	0	0	0	0	0	0
Virginia	79	77	58	0	0	0	17	0	0	0	0	0
West Virginia	24	42	42	0	0	0	0	0	0	0	0	0
North Carolina	178	189	189	0	0	0	0	0	0	0	0	2
South Carolina	69	46	55	0	0	1	0	0	0	0	0	1
Georgia	16	91	29	0	0	1	1	0	0	0	1	6
Florida	18	42	19	0	0	1	0	0	0	0	0	0
EAST SOUTH CENTRAL												
Kentucky	83	50	59	0	0	0	0	0	0	0	0	0
Tennessee	36	67	43	0	1	0	3	0	0	0	0	0
Alabama	119	52	23	0	0	0	0	0	0	0	0	4
Mississippi [3]				0	0	0	0	0	0	0	2	3
WEST SOUTH CENTRAL												
Arkansas	9	9	9	0	1	0	0	0	0	0	0	0
Louisiana	2	18	5	0	6	0	0	0	0	0	1	1
Oklahoma	10	45	10	0	0	0	0	0	0	0	0	0
Texas	172	697	284	0	1	205	0	0	0	0	0	7
MOUNTAIN												
Montana	3	11	11	0	0	0	0	0	0	0	0	0
Idaho	0	0	2	0	0	0	0	0	0	0	0	0
Wyoming	0	2	2	0	2	0	0	0	0	0	0	0
Colorado	0	19	60	0	0	0	0	0	0	0	0	0
New Mexico	4	7	26	0	0	0	0	0	0	0	0	0
Arizona	29	35	35	0	0	0	18	0	0	0	0	0
Utah [3]	39	46	46	1	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	46	34	64	0	0	0	0	0	0	0	0	0
Oregon	20	19	19	0	0	0	0	0	0	0	0	0
California	75	416	372	0	0	6	0	1	0	0	0	0
Total	1,747	4,456	3,562	4	15	221	40	6	0	0	5	24
[4] 4 weeks	25,620	55,880	55,880	16	372	2,810	896	139	9	4	139	528
[4] 4 weeks, 1943				22	405	2,796	596	155	7	5	245	679

Alaska—Week ended April 8, 1944: Influenza, 3; measles, 18; meningitis, 1; whooping cough, 1; pneumonia, 2; chickenpox, 7.

[1] New York City only. [2] Period ended earlier than Saturday.

[3] Exclusive of delayed report (included in cumulative total only) of 19 cases in Oklahoma.

[4] Including paratyphoid fever cases reported separately as follows: New York, 1; Michigan, 1; Virginia, 1; California, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended March 25, 1944

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	12	1	1	0	18	0	0	0
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	3	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	1	0	------	0	99	4	17	0	84	0	0	25
Fall River	0	0	------	0	14	0	0	0	1	0	0	0
Springfield	0	0	------	0	51	0	0	0	42	0	0	7
Worcester	0	0	------	0	0	0	8	0	62	0	0	0
Rhode Island:												
Providence	0	0	1	0	145	2	5	0	5	0	0	7
Connecticut:												
Bridgeport	0	0	------	0	38	1	1	0	3	0	0	0
Hartford	0	0	1	0	8	1	0	0	16	0	0	0
New Haven	0	0	------	0	132	1	1	0	4	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	3	0	12	0	34	0	0	0
New York	12	3	6	3	2071	38	84	0	345	0	2	35
Rochester	0	0	------	0	7	3	2	0	4	0	0	3
Syracuse	0	0	------	0	2	1	4	0	5	0	0	3
New Jersey:												
Camden	0	0	------	0	6	0	5	0	49	0	0	0
Newark	0	0	1	0	122	4	4	0	17	0	0	5
Trenton	0	0	5	0	8	2	1	0	11	0	0	0
Pennsylvania:												
Philadelphia	3	0	8	2	51	4	33	0	100	0	2	13
Pittsburgh	0	0	4	4	42	5	23	0	23	0	1	7
Reading	0	0	------	0	2	0	1	0	7	0	0	0
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	1	67	10	6	0	52	0	0	1
Cleveland	0	0	1	0	352	14	9	0	111	0	0	2
Columbus	0	0	1	1	134	0	6	0	5	0	0	3
Indiana:												
Fort Wayne	0	0	------	0	3	0	5	0	7	0	1	0
Indianapolis	1	0	------	1	52	3	6	0	57	0	0	2
South Bend	0	0	------	0	5	0	0	0	7	0	0	0
Terre Haute	0	0	------	0	0	0	2	0	0	0	0	0
Illinois:												
Chicago	1	0	4	2	117	21	35	0	179	0	0	14
Springfield	0	0	------	0	59	0	3	0	4	0	0	2
Michigan:												
Detroit	5	0	5	1	109	16	18	0	168	0	1	13
Flint	0	0	------	0	8	0	1	0	1	0	0	2
Grand Rapids	0	0	------	0	151	1	0	0	15	0	0	0
Wisconsin:												
Kenosha	0	0	------	0	19	0	0	0	1	0	0	1
Milwaukee	3	0	1	1	144	4	5	0	90	0	0	19
Racine	0	0	------	0	3	0	0	0	2	0	0	1
Superior	0	0	------	0	0	0	2	0	30	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	19	1	2	0	24	0	0	3
Minneapolis	4	0	------	1	573	1	8	0	45	0	0	6
St. Paul	0	0	------	1	672	5	6	0	32	0	0	6
Missouri:												
Kansas City	1	0	------	1	44	6	10	0	56	0	0	0
St. Joseph	1	0	------	0	4	1	0	0	1	0	0	3
St. Louis	0	0	3	2	191	11	16	0	46	0	0	5

City reports for week ended March 25, 1944—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	8	0	0	0	7	0	0	0
Nebraska:												
Omaha	0	0	------	0	0	0	7	0	0	0	0	0
Kansas:												
Topeka	0	0	------	0	37	0	1	0	3	0	0	4
Wichita	0	0	1	0	152	0	2	0	5	0	2	1
SOUTH ATLANTIC												
Delaware:												
Wilmington	1	0	------	0	2	5	2	0	1	0	0	0
Maryland:												
Baltimore	8	0	3	3	871	3	13	0	99	0	0	20
Cumberland	0	1	0	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	3	0	0	0	0	0	0	0
District of Columbia:												
Washington	2	0	3	0	153	2	13	0	155	0	0	2
Virginia:												
Lynchburg	0	0	------	0	7	1	0	0	2	0	0	1
Richmond	0	0	------	0	251	2	3	0	5	0	1	0
Roanoke	0	0	------	0	72	0	1	0	0	0	0	0
West Virginia:												
Charleston	0	0	------	0	3	0	0	0	17	0	1	0
Wheeling	0	0	------	0	23	0	1	0	22	0	0	0
North Carolina:												
Winston-Salem	0	0	------	0	31	0	2	0	3	0	0	0
South Carolina:												
Charleston	0	0	21	0	34	0	5	0	1	0	0	0
Georgia:												
Atlanta	1	0	3	0	51	3	1	0	9	0	0	1
Brunswick	0	0	------	0	0	1	1	0	0	0	0	0
Savannah	0	0	2	1	7	2	1	0	0	0	0	0
Florida:												
Tampa	1	0	------	0	21	3	3	0	2	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	3	1	22	9	2	0	13	0	0	1
Nashville	0	0	------	0	7	1	8	0	6	0	0	1
Alabama:												
Birmingham	0	0	2	1	10	1	5	0	5	0	0	0
Mobile	0	0	------	0	3	0	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	1	0	38	0	3	0	0	0	0	0
Louisiana:												
New Orleans	0	0	5	1	24	1	5	0	7	0	7	0
Shreveport	0	0	------	0	0	0	8	0	1	0	0	0
Texas:												
Dallas	0	0	------	0	158	1	4	0	3	0	0	4
Galveston	0	0	------	0	1	0	1	0	0	0	0	0
Houston	2	0	------	1	46	1	8	0	1	0	0	4
San Antonio	1	0	2	3	15	0	9	1	2	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	5	0	0	0	1	0	0	0
Great Falls	0	0	------	0	13	1	0	0	7	0	0	0
Helena	0	0	------	0	1	0	0	0	12	0	0	0
Missoula	0	0	------	0	0	0	0	0	1	0	0	0
Idaho:												
Boise	0	0	------	0	5	1	0	0	6	0	0	0
Colorado:												
Denver	0	0	4	0	96	1	3	0	22	0	0	12
Pueblo	0	0	------	0	16	0	2	0	3	0	0	0
Utah:												
Salt Lake City	0	0	------	0	4	1	2	0	26	0	0	2

City reports for week ended March 25, 1944—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	0	0	------	0	51	1	9	1	63	0	0	2
Spokane	0	0	3	3	45	0	0	0	23	0	0	3
Tacoma	0	0	------	1	5	0	1	0	56	0	0	2
California:												
Los Angeles	4	0	24	1	288	3	9	0	47	0	0	2
Sacramento	0	0	1	1	28	0	1	0	1	0	0	11
San Francisco	0	0	5	0	70	7	6	0	38	0	0	5
Total	53	4	124	38	8,216	212	486	2	2,441	0	18	234
Corresponding week, 1943	68	1	131	42	7,252	199	545	3	1,681	0	7	1,186
Average, 1939–43	74	------	393	[1] 40	[2] 5,783	------	[1] 497	------	1,560	6	17	1,096

[1] 3-year average, 1941–43.
[2] 5-year median.

Dysentery, amebic.—Cases: New York, 1; Philadelphia, 10; Birmingham, 1; Mobile, 1; Los Angeles, 2; San Francisco, 2.
Dysentery, bacillary.—Cases: Providence, 2; New York, 3; Detroit, 1; Charleston, S. C., 8; Dallas, 1; Los Angeles, 12.
Dysentery, unspecified.—Cases: San Antonio, 5.
Typhus fever.—Cases: New York, 1; Tampa, 1; Houston, 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 88 cities in the preceding table (estimated population, 1942, 34,680,400)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	2.5	0.0	5.0	0.0	1243	24.9	84.7	0.0	593	0.0	0.0	100
Middle Atlantic	6.7	1.3	10.7	4.0	1035	25.5	75.6	0.0	266	0.0	2.2	30
East North Central	6.4	0.0	7.0	4.1	716	40.4	57.4	0.0	427	0.0	1.2	35
West North Central	11.8	0.0	7.8	9.8	3331	49.0	101.9	0.0	429	0.0	3.9	55
South Atlantic	22.6	1.7	55.7	7.0	2661	38.3	80.0	0.0	550	0.0	3.5	42
East South Central	0.0	0.0	29.8	11.9	250	65.5	95.3	0.0	143	0.0	0.0	12
West South Central	8.8	0.0	23.5	14.7	829	8.8	111.8	2.9	41	0.0	20.6	24
Mountain	0.0	0.0	32.2	0.0	1129	32.2	56.4	0.0	629	0.0	0.0	113
Pacific	7.0	0.0	57.8	10.5	853	19.3	45.6	1.8	400	0.0	0.0	44
Total	8.0	0.6	18.7	5.7	123.9	32.0	73.3	0.3	36.8	0.0	2.7	35

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—During the period March 1–15, 1944, 12 cases of dengue fever were reported in Honolulu, T. H., bringing the total since the beginning of the outbreak last year to 1,446 cases.

Plague (rodent).—Plague-infected rodents (rats and mice) have been found in Hamakua District, Island of Hawaii, T. H., as follows: Honokaa—February 22, 1944, 2 rats, March 1, 1 rat; Kapulena—February 23, 1 rat, February 25, 1 rat; Kukuihaele—February 29, 1 rat; Paauhau—February 28, 2 mice, March 1, 1 mouse.

FOREIGN REPORTS

BRITISH GUIANA

Vital statistics—1942—Comparative.—The following table shows the numbers of births and deaths in the whole colony of British Guiana for the year 1942, as compared with the year 1941:

	1942		1941	
	Number	Rate per 1,000 population	Number	Rate per 1,000 population
Live births	13,835	38.2	----------	35.4
Stillbirths	691	[1] 5.0	----------	[1] 4.5
Deaths	6,233	17.2	----------	15.6
Deaths under 1 year of age	1,340	[2] 97	----------	[2] 84
Deaths from:				
Bronchitis and bronchopneumonia	528	1.5	495	1.4
Cancer	141	----------	143	----------
Diphtheria	14	----------	7	----------
Filariasis	31	----------	----------	----------
Heart diseases	441	----------	429	----------
Hookworm disease	10	----------	7	----------
Influenza	9	----------	----------	----------
Intestinal diseases	328	----------	334	----------
Malaria	367	----------	288	----------
Nephritis	497	1.4	485	1.4
Pneumonia	326	0.9	284	0.8
Puerperal fever	10	----------	7	----------
Tetanus	14	----------	9	----------
Tuberculosis (all forms)	232	0.64	238	0.67
Typhoid and paratyphoid fever	62	----------	86	----------

[1] Per 100 live births.
[2] Per 1,000 registered births.

NOTE.—Population estimated as of Dec. 31, 1942, 361,754.

CANADA

Provinces—Communicable diseases—Week ended March 11, 1944.—During the week ended March 11, 1944, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox	5	22	----------	206	352	71	55	98	159	968
Diphtheria	----------	8	2	69	1	7	----------	----------	3	90
Dysentery (bacillary)	----------	----------	----------	6	----------	----------	----------	----------	----------	6
German measles	----------	7	----------	59	54	14	38	13	40	225
Influenza	1	4	----------	----------	33	3	4	----------	22	67
Measles	----------	90	2	865	667	169	94	203	42	2,132
Meningitis, meningococcus	1	3	1	2	9	----------	----------	----------	2	18
Mumps	2	3	----------	127	359	61	10	76	33	671
Poliomyelitis	----------	----------	----------	4	----------	----------	----------	----------	----------	4
Scarlet fever	----------	28	8	96	198	54	18	57	78	537
Tuberculosis (all forms)	----------	2	8	99	60	25	24	21	38	277
Typhoid and paratyphoid fever	----------	----------	----------	14	1	----------	----------	----------	----------	15
Undulant fever	----------	----------	----------	2	2	----------	----------	----------	----------	4
Whooping cough	----------	6	2	66	68	10	11	2	37	202

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

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Egypt—Ismailiya District.—During the week ended March 25, 1944, 16 deaths from plague have been unofficially reported in Ismailiya District, Egypt.

Indochina.—Plague has been reported in Indochina as follows: Cochinchina, February 1–10, 1944, 1 case; Laos, February 11–20, 1944, 1 case, February 21–29, 4 cases; Annam, February 21–29, 1944, 4 cases.

Smallpox

Algeria.—For the period February 21–29, 1944, 27 cases of smallpox were reported in Algeria.

Gambia.—During the week ended March 11, 1944, 13 cases of smallpox were reported in Gambia.

Great Britain—England—London.—During the week ended March 18, 1944, 4 cases of smallpox were reported in London. These cases were all contacts with previous cases.

India.—During the week ended March 4, 1944, 289 cases of smallpox with 102 deaths were reported in Bombay, and for the week ended March 11, 240 deaths from smallpox were reported in Calcutta, India.

Indochina.—For the period February 11–29, 1944, 388 cases of smallpox were reported in Indochina.

Ivory Coast.—For the period February 11–20, 1944, 57 cases of smallpox with 13 deaths were reported in Ivory Coast.

Mexico.—During the month of January 1944, 236 cases of smallpox were reported in Mexico. States reporting the highest numbers of cases were as follows: Coahuila, 48; Guerrero, 13; Mexico, 11; Puebla, 15; San Luis Potosi, 36; Tamaulipas, 23; Vera Cruz, 45; and Zacatecas, 17.

Sudan (French).—For the period February 11–20, 1944, 95 cases of smallpox with 7 deaths were reported in French Sudan.

Turkey.—During the month of January 1944, 1,661 cases of smallpox were reported in Turkey.

Typhus Fever

Algeria.—For the period February 21–29, 1944, 15 cases of typhus fever were reported in Algeria.

Bulgaria.—For the period January 20 to February 16, 1944, 213 cases of typhus fever were reported in Bulgaria.

Hungary.—During the week ended March 4, 1944, 66 cases of typhus fever were reported in Hungary, and for the week ended March 11, 75 cases were reported.

Mexico.—During the month of January 1944, 185 cases of typhus fever were reported in Mexico. States reporting the highest numbers of cases were as follows: Mexico, D. F., 43; Mexico State, 21; Michoacan, 12; Puebla, 39.

Rumania.—For the period March 16–23, 1944, 443 cases of typhus fever were reported in Rumania.

Slovakia.—During the week ended February 26, 1944, 14 cases of typhus fever were reported in Slovakia.

Turkey.—For the month of January 1944, 190 cases of typhus fever were reported in Turkey.

Union of South Africa—Cape Province.—For the period January 7 to February 19, 1944, 2,500 cases of typhus fever were reported in the Transkei region of Cape Province, Union of South Africa. For the week ended February 19, 1944, 378 cases were reported and for the week ended February 26, 429 cases of typhus fever were reported. With few exceptions all cases were among non-Europeans.

Yugoslavia.—For the period January 8–31, 1944, 273 cases of typhus fever were reported in Yugoslavia.

Yellow Fever

Belgian Congo—Stanleyville Province—Babeyru.—On February 17, 1944, 1 death from yellow fever was reported in Babeyru near Wamba in the northeastern section of Stanleyville Province, Belgian Congo.

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