

PUBLIC HEALTH REPORTS

VOL. 47

MAY 6, 1932

NO. 19

THE STANDARDIZATION OF SCARLET FEVER STREPTOCOCCUS ANTITOXIN

A Method Employing the Ear of the White Rabbit

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This study was undertaken for the purpose of developing a practical test for the potency determination of scarlet fever streptococcus antitoxin which could be carried out by the use of laboratory animals instead of using human subjects for test purposes, as is being done at the present time. The method which is presented has given, in the writer's hands, more definite results and with fewer test subjects than is the case with the human-test method. The test is dependent upon the fact that white rabbits give a sharply outlined area of subcutaneous inflammation when injected intradermally on the ventral surface of the ear with one human skin test dose of purified and concentrated scarlet fever streptococcus toxin, and further, that this reaction may be prevented by the addition of a sufficient amount of antiserum.

Method of toxin purification and concentration.—Because of the fact that a fairly high percentage of white rabbits, such as were used in the present study, are susceptible both to the toxin contained in the hemolytic streptococcus broth filtrate and to the other dissolved bacterial substances contained therein, it is necessary to remove the latter from the filtrate before the true toxin reaction can be observed in these animals. Ando, Kurauchi, and Nishimura (1) have developed a method of purifying and concentrating the filtrate from broth cultures of the scarlet fever streptococcus so as to eliminate those bacterial substances, commonly designated as nucleoproteins. More recently, Wadsworth and Quigley (2) report a method for purifying and concentrating the toxin by which there is a marked reduction in the total nitrogen. They make no mention, however, as to the presence of nucleoprotein substances in the final product.

The writer has developed from these two methods a modification which eliminates the use of absolute alcohol, as in the Ando method, and the need for dialysis as required by the Wadsworth-Quigley technique. The procedure is as follows:

Coal one volume of toxin and two volumes of acetone to 0 to 5° C. and then add the toxin to the acetone. Shake the mixture thoroughly for several minutes.

A heavy precipitate forms immediately. Allow to settle for one-half to 1 hour and then collect the precipitate by suction filtration. When all trace of the acetone has disappeared from the precipitate, redissolve it in distilled water, using a volume equal to one-tenth the original volume of the toxin. To this solution add sufficient sodium chloride to make a 1 per cent solution. This solution is now cooled as above and then brought to a pH of 4.0 by the addition of 50 per cent acetic acid. Shake thoroughly and allow to stand in the cold for 1 to 4 hours. A heavy and somewhat colloidal precipitate forms, which is removed and discarded. The writer has accomplished this removal by centrifuging in the usual centrifuge, though a small Sharples probably would be more satisfactory. The supernatant liquid is collected, filtered clear if necessary, brought to a pH of 7.0 to 7.4 with sodium hydroxide, cooled to 0 to 5° C., and then added to twice its volume of cooled acetone. The mixture is shaken thoroughly and the precipitate collected as above described.

If a highly purified toxin is desired, the above-mentioned steps should be repeated until no further precipitate is obtained by the addition of acetic acid.

When the precipitation processes are completed, the final acetone precipitate is dissolved in equal parts of normal saline and of the original broth. The volume is brought to one-tenth that of the original toxin, a preservative is added (merthiolate 1:10,000 is very satisfactory), the reaction is adjusted to pH 7.4 to 7.5, and, as a final step, the purified and concentrated toxin is passed through a suitable candle filter.

The writer has prepared a purified and concentrated standard stock toxin by passing 40 liters of raw toxin through 4 acetic acid and 5 acetone precipitations. The total nitrogen content of this purified and concentrated toxin, calculated as milligrams per 100 c. c. on the basis of the original volume, is as follows:

	Total nitrogen expressed as milligrams per 100 c. c.			
	Reported by Ando	Reported by Wadsworth	Reported by Veldee	
			Precipitated once	Precipitated 4 times
Original toxin filtrate.....	185	370	294	351
Purified and concentrated toxin.....	11	47	31	11

This stock toxin has been standardized on human subjects against a well-standardized raw toxin. As a means of conserving the supply and in order to simplify the making of dilutions, this concentrated stock toxin has been diluted in broth so as to contain 15,000 human skin test doses per cubic centimeter. Such a diluted toxin has now been kept at 10° C. for 10 months without any indication of deterioration.

Having determined the apparent suitability of the rabbit method (to be described later) for the testing of toxins and antitoxins by the use of this purified and concentrated scarlet fever streptococcus toxin and the National Institute of Health standard scarlet fever strepto-

coccus antitoxin, it seemed advisable to extend the testing to include other scarlet fever streptococcus toxins and antitoxins. For this purpose eight additional cultures were obtained, either from the scarlet fever committee or from the various commercial biologic laboratories. Individual toxin-broth filtrates from each of these cultures were precipitated twice with acetone and once with acetic acid. The approximate titers of these toxins are shown in Table 1. Toxin NY-2 was discarded at once because of its low titer, and later it was found advisable to do the same with toxin D-I, because the low titer did not permit sufficient dilution to eliminate pseudo-reactions in many rabbits. The remaining six toxins were of a sufficiently high titer to be suitable for the rabbit tests, even though they were not as highly purified as the standard toxin.

Douglas tryptic digest broth has been used throughout for the production of toxin. The method for preparing this medium will be found described by Watson and Wallace (3) and Cole and Onslow (4). The method as described was modified to the extent of adding only 45 c. c. instead of 90 c. c. of concentrated hydrochloric acid to 7 kilograms of meat; the final reaction was adjusted to pH 7.6, and the final volume was increased so as to make a three-quarter strength broth.

Inoculation of the broth was made from an 18-hour broth culture of the desired organism and growth was continued for 72 hours at 37° C.

Details of the rabbit method.—The rabbit appears to be the only small laboratory animal which shows a significant susceptibility to the toxin of the scarlatinal hemolytic streptococcus. Hartley (5), Pulvertaft (6), and others have reported that rabbits may be killed by the intravenous injection of scarlet fever streptococcus toxin. However, the size of the dose required to kill varies widely. The writer has obtained similar results. Of 96 rabbits injected intravenously with doses of raw toxin varying from 0.5 c. c. to 3 c. c. (25,000 to 150,000 skin test doses), 56 died within an average of 16 hours (6 to 48 hours) and 9 others died within an average of 123 hours (84 to 246 hours). Recovery was not always restricted to those receiving the smaller doses. Similarly, 8 rabbits were injected intravenously with the standard purified and concentrated toxin which has been used in the present study. Two rabbits each were injected with 0.25 c. c., 0.5 c. c., 0.75 c. c., and 1 c. c., respectively, and all died except one of those receiving 0.5 c. c. and one receiving 0.75 c. c.

Fraser and Plummer (7) have reported intradermal reactions when toxin injections are made on the closely clipped back or sides of chinchilla rabbits. Constant and uniform results, however, were not obtained by them.

The writer began the present work by injecting the rabbit in various places, hoping thereby to find some tissue or organ which

would show definite and constant susceptibility. Intradermal injections on the side or back after shaving or clipping according to the Fraser and Plummer method gave rather indefinite results with most rabbits. Injections into the mammary gland usually produced vascular engorgement, often actual hemorrhages into the tissues, and in some nonpregnant rabbits the lacteals became engorged with milk. However, a rather large dose of toxin was required and the point of change from normal to beginning reaction was difficult to determine. Intrascleral injections failed to produce results. Intradermal injections on the ventral surface of the pinna of the ear gave no reaction which could be observed by reflected light; but if the pinna was held up so as to be viewed by transmitted light it was observed that very definite reactions generally occurred, even with one human skin test dose of toxin. This observation forms the basis for the present report.

It was soon observed that, while most rabbits gave this subcutaneous auricular reaction to the raw toxin, in many rabbits the reaction could not be prevented by the addition of antitoxin to the toxin before injecting. Similarly, such rabbits continued to give a positive reaction with toxin that had been heated in boiling water for two hours. However, it was found that when a purified and concentrated toxin was used these false reactions did not occur.

A white skinned rabbit is very desirable for this work, since it simplifies the readings. The writer has used exclusively such white rabbits as are obtained by the National Institute of Health on competitive bid in the open market, the only specifications being that they shall be all white, healthy rabbits and not less than 4 pounds in weight. This weight requirement obviates the necessity of specifying a minimum age; young rabbits do not respond to toxin as well as those fully matured. This observation confirms the findings of Parish and Okell (8) and Trask (9). Records have been kept on 321 rabbits, and of these 236 or 74 per cent gave definite reactions to one human skin test dose, the remainder giving either indefinite reactions or none at all. This susceptibility is possibly an inherited characteristic, and if so, it should be possible by selective breeding to establish a strain in which all will be reactors.

The actual steps in making the toxin-antitoxin neutralization tests on the rabbit's ear are as follows:

A sufficient supply of reacting animals is obtained by injecting a considerable number of fresh rabbits with one human skin test dose of purified and concentrated toxin contained in a 0.1 c. c. volume, a day or more in advance of putting on the neutralization test. Several days in advance is preferable, so that the reaction produced, especially in the more susceptible animals, will have subsided somewhat before using for the neutralization tests. The preliminary toxin-injection is made intradermally on the inside of the right pinna in the mid line and near the base. This leaves the remainder of the right ear flap and all of

the left fresh for the toxin-antitoxin tests. Readings are made in 18 to 24 hours, and only those rabbits are reserved for test purposes which show a reaction area of 10 by 10 mm. or more in dimension and which show an intensity of + when measured on a scale of 0, \pm , +, and ++.

A preliminary series of tests showed that fresh rabbits are not serum sensitive and that the reaction produced by the toxin could be completely neutralized with sufficient antitoxin, indicating that protein reactions were not being obtained as with the raw unpurified toxin.

The toxin-antitoxin mixtures are made in the usual way, using 25 human skin test doses of purified and concentrated toxin as the unit of toxin in each instance instead of 5 STD as are used for the human test dose. The mixtures are placed at 37° C. for one hour. The injections of 0.1 c. c. each are made on the inner side of the pinna between the main blood vessel and the margin of the ear. The size of the ear flap permits three injections equally spaced on the right and the same number in corresponding positions on the left, with an additional injection on the left in a position corresponding to the site of the test toxin injection on the right. The usual Schick syringe and needles may be used, though the writer prefers a 26-gage, one-half inch, flexible shaft and long beveled needle in preference to the usually used short, blunt Schick needle. The ear flap is supported on the fingers of the left hand so as to expose the ventral surface. When the needle has been inserted into the skin directly over the left index finger, the left thumb is pressed down on the ear at the junction of the needle shaft and the skin of the ear. This will hold the needle securely in place between thumb and index finger in case the rabbit struggles, and it will also prevent leakage along the needle shaft. The needle is withdrawn while the thumb is still in place. The skin on the inside of the ear possesses very little elasticity, and for this reason leakage is likely to occur when the needle is withdrawn. This leakage may be avoided by rubbing a small amount of collodion into the needle hole.

Readings are made at 24 and 48 hours, though it is advisable to make an observation at 15 to 18 hours as well. This gives a better impression of the development of the reaction. It will be observed that when the ear is viewed by reflected light nothing abnormal is seen unless the reaction is of pronounced intensity. The readings must, therefore, be made by light transmitted through the pinna. This should be good daylight, or its equivalent, direct sunlight or the usual electric light being unsatisfactory. Readings are made with the rabbit sitting quietly and without unnecessary manipulation of the ear. Gentle massage will increase the intensity of the reaction, but will not render a negative reaction positive. However, it is believed that reading the undisturbed ear is preferable.

Two dimensions of the inflamed area are recorded and also the intensity. The intensity is recorded as \pm , +, or ++. In the present work, reactions of less than 10 by 10 mm. in area were considered as negative. With further experience, however, it may be advisable to regard any reaction other than the trauma caused by the needle insertion as a positive reaction.

EXPERIMENTAL WORK ON RABBITS

Neutralization tests have been made with single strain toxins prepared from seven well-known strains of hemolytic streptococci which

were originally isolated from scarlet-fever sources and also with certain combinations of these toxins, using in each composite toxin equal portions by titer of the respective toxins. The reactions of these toxins on one susceptible human test subject as compared with the reactions produced by 1 STD of a well standardized raw toxin are shown in Table 1, and also the mean reactions produced by these purified and concentrated toxins in the rabbits when injected at the potency indicated. It will be seen that these various toxins induce reactions both in the human being and the rabbits which correspond reasonably well in both size and intensity.

TABLE 1.—The "strains" of scarlet fever hemolytic streptococci used in the present study and the potency of their toxins after purification and concentration according to the method described

Strain of hemolytic streptococcus	Estimated potency per c. c.	Reaction produced by 1 STD on the same susceptible individual	Reaction produced by one human skin test dose of toxin when injected intradermally on the ventral surface of the ear of white rabbits ¹
NY-5.....	196,000	15 by 16 FP ²	See all protocols; mean of 60 rabbits, 16 by 23 mm.
D-IV.....	150,000	11 by 14 FP.....	13 by 19 mm. against NY-5 control of 16 by 24 mm.; see protocol 2.
D-II.....	100,600	14 by 14 FP.....	15 by 23 mm. against NY-5 control of 18 by 27 mm.; see protocol 3.
HL-391.....	100,600	18 by 21 FP.....	13 by 26 mm. against NY-5 control of 18 by 27 mm.; see protocol 4.
NY-55.....	75,000	18 by 19 FP.....	13 by 21 mm. against NY-5 control of 15 by 20 mm.; see protocol 5.
C-203.....	75,000	20 by 20 FP.....	14 by 20 mm. against NY-5 control of 16 by 23 mm.; see protocol 6.
D-III.....	25,000	18 by 20 FP.....	13 by 18 mm. against NY-5 control of 16 by 20 mm.; see protocol 7.
D-I.....	15,000	10 by 11 FP.....	Toxin not used because of low titer.
1 STD of standard toxin.....		15 by 17 VFP.....	

¹ The rabbits used for these comparative tests were selected on the basis of their reaction to a well standardized, concentrated and purified NY-5 toxin; only those being included which gave a reaction of at least 10 mm. in one of two dimensions and a reaction intensity of at least + (intensity scale 0, ±, +, ++).

² This toxin had been precipitated 5 times with acetone and 4 times with acetic acid as compared with the remaining toxins which were precipitated only twice with acetone and once with acetic acid. Therefore the NY-5 toxin is more highly purified, but at the same time the potency has been reduced more through loss than is the case with the other toxins.

³ Mean reaction on 33 susceptible individuals was 19 by 26 mm., as compared with a reaction of 15 by 21 mm. by a well standardized toxin on the same individuals.

⁴ One of 10 rabbits gave no reaction to 1 STD of C-203.

⁵ Three of 10 rabbits gave no reaction to 1 STD of D-III.

The antitoxins used, in addition to the National Institute of Health standard antitoxin, were antitoxins prepared by different biologic laboratories. Antitoxins A and B of this study represent sera from the same manufacturers as were used in the therapeutic study of Veldee, Stevenson, and Mitchell (10).

Five susceptible rabbits were used for each protocol. This seemed to be a very suitable number, since with the proper dilution range it gave satisfactory readings on 3 to 5 separate animals. It is not practical to reproduce each of the 29 protocols covering the toxin-antitoxin neutralization tests which are summarized in Table 2. Sample protocols, however, are given so that the reader may study the individual rabbit reactions. It should be remembered that a reaction measuring 10 mm. or more in at least one dimension was considered positive.

TABLE 2.—Summary of the data contained in protocols 1 to 14, inclusive, showing the neutralizing value of different scarlet fever streptococcus antitoxins for the concentrated and purified toxins prepared from various "strains" of hemolytic streptococci, neutralization being measured by the reactions resulting from the intradermal injection of various mixtures of toxin-antitoxin into the skin on the ventral surface of the ears of white rabbits

A. National Institute of Health standard antitoxin unconcentrated, containing in the original serum 500 units (55,000 NSTD) per c. c., but for the purpose of this study diluted to contain 80 units (4,000 NSTD) per c. c. Prepared with toxin from strain NY-5

Data from protocol number	Strain of toxin used	Amount of antitoxin required to effect the neutralization of 25 skin test doses of the toxin indicated
1A-----	NY-5-----	Between 0.000833 c. c. and 0.001208 c. c. (0.066-0.096 unit, or 3.3-4.8 NSTD).
2A-----	D-IV-----	Between 0.000875 c. c. and 0.00125 c. c. (0.07-0.1 unit, or 3.5-5.0 NSTD).
3A-----	D-II-----	Between 0.0009 c. c. and 0.0013 c. c. (0.072-0.104 unit, or 3.6-5.2 NSTD).
4A-----	HL-391-----	Between 0.0009 c. c. and 0.0013 c. c. (0.072-0.104 unit, or 3.6-5.2 NSTD).
5A-----	NY-55-----	Between 0.000625 c. c. and 0.000825 c. c. (0.05-0.07 unit, or 2.5-3.5 NSTD).
6A-----	C-203-----	Between 0.000875 c. c. and 0.00125 c. c. (0.07-0.1 unit, or 3.5-5.0 NSTD).
7A-----	D-III-----	Between 0.000708 c. c. and 0.00085 c. c. (0.056-0.068 unit, or 2.8-3.4 NSTD).
8A-----	Composite of above seven toxins	Between 0.0006875 c. c. and 0.000969 c. c. (0.054-0.078 unit, or 2.7-3.9 NSTD).
9A-----	Composite of D-II, D-III, and D-IV.	Between 0.000725 c. c. and 0.001025 c. c. (0.058-0.082 unit, or 2.9-4.1 NSTD).

B. Commercial antitoxin A concentrated, containing approximately 360 units (18,000 NSTD) per c. c. and prepared with the combined toxins of strains D-I, D-II, D-III and D-IV

1B-----	NY-5-----	Failed to show neutralization with 0.00362 c. c. (1.3 units, or 65 NSTD).
2B-----	D-IV-----	Failed to show neutralization with 0.00362 c. c. (1.3 units, or 65 NSTD).
3B-----	D-II-----	Failed to show neutralization with 0.00362 c. c. (1.3 units, or 65 NSTD).
4B-----	HL-391-----	Failed to show neutralization with 0.00362 c. c. (1.3 units, or 65 NSTD).
5B-----	NY-55-----	Failed to show neutralization with 0.00362 c. c. (1.3 units, or 65 NSTD).
6B-----	C-203-----	Between 0.00102 c. c. and 0.00139 c. c. (0.36-0.5 unit, or 18-25 NSTD).
7B-----	D-III-----	With less than 0.000835 c. c. (0.3 unit, or 15 NSTD).
8B-----	Composite of above seven toxins	Failed to show neutralization with 0.00362 c. c. (1.3 units, or 65 NSTD).
9B-----	Composite of D-II, D-III and D-IV.	Between 0.001832 c. c. and 0.00238 c. c. (0.66-0.86 unit, or 33-43 NSTD).

C. Antitoxin B unconcentrated, containing approximately 800 units (40,000 NSTD) per c. c. and prepared with toxin from strain NY-5

10A-----	NY-5-----	Between 0.0000687 c. c. and 0.0000969 c. c. (0.054-0.078 unit, or 2.7-3.9 NSTD).
10B-----	Composite of above seven toxins.	Between 0.0002031 c. c. and 0.0003969 c. c. (0.162-0.318 unit, or 8.1-15.9 NSTD).

D. Antitoxin B concentrated, containing approximately 3,000 units (150,000 NSTD) per c. c.

11A-----	NY-5-----	Between 0.0000213 c. c. and 0.0000306 c. c. (0.064-0.092 unit, or 3.2-4.6 NSTD).
11B-----	Composite of above seven toxins.	Between 0.0000417 c. c. and 0.0000782 c. c. (0.126-0.234 unit, or 6.3-11.7 NSTD).

E. Commercial antitoxin C concentrated, containing approximately 350 units (17,500 NSTD) per c. c. and prepared with the combined toxins of strains D-IV and NY-5

12A-----	NY-5-----	With less than 0.000165 c. c. (0.058 unit, or 2.9 NSTD).
12B-----	Homologous toxin (D-IV and NY-5).	Between 0.000314 c. c. and 0.000457 c. c. (0.11-0.16 unit, or 5.5-8.0 NSTD).
12C-----	Composite of above seven toxins.	With less than 0.000227 c. c. (0.08 unit, or 4.0 NSTD).

TABLE 2.—Summary of the data contained in protocols 1 to 14, inclusive, showing the neutralizing value of different scarlet fever streptococcus antitoxins for the concentrated and purified toxins prepared from various "strains" of hemolytic streptococci, neutralization being measured by the reactions resulting from the intradermal injection of various mixtures of toxin-antitoxin into the skin on the ventral surface of the ears of white rabbits—Continued

F. Commercial antitoxin D concentrated, containing approximately 300 units (15,000 NSTD) per c. c. and prepared with the combined toxins of strains D-I, D-II, D-III, D-IV and NY-5

Data from protocol number	Strain of toxin used	Amount of antitoxin required to effect the neutralization of 25 skin test doses of the toxin indicated
13A.....	NY-5.....	Between 0.00032 c. c. and 0.00044 c. c. (0.096-0.132 unit, or 4.8-6.6 NSTD).
13B.....	Composite of D-II, D-III, D-IV and NY-5.	With 0.00027 c. c. (0.082 unit, or 4.1 NSTD).

G. Commercial antitoxin E concentrated, containing approximately 350 units (16,500 NSTD) per c. c. and prepared with the combined toxins of strains D-I, D-II, D-III and D-IV

14A.....	NY-5.....	Between 0.00404 c. c. and 0.00555 c. c. (1.334-1.832 units, or 66.7-91.6 NSTD).
14B.....	Composite of D-II, D-III, and D-IV.	Between 0.001361 c. c. and 0.001966 c. c. (0.452-0.638 unit, or 22.6-31.9 NSTD).

Summary Table 2A shows the neutralizing action of National Institute of Health standard antitoxin against seven separate toxins and two composite toxins. This is an unconcentrated antitoxin prepared with a NY-5 antigen and very carefully standardized to contain 500 units (25,000 NSTD) per cubic centimeter in its undiluted state. Thus neutralization of NY-5 toxin becomes the neutralization of its homologous toxin, but it will be seen from the protocols and Table 2A that the other toxins and the composite toxins are equally well neutralized with the same quantity of antitoxin. The surprising fact is that so little antitoxin is required to neutralize 25 human skin test doses of toxin in the rabbit as compared with the human. It will be observed as this study progresses that this toxin-antitoxin relationship does not vary as long as NY-5 antigen has entered into the antitoxin production.

Table 2B shows the neutralizing value of commercial antitoxin A on the same single strain and composite toxins as were used with the standard antitoxin. Antitoxin A is a concentrated antitoxin made with D-I, D-II, D-III, and D-IV antigen. This antitoxin has not been standardized with the same care as was used in standardizing the National Institute of Health's standard antitoxin yet sufficient human subjects were used to warrant the conclusion that it did contain approximately 360 units per cubic centimeter. Its neutralizing ability in the rabbit varied widely from that of the standard antitoxin. Toxins NY-5, D-IV, D-II, HL-391, and NY-55 failed to be neutralized with 0.00362 c. c., or 1.3 units (65 NSTD). Toxin C-203 was neutralized with 0.36 to 0.5 units (18 to 25 NSTD), and toxin D-III with less than 0.3 units (15 NSTD). A composite toxin

of all seven strains failed to be neutralized with 1.3 units (65 NSTD). However, when an homologous toxin (except for the omission of toxin D-I) was used, the quantity of antitoxin required to neutralize was 0.66 to 0.86 units (33 to 43 NSTD).

A third neutralization series was run using as the neutralizing antitoxin antitoxin B, unconcentrated. This is in fact the same type of antitoxin as the National Institute of Health standard, except for the fact that the former contains 800 units (40,000 NSTD) per cubic centimeter. Table 2C shows its neutralizing ability against the homologous toxin and against the same composite toxin as was used in protocols 8A and 8B. (See Table 2A and 2B.) Neutralization of the homologous toxin was affected with 0.054 to 0.078 units (2.7 to 3.9 NSTD) which is the same as required of the standard antitoxin. A trifle more, 0.162 to 0.318 units (8.1 to 15.9 NSTD) was required to neutralize the composite toxin.

The manufacturer of antitoxin B submitted to the National Institute of Health a sample batch of concentrated antitoxin B which was labelled "For experimental purposes," with an accompanying letter stating that "it appears to contain in the neighborhood of 3,500 units per c. c." It was tested at 3,000 units (150,000 NSTD) against the same toxins as were used with unconcentrated antitoxin B. It will be seen from Table 2D that the neutralizing qualities of this concentrated antitoxin, even at this extremely high antitoxic value, equaled the neutralizing value of both the unconcentrated antitoxin B and the standard antitoxin.

Commercial antitoxin C is a concentrated antitoxin prepared with toxins from strains D-IV and NY-5. The lot used in this study was standardized at 350 units (17,500 NSTD). It was titrated on rabbits against toxin NY-5, its homologous composite toxin (D-IV plus NY-5), and against the composite toxin representing all seven strains used. Neutralization occurred in each instance (Table 2E) with essentially the same quantities of antitoxin C as were required of the standard antitoxin or antitoxin B.

A third commercial antitoxin, prepared with toxins from strains D-I, D-II, D-III, D-IV, and NY-5, was designated as antitoxin D. It is a concentrated antitoxin containing approximately 300 units (15,000 NSTD) per cubic centimeter. It was titrated against toxin NY-5 and the homologous composite toxin (except for strain D-I, which was discarded because of its poor toxin yield). The amount of antitoxin required in each instance was the same as that required when neutralizing these toxins with standard antitoxin unconcentrated, antitoxin B unconcentrated, antitoxin B concentrated, or antitoxin C concentrated. (See Table 2F.)

PROTOCOL 8

The neutralization of purified and concentrated scarlet fever streptococcus toxin at 15,000 skin test doses per cubic centimeter and which is composed of equal parts by titer of toxins from strains NY-5, D-IV, D-II, HL-391, NY-55, C-203, and D-III with—

A. Standard antitoxin diluted to contain 80 units (4,000 neutralizing skin test doses) per c. c.

Animal number	Hours of reading	NY-5 toxin control 1 STD	25 STD of composite toxin plus following quantities of standard antitoxin						Composite toxin control 1 STD
			0.000625 c. c., or 0.05 unit 2.5 NSTD	0.000875 c. c., or 0.07 unit 3.5 NSTD	0.00125 c. c., or 0.1 unit 5.0 NSTD	0.001875 c. c., or 0.15 unit 7.5 NSTD	0.0025 c. c., or 0.2 unit 10 NSTD	0.005 c. c., or 0.4 unit 20 NSTD	
695	24	13×17+	0	0	0	0	0	0	0
	48	-----	0	0	0	0	0	0	0
696	24	19×24+	17×25+	0	0	0	0	0	14×15+
	48	-----	-----	0	0	0	0	0	-----
697	24	11×16+	0	0	0	0	0	0	12×20+
	48	-----	8×12+	0	0	0	0	0	-----
698	24	17×24+	12×15+	0	0	0	0	0	15×22+
	48	-----	-----	0	0	0	0	0	-----
699	24	14×15+	7×10±	10×12±	0	0	0	0	14×15+
	48	-----	14×25+	15×20+	0	0	0	0	-----

B. Commercial antitoxin A at 380 units (18,000 neutralizing skin test doses) per c. c.

Animal number	Hours of reading	NY-5 toxin control 1 STD	25 STD of composite toxin plus following quantities of antitoxin A						Composite toxin control 1 STD
			0.000835 c. c., or 0.3 unit 15 NSTD	0.00139 c. c., or 0.5 unit 25 NSTD	0.001945 c. c., or 0.7 unit 35 NSTD	0.0025 c. c., or 0.9 unit 45 NSTD	0.003011 c. c., or 1.1 unit 55 NSTD	0.00362 c. c., or 1.3 unit 65 NSTD	
700	24	16×20+	14×25++	15×30+	15×15+	15×17+	12×14+	14×15+	16×30++
	48	-----	-----	-----	-----	-----	-----	-----	-----
701	24	18×22+	17×20+	10×10±	0	0	0	0	18×20±
	48	-----	-----	-----	0	0	0	0	-----
702	24	14×20+	12×15+	13×15±	10×12±	12×16+	0	12×12+	12×12+
	48	-----	-----	-----	-----	-----	0	-----	-----
717	24	17×19+	19×30++	13×17+	15×16+	12×12+	11×13+	14×17+	22×35+
	48	-----	-----	-----	-----	-----	-----	-----	-----
718	24	22×35++	19×25++	16×25+	18×22+	14×22+	16×17++	16×26+	17×25+
	48	-----	-----	-----	-----	-----	-----	-----	-----

NOTE.—No record is made in this protocol or in the succeeding protocols of those 48-hour readings which did not exceed in size or intensity the corresponding 24-hour reading. Actually all rabbits were observed at 18-24 hours and again at 40-48 hours. Early in the work, observations were also made at 72 and 96 hours. Only rarely did a reaction develop after 48 hours.

PROTOCOL 12

The neutralizing action of concentrated scarlet fever streptococcus antitoxin C against—

A. Purified and concentrated toxin, strain NY-5, at 196,000 skin test doses per c. c.

Animal number	Hours of reading	NY-5 toxin control 1 STD	25 STD of NY-5 toxin plus following quantities of antitoxin C					
			0.000165 c. c.	0.000335 c. c.	0.0005 c. c.	0.000665 c. c.	0.001335 c. c.	0.00165 c. c.
590	24	18×22++	0	0	0	0	0	0
	48	-----	8×8±	0	0	0	0	0
591	24	14×15±	0	0	0	0	0	0
	48	-----	0	0	0	0	0	0
592	24	13×20±	0	0	0	0	0	0
	48	-----	6×9±	0	0	0	0	0
593	24	18×18+	0	0	0	0	0	0
	48	-----	(1)	(1)	(1)	(1)	(1)	(1)
594	24	15×22+	0	0	0	0	0	0
	48	-----	15×15+	0	0	0	0	0

¹ Rabbit dead of snuffles and pneumonia before 48 hour reading.

The neutralizing action of concentrated scarlet fever streptococcus antitoxin C against—Continued

B. Composite toxin at 15,000 STD per c. c. (containing equal portions by titer of toxins from strains NY-5 and D-IV)

Animal number	Hours of reading	NY-5 toxin control 1 STD	25 STD of composite toxin plus following quantities of antitoxin C						Composite toxin control 1 STD
			0.00014 c. c.	0.000285 c. c.	0.00043 c. c.	0.000565 c. c.	0.000855 c. c.	0.001145 c. c.	
625	24	17×25++	10×15+	8×15+	0	0	0	0	14×20+
	48	-----	14×23+	10×15+	5×6±	5×6±	6×6±	6×6±	-----
626	24	12×17+	10×10±	8×12±	0	0	0	0	13×20+
	48	-----	17×20+	12×17+	10×12±	0	0	0	-----
627	24	8×10±	0	0	0	0	0	0	8×10±
	48	-----	8×10±	7×10±	0	0	0	0	-----
628	24	16×20+	0	0	0	0	0	0	14×16+
	48	-----	8×12±	9×11±	6×7±	0	0	0	-----
629	24	18×30+	14×16+	14×20+	0	0	0	0	15×25+
	48	-----	15×20+	13×23+	0	0	0	0	-----

C. Composite toxin at 15,000 STD per c. c. (containing equal parts by titer of toxins from strains NY-5, D-IV¹ D-II, HL-391, NY-55, C-203 and D-III)

Animal number	Hours of reading	NY-5 toxin control 1 STD	25 STD of composite toxin plus following quantities of antitoxin C						Composite toxin control 1 STD
			0.00014 c. c.	0.000285 c. c.	0.00043 c. c.	0.000565 c. c.	0.000855 c. c.	0.001145 c. c.	
680	24	13×15+	0	0	0	0	0	0	11×15±
	48	-----	0	0	0	0	0	0	-----
681	24	12×17+	0	0	0	0	0	0	10×13±
	48	-----	0	0	0	0	0	0	-----
682	24	13×18±	8×8+	6×6±	0	0	0	0	10×15+
	48	-----	12×12+	0	0	0	0	0	-----
683	24	14×22+	17×20+	0	0	0	0	0	15×20+
	48	-----	20×22+	0	0	0	0	0	-----
684	24	17×30++	10×14±	0	0	0	0	0	18×30+
	48	-----	12×16+	0	0	0	0	0	-----

PROTOCOL 13

The neutralizing action of concentrated scarlet fever streptococcus antitoxin D against—

A. Purified and concentrated toxin, strain NY-5, at 198,000 skin test doses per c. c.

Animal number	Hours of reading	NY-5 toxin control 1 STD	25 STD of toxin NY-5 plus following quantities of antitoxin D					
			0.0001 c. c.	0.0002 c. c.	0.0003 c. c.	0.0004 c. c.	0.0006 c. c.	0.0008 c. c.
585	24	25×35++	17×18+	15×20±	15×19±	3×5±	0	0
	48	-----	-----	-----	-----	0	0	0
586	24	20×31++	17×20+	15×15+	10×15+	0	5×6±	0
	48	-----	18×30++	16×25+	20×25++	13×15+	15×25++	0
587	24	16×28+	14×17+	8×14±	0	0	0	0
	48	-----	18×20+	14×22+	0	0	0	0
588	24	20×26+	18×20+	19×20+	0	0	0	0
	48	-----	-----	-----	0	0	0	0
589	24	16×20+	17×17+	15×25+	7×7±	0	0	0
	48	-----	-----	20×25+	14×15±	0	0	0

The neutralizing action of concentrated scarlet fever streptococcus antitoxin D against—Continued

B. Composite toxin at 15,000 STD per c. c. (containing equal portions by titer of toxins from strains NY-5 D-IV, D-II and D-III)

Animal number	Hours of reading	NY-5 toxin control 1 STD	25 STD of composite toxin plus following quantities of antitoxin D					Composite toxin control 1 STD
			0.0002 c. c.	0.0003 c. c.	0.0004 c. c.	0.0006 c. c.	0.0008 c. c.	
690-----	24	13×16±	0	0	0	0	0	0
	48		0	0	0	0	0	0
691-----	24	11×17++	6×8±	0	0	0	0	10×12±
	48		0	0	0	0	0	
692-----	24	12×22+	0	0	0	0	0	0
	48		0	0	0	0	0	0
693-----	24	16×24+	15×25+	12×22+	6×8±	0	0	12×15+
	48		20×30+	15×25+	0	0	0	0
694-----	24	11×15+	8×8±	0	0	0	0	10×12±
	48		0	0	0	0	0	

The fourth antitoxin studied is a concentrated antitoxin made with toxin from the same strains as enter into the preparation of commercial antitoxin A. The antitoxin is prepared in a manner similar to that in which antitoxin A is prepared, though by a different commercial laboratory. It has been designated as commercial antitoxin E, and it contained approximately 330 units (16,500 NSTD) per cubic centimeter. The results of rabbit testing are reported in Table 2 G, from which it will be seen that the neutralizing value of this antitoxin on the rabbit is essentially the same as antitoxin A. The slight difference in the values obtained against the homologous composite toxin with these two antisera is probably due to the fact that antitoxin E actually contained more than 330 units per cubic centimeter.

DISCUSSION

The present study had for its original purpose the development of a practical laboratory animal method of measuring the potency of scarlet fever streptococcus toxins and antitoxins. Such a method has been developed which, in the hands of the writer, gives end results that are more definite than are obtained by similar neutralization tests on human subjects. This is particularly true if the test antitoxin has been prepared in whole or in part with an antigen containing NY-5 toxin. Antitoxins prepared with antigens other than NY-5 vary more widely in their neutralizing properties on different rabbits and in some instances fail to neutralize except with quantities of antitoxin which are many times the required human neutralizing dose. With NY-5 present in the antigen used to produce the antitoxin, end points are obtained that show small variation from the mean.

The experience has been somewhat similar when human test subjects were used. A total of 94 suitable human subjects received on the one arm a series of intradermal injections of toxin-antitoxin

mixtures in which antitoxin NY-5 was not represented, and on the other arm a control series of similar injections in which NY-5 was represented. The latter gave satisfactory readings in 60 per cent of the test subjects, as against only 40 per cent in the former. In 69 other suitable human subjects similar injections were made, except for the fact that NY-5 was represented in the antitoxin under test as well as in the control mixture. Forty-three per cent of these test subjects gave satisfactory end points with both test and control antitoxin as compared to the former series where there was a discrepancy of 20 per cent.

Aside from developing this rabbit ear method of testing, the present work has brought out a striking difference in the neutralizing value of different antitoxins. It will be seen from the individual protocols and the summary table that the single strain NY-5 standard antitoxin required only 0.06 to 0.1 units (3 to 5 NSTD) in order completely to neutralize the reaction produced by 25 human skin test doses of the single strain or composite toxins studied. However, those antitoxins which had not been prepared with a NY-5 containing antigen actually required a very much greater quantity of antitoxin for the neutralization of the reaction produced by the toxin. Against five of the single strain toxins and the heterologous composite toxin the quantity of antitoxin A required exceeded 1.3 units (65 NSTD), whereas with two other single strain toxins the required quantity did not exceed 0.5 unit (25 NSTD) and with a homologous composite toxin slightly more than 0.5 unit (25 NSTD) was required. Similar results were obtained with commercial antitoxin E which likewise had not been prepared with a NY-5 containing antigen.

One single strain NY-5 antitoxin was available, and this neutralized in a manner similar to the standard antitoxin. Two multiple strain commercial antitoxins included NY-5 in their antigen. It was thought that these antitoxins would neutralize with quantities of antitoxin between that required of the standard antitoxin and commercial antitoxin A; the exact amount depending upon the absolute amount of each strain entering into the respective antigen used. However, this was not the case. In each instance these multistrained antitoxins neutralized in the same manner as the single strain NY-5 antitoxin.

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COURT DECISION RELATING TO PUBLIC HEALTH

Production of health department's records showing treatment for communicable disease at clinic not compelled.—(New York Supreme Court, Appellate Division; *McGowan v. Metropolitan Life Ins. Co.*,* 255 N. Y. S. 130; decided Jan. 29, 1932.) In an action by a beneficiary to recover on an insurance policy, the defendant company moved for a subpoena duces tecum, addressed to the New York City Department of Health, directing the production of records showing the treatment of the deceased for a communicable disease at the health department's clinics. A section of the sanitary code and a regulation adopted thereunder provided that the records of the health department should not be open to inspection by the public or to any person other than the representatives of the department and such persons as may be authorized by law to inspect such records. The appellate division denied the motion, saying that the rule of the department was a sufficient ground for such denial and that "to divulge to the world the secrets of a patient would not only be shocking but against public policy." In the course of the opinion the court also said:

To induce those who are afflicted with a communicable disease to submit to examination and treatment in an effort to eradicate such diseases and protect the public who might come in contact with those suffering from same, the department of health has established clinics for their use, with the assurance that the information thus obtained will not be divulged and that the records containing such information will not be open for inspection by the public. If that assurance can not be relied upon, those so afflicted may refuse such aid, with the result that they may endanger the health of the public at large. The security inspired by such a rule gives confidence to those requiring treatment and encourages them to cooperate with the department of health in an effort to control or eradicate such diseases.

* See PUBLIC HEALTH REPORTS, Jan. 22, 1932, Vol. 47, No. 4, p. 202, for report of case in lower court.

DEATHS DURING WEEK ENDED APRIL 16, 1932

Summary of information received by telegraph from industrial insurance companies for the week ended April 16, 1932, and corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Apr. 16, 1932	Corresponding week, 1931
Policies in force.....	73, 637, 230	75, 146, 342
Number of death claims.....	16, 103	15, 930
Death claims per 1,000 policies in force, annual rate.....	11. 4	11. 1
Death claims per 1,000 policies, first 15 weeks of year, annual rate.....	10. 6	11. 2

Deaths¹ from all causes in certain large cities of the United States during the week ended April 16, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 16, 1932				Corresponding week, 1931		Death rate ¹ for the first 15 weeks	
	Total deaths	Death rate ²	Deaths under 1 year	Infant mortality rate ³	Death rate ¹	Deaths under 1 year	1932	1931
Total (85 cities).....	8, 396	12. 0	668	56	12. 9	807	12. 6	13. 9
Akron.....	23	4. 5	3	37	8. 7	6	7. 5	8. 7
Albany.....	39	15. 6	3	61	17. 8	6	15. 1	15. 7
Atlanta.....	61	11. 3	5	49	13. 9	6	14. 3	16. 1
White.....	31	8. 6	2	29	12. 4	3	11. 2	13. 0
Colored.....	30	16. 4	3	86	16. 8	3	20. 3	22. 3
Baltimore.....	240	15. 3	21	74	15. 9	21	15. 0	17. 3
White.....	180	14. 0	15	68	14. 0	16	13. 9	15. 9
Colored.....	60	20. 9	6	96	24. 5	5	19. 9	23. 7
Birmingham.....	60	11. 3	4	42	17. 0	4	12. 2	15. 9
White.....	27	8. 2	1	16	15. 3	2	9. 9	12. 4
Colored.....	33	16. 4	3	81	19. 8	2	15. 8	21. 6
Boston.....	237	15. 7	23	70	15. 4	25	15. 7	16. 3
Bridgeport.....	29	10. 3	6	89	12. 8	4	12. 1	13. 1
Buffalo.....	150	13. 3	14	67	14. 0	15	14. 3	15. 4
Cambridge.....	35	16. 0	4	83	11. 4	1	14. 3	13. 8
Camden.....	31	13. 6	3	53	12. 3	5	16. 3	17. 7
Canton.....	18	8. 7	2	50	10. 7	1	10. 6	11. 3
Chicago.....	656	9. 7	59	58	11. 3	79	10. 9	11. 9
Cincinnati.....	158	17. 9	9	58	19. 3	8	17. 0	18. 3
Cleveland.....	238	13. 5	20	65	12. 9	20	12. 2	12. 8
Columbus.....	66	11. 5	5	50	12. 9	4	14. 7	15. 2
Dallas.....	53	9. 8	0	-----	13. 7	8	11. 6	12. 8
White.....	35	7. 8	0	-----	11. 3	6	10. 7	11. 2
Colored.....	18	19. 3	0	-----	25. 3	2	16. 2	20. 4
Dayton.....	44	9. 7	2	29	8. 8	2	11. 8	13. 8
Denver.....	76	13. 5	10	98	15. 6	7	16. 6	15. 2
Des Moines.....	35	12. 5	2	34	11. 9	3	12. 7	12. 2
Detroit.....	228	6. 9	23	41	9. 4	43	8. 6	9. 8
Duluth.....	23	11. 8	1	29	12. 3	2	10. 4	12. 0
El Paso.....	19	9. 3	3	-----	15. 4	4	14. 9	17. 7
Erie.....	24	10. 5	3	64	12. 4	4	12. 3	11. 9
Evansville.....	20	9. 9	1	33	13. 5	2	10. 3	12. 2
Fall River.....	38	17. 2	3	80	10. 0	1	13. 5	13. 8
Flint.....	26	8. 0	1	15	8. 3	4	9. 1	7. 8
Fort Wayne.....	21	9. 1	1	26	10. 6	0	11. 1	12. 1
Fort Worth.....	46	14. 1	3	-----	10. 9	4	11. 0	12. 1
White.....	40	14. 5	3	-----	10. 0	2	10. 6	11. 7
Colored.....	6	11. 7	0	-----	15. 3	2	13. 1	14. 1
Grand Rapids.....	25	7. 5	0	0	12. 8	3	9. 5	9. 9
Houston.....	71	11. 4	5	-----	12. 3	6	11. 2	11. 7
White.....	48	10. 5	3	-----	10. 8	5	10. 6	10. 8
Colored.....	23	14. 0	2	-----	16. 3	1	13. 1	14. 4
Indianapolis.....	92	12. 8	4	32	14. 1	8	14. 0	15. 4
White.....	78	12. 4	4	37	14. 8	7	13. 5	14. 9
Colored.....	14	15. 9	0	0	9. 2	1	17. 2	19. 1

See footnotes at end of table.

Deaths¹ from all causes in certain large cities of the United States during the week ended April 16, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931—Continued

City	Week ended Apr. 16, 1932				Corresponding week 1931		Death rate ² for the first 15 weeks	
	Total deaths	Death rate ¹	Deaths under 1 year	Infant mortality rate ³	Death rate ¹	Deaths under 1 year	1932	1931
Jersey City	72	11.7	7	58	11.1	7	12.0	13.8
Kansas City, Kans. ⁴	29	12.2	2	44	14.4	4	13.4	15.7
White	25	13.1	2	54	12.1	3	13.0	14.4
Colored	4	8.8	0	0	24.4	1	15.0	21.4
Kansas City, Mo.	97	12.2	5	57	14.7	17	13.4	15.3
White	30	14.0	0	0	13.4	5	13.0	14.5
Colored	26	14.5	0	0	10.3	5	12.0	13.3
Knoxville ⁵	4	11.4	0	0	29.3	0	18.3	20.7
White	33	10.7	0	0	11.6	0	10.2	10.9
Colored	268	9.9	18	53	11.6	28	11.6	11.6
Long Beach	80	13.5	2	18	13.7	5	14.6	17.6
Los Angeles	61	12.2	2	21	12.0	5	13.1	16.7
Louisville ⁶	19	20.8	0	0	23.0	0	23.0	27.5
White	27	14.1	4	105	12.0	2	14.9	14.7
Colored	18	9.1	0	0	10.7	0	12.2	12.4
Lowell ⁷	86	17.1	8	87	20.3	11	17.2	18.3
Lynn	49	15.7	5	85	14.0	6	13.2	15.4
Memphis ⁸	37	19.2	3	90	30.6	3	23.6	23.0
White	26	11.9	3	84	15.3	2	12.8	14.6
Colored	19	17.0	2	39	16.1	1	11.8	13.3
Miami ⁹	9	18.6	0	201	12.4	1	16.0	17.4
White	111	9.6	2	43	9.4	10	9.5	10.7
Colored	82	8.9	0	46	11.7	12	11.4	12.3
Millwaukee	38	12.7	3	45	15.4	7	15.2	18.6
Minneapolis	18	8.3	3	59	13.4	5	14.1	16.0
Nashville ¹⁰	20	24.4	0	0	20.7	2	18.4	25.3
White	40	18.6	1	29	13.0	8	13.9	13.3
Colored	47	15.1	2	40	12.2	3	13.9	13.7
New Bedford ¹¹	40	16.0	16	91	15.6	9	16.0	19.1
New Haven	91	14.1	7	78	12.1	5	13.6	15.6
New Orleans ¹²	54	20.5	7	114	24.4	4	21.8	27.7
White	1,645	11.9	146	65	12.4	165	12.0	12.4
Colored	221	8.4	20	58	9.0	20	8.9	9.7
New York	607	11.8	55	61	11.6	64	11.2	12.5
Bronx Boro.	628	13.4	59	84	18.7	55	18.4	20.4
Brooklyn Boro.	156	6.7	12	50	8.4	24	7.7	8.7
Manhattan Boro.	35	10.9	0	0	12.1	2	14.6	14.2
Queens Boro.	86	10.0	6	33	11.9	5	11.9	13.7
Richmond Boro.	70	12.2	4	80	9.8	4	11.6	11.8
Newark, N. J.	49	12.4	4	55	11.9	2	10.5	12.3
Oakland	58	13.9	0	0	11.1	3	15.1	14.4
Oklahoma City	33	12.4	2	36	20.7	6	14.2	16.3
Omaha	25	11.8	3	83	10.6	1	12.6	13.8
Paterson	524	14.0	39	60	14.7	50	14.1	16.1
Peoria	168	12.9	22	101	17.4	20	14.9	17.9
Philadelphia	58	9.7	5	64	11.5	1	12.3	12.7
Pittsburgh	70	14.3	8	77	15.3	4	15.6	15.3
Portland, Ore.	54	15.2	7	105	20.7	7	14.9	18.3
Providence	38	15.0	3	67	17.1	3	12.5	15.5
Richmond ¹³	16	15.8	4	183	29.6	4	20.9	25.1
White	94	14.7	3	29	12.9	8	12.9	13.9
Colored	204	12.8	11	39	15.6	6	14.8	18.2
Rochester	62	11.6	3	32	11.1	6	11.2	11.7
St. Louis	30	10.8	3	47	11.7	1	11.5	12.9
St. Paul	74	15.7	15	17.4	18	15.0	15.2	15.4
Salt Lake City ¹⁴	43	13.8	1	22	13.0	3	16.2	15.4
San Antonio	151	11.9	4	28	12.8	4	13.7	14.4
San Diego	27	14.6	3	87	11.9	1	11.8	12.3
San Francisco	88	12.2	1	10	10.5	2	12.3	13.1
Schenectady	21	10.3	1	40	11.4	4	10.6	11.2
Seattle	17	8.0	1	29	7.2	0	8.1	9.2
Somerville	30	13.4	4	107	18.4	3	12.8	13.5
South Bend	39	13.2	1	17	13.7	4	12.2	13.8
Spokane	65	15.7	5	64	13.7	3	12.7	12.9
Springfield, Mass.	27	13.0	2	55	15.0	6	12.4	14.8
Syracuse	25	12.1	0	0	7.0	0	12.7	14.3
Tacoma	14	8.6	0	0	6.9	0	12.1	13.1
Tampa ¹⁵	11	25.2	0	0	7.0	0	15.1	18.8
White	67	11.6	6	65	12.1	9	12.9	13.7
Colored	30	12.6	5	99	20.6	3	17.7	19.6
Toledo	44	22.4	3	85	15.8	1	17.1	16.8
Trenton								
Utica								

See footnotes at end of table.

Deaths¹ from all causes in certain large cities of the United States during the week ended April 16, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931—Continued.

City	Week ended Apr. 16, 1932				Corresponding week 1931		Death rate ² for the first 15 weeks	
	Total deaths	Death rate ²	Deaths under 1 year	Infant mortality rate ³	Death rate ¹	Deaths under 1 year	1932	1931
Washington, D. C. ⁴	157	16.6	13	73	15.8	9	17.6	18.4
White.....	94	13.8	7	57	14.1	5	15.9	15.9
Colored.....	63	24.1	6	107	20.5	4	21.9	25.0
Waterbury.....	26	13.4	3	99	9.8	1	10.7	11.2
Wilmington, Del. ⁷	27	13.2	1	23	13.7	2	18.1	17.0
Worcester.....	41	10.8	1	14	15.3	6	13.4	15.2
Yonkers.....	27	9.9	2	52	8.3	0	8.7	10.2
Youngstown.....	31	9.2	1	16	10.0	3	11.0	11.7

¹ Deaths of nonresidents are included. Stillbirths are excluded.

² These rates represent annual rates per 1,000 population, as estimated for 1932 and 1931 by the arithmetical method.

³ Deaths under 1 year of age per 1,000 estimated live births. Cities left blank are not in the registration area for births.

⁴ Data for 80 cities.

⁵ Deaths for week ended Friday.

⁶ For the cities for which deaths are shown by color the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; Tampa, 21; and Washington, D. C., 27.

⁷ Population Apr. 1, 1930; decreased 1920 to 1930, no estimated made.

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 April 23, 1932, and April 25, 1931

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 23, 1932, and April 25, 1931

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931
New England States:								
Maine.....		6	2	16	152	2	1	0
New Hampshire.....	1	2			29	31	0	0
Vermont.....					119	1	0	0
Massachusetts.....	20	32	4	7	733	496	3	1
Rhode Island.....	11	9		1	139	35	0	0
Connecticut.....	8	11	8	7	160	754	0	2
Middle Atlantic States:								
New York.....	116	95	134	121	2,271	2,367	10	7
New Jersey.....	30	59	22	8	739	930	1	6
Pennsylvania.....	65	87			2,265	4,485	10	10
East North Central States:								
Ohio.....	32	22	20	24	1,145	1,097	2	4
Indiana.....	33	34	50	21	88	1,118	9	12
Illinois.....	73	77	124	5	1,047	1,861	6	23
Michigan.....	19	25	12	4	1,966	103	4	9
Wisconsin.....	15	12	101	77	1,055	729	0	2
West North Central States:								
Minnesota.....	7	14	5	1	22	105	1	2
Iowa.....	10	8			2	113	0	3
Missouri.....	20	39	13	27	109	454	1	16
North Dakota.....	5	1			38	14	0	1
South Dakota.....	3	4			11	46	0	3
Nebraska.....	4	6			3	3	1	0
Kansas.....	6	7	1	12	549	54	0	0
South Atlantic States:								
Delaware.....	4	2	1			168	0	0
Maryland.....	16	14	51	16	27	1,392	0	1
District of Columbia.....	7	13	3	2	12	287	0	1
West Virginia.....	10	10	131	17	300	67	1	2
North Carolina.....	11	17	172	15	599	818	0	5
South Carolina.....	6	14	1,484	703	150	199	0	2
Georgia.....	14	6	142	85	34	86	5	3
Florida.....	20	4	5	5	3	227	0	8

1 New York City only.

2 Week ended Friday.

3 Typhus fever, week ended Apr. 23, 1932, 4 cases: 3 cases in Georgia, and 1 case in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 23, 1932, and April 25, 1931—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931
East South Central States:								
Kentucky.....	6		178		82	128	1	3
Tennessee.....	11	1	342	153	237	132	4	5
Alabama.....	17	15	140	51	21	304	2	2
Mississippi.....	8	4					0	0
West South Central States:								
Arkansas.....	4	5	183	163	6	30	4	0
Louisiana.....	17	19	13	19	86	3	2	4
Oklahoma ¹	18	15	151	110	16	16	0	4
Texas ¹	29	17	300	81	383	3	0	0
Mountain States:								
Montana.....	1	3	5		73	7	1	2
Idaho.....	1	2		23	1		0	2
Wyoming.....				1	23	1	0	0
Colorado.....	10	5			125	158	0	0
New Mexico.....	9	1	3	56	77	91	0	1
Arizona.....	7	4	6	5	1	17	2	0
Utah ¹	1	2		7	1	7	0	1
Pacific States:								
Washington.....	4	6	4		342	30	0	3
Oregon.....	2	5	40	97	293	187	0	0
California.....	83	56	65	276	619	1,558	3	7
Total.....	790	790	3,815	2,056	16,153	20,714	74	152

Division and State	Polio myelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931
New England States:								
Maine.....	0	0	41	26	0	0	1	0
New Hampshire.....	0	0	48	6	0	0	1	0
Vermont.....	0	0	14	4	4	0	1	0
Massachusetts.....	0	2	473	384	0	0	2	3
Rhode Island.....	0	0	63	77	0	0	2	0
Connecticut.....	0	0	119	58	0	0	0	2
Middle Atlantic States:								
New York.....	2	3	1,617	966	10	2	11	9
New Jersey.....	1	0	304	338	0	0	1	5
Pennsylvania.....	0	1	596	634	0	0	8	6
East North Central States:								
Ohio.....	0	0	280	367	13	43	11	4
Indiana.....	0	0	150	216	6	125	2	4
Illinois.....	1	0	442	551	3	38	2	4
Michigan.....	0	1	465	293	3	39	5	3
Wisconsin.....	0	1	63	170	0	24	1	1
West North Central States:								
Minnesota.....	0	0	155	87	3	5	3	0
Iowa.....	2	0	62	75	44	81	1	1
Missouri.....	1	0	68	263	6	30	3	4
North Dakota.....	0	0	16	8	0	2	0	0
South Dakota.....	0	0	3	18	4	32	2	1
Nebraska.....	0	0	20	26	10	24	0	0
Kansas.....	0	1	65	59	3	136	0	3
South Atlantic States:								
Delaware.....	0	0	14	20	0	0	0	0
Maryland.....	0	0	108	71	0	0	8	0
District of Columbia.....	0	0	26	28	0	0	0	0
West Virginia.....	0	0	29	64	1	5	3	4
North Carolina.....	0	0	53	41	3	3	6	1
South Carolina.....	0	1	4	9	0	3	6	6
Georgia ²	0	0	16	69	1	0	9	3
Florida.....	0	0	8	4	0	0	16	2

¹ Week ended Friday.

² Typhus fever, week ended Apr. 23, 1932, 4 cases: 3 cases in Georgia, and 1 case in Texas.

³ Figures for 1932 are exclusive of Oklahoma City and Tulsa, and for 1931 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 23, 1932, and April 25, 1931—Continued

Division and State	Polliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931	Week ended Apr. 23, 1932	Week ended Apr. 25, 1931
	East South Central States:							
Kentucky.....	0	0	92	49	1	14	0	1
Tennessee.....	0	0	27	41	16	17	12	4
Alabama.....	1	0	14	19	25	4	13	2
Mississippi.....	0	1	8	14	29	51	5	3
West South Central States:								
Arkansas.....	0	0	4	26	3	51	5	7
Louisiana.....	3	0	15	23	3	36	14	9
Oklahoma ¹	0	0	21	40	12	68	16	11
Texas ²	1	0	36	43	87	54	6	10
Mountain States:								
Montana.....	0	0	13	45	5	2	1	1
Idaho.....	0	0	4	3	1	1	0	2
Wyoming.....	0	0	4	11	0	2	1	0
Colorado.....	0	0	29	30	1	2	1	1
New Mexico.....	0	0	16	4	1	1	1	5
Arizona.....	0	0	9	7	0	0	1	0
Utah ³	0	1	2	10	0	0	1	1
Pacific States:								
Washington.....	0	0	31	23	14	23	0	4
Oregon.....	0	0	19	14	16	33	4	0
California.....	5	7	182	154	16	46	11	10
Total	17	20	5,850	5,488	344	997	197	137

¹ Week ended Friday.

² Typhus fever, week ended Apr. 23, 1932, 4 cases: 3 cases in Georgia, and 1 case in Texas.

³ Figures for 1932 are exclusive of Oklahoma City and Tulsa, and for 1931 are exclusive of Tulsa only.

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	Me-ningo-coccus menin-gitis	Diph-theria	Influ-enza	Ma-laria	Meas-les	Pel-lagra	Polio-mye-litis	Scarlet fever	Small-pox	Ty-phoid fever
<i>March, 1932</i>										
Alabama.....	4	58	383	37	23	29	0	82	45	27
California.....	23	330	748	8	2,732	3	18	771	64	34
Idaho.....		6	19		7		3	35	15	6
Illinois.....	24	354	1,051	12	1,602		1	1,828	65	37
Maryland.....	10	96	1,370		234	1	0	633	0	14
Michigan.....	20	132	458	1	3,760		3	2,056	45	35
Minnesota.....	6	51	14		68		2	546	9	6
Missouri.....	3	130	320	3	337		0	288	41	11
New York.....	40	504		5	10,381		6	7,810	12	31
Ohio.....	22	206	1,165		6,270		4	1,884	194	20
Porto Rico.....		55	52	2,563	147		0		0	32
Texas.....	2	204	1,125	381			0	165		16
West Virginia.....	5	64	1,447		2,089		2	136	22	36

<i>March, 1932</i>		Chicken pox:	
Actinomycosis:	Cases	Alabama.....	Cases
California.....	1	California.....	4,966
Anthrax:		Idaho.....	37
New York.....	2	Illinois.....	1,352
Porto Rico.....	2	Maryland.....	565
Botulism:		Michigan.....	1,119
California.....	1	Minnesota.....	176

	Cases		Cases
Chicken pox—Continued.		Mumps—Continued.	
Missouri.....	381	New York.....	1,798
New York.....	2,730	Ohio.....	1,010
Ohio.....	1,486	Porto Rico.....	60
Porto Rico.....	61	West Virginia.....	9
West Virginia.....	158	Ophthalmia neonatorum:	
Conjunctivitis:		Illinois.....	4
Maryland.....	2	Maryland.....	3
Dengue:		Missouri.....	1
Alabama.....	1	New York.....	7
Porto Rico.....	3	Ohio.....	67
Diarrhea:		Porto Rico.....	8
Maryland.....	11	Paratyphoid fever:	
Diarrhea and enteritis:		California.....	4
Ohio (under 2 years).....	19	Illinois.....	1
Dysentery:		New York.....	3
California (amebic).....	8	Porto Rico.....	9
California (bacillary).....	16	Psittacosis:	
Illinois.....	9	California.....	4
Maryland.....	4	Puerperal septicemia:	
Missouri.....	2	Illinois.....	7
New York.....	5	New York.....	16
Porto Rico.....	16	Ohio.....	6
Filariasis:		Porto Rico.....	5
Porto Rico.....	8	Rabies in animals:	
Food poisoning:		California.....	72
California.....	10	Illinois.....	6
Ohio.....	8	Maryland.....	2
German measles:		Missouri.....	4
California.....	106	New York ¹	6
Illinois.....	36	Rabies in man:	
Maryland.....	32	California.....	1
New York.....	197	Scabies:	
Ohio.....	44	Maryland.....	5
Granuloma:		Septic sore throat:	
California, coccidioid.....	2	California.....	10
Maryland.....	1	Illinois.....	17
Hookworm disease:		Maryland.....	13
California.....	2	Michigan.....	76
Impetigo contagiosa:		Missouri.....	9
Maryland.....	14	New York.....	64
Jaundice:		Ohio.....	172
California (epidemic).....	5	Tetanus:	
Maryland.....	1	California.....	4
Lead poisoning:		Illinois.....	6
Illinois.....	3	Maryland.....	1
Ohio.....	8	New York.....	1
Leprosy:		Porto Rico.....	7
California.....	1	Tetanus, infantile:	
Ohio.....	1	Porto Rico.....	11
Lethargic encephalitis:		Trachoma:	
California.....	5	California.....	20
Illinois.....	10	Illinois.....	4
Michigan.....	1	Minnesota.....	1
New York.....	14	Missouri.....	22
Ohio.....	6	New York.....	2
West Virginia.....	2	Ohio.....	5
Mumps:		Porto Rico.....	3
Alabama.....	89	Trichinosis:	
California.....	950	California.....	6
Idaho.....	29	Illinois.....	1
Illinois.....	396	New York.....	6
Maryland.....	570	Tularæmia:	
Michigan.....	1,360	Alabama.....	3
Missouri.....	308	Illinois.....	2

¹ Exclusive of New York City.

Tularæmia—Continued.	Cases	Vincent's angina:	Cases
Maryland.....	1	Illinois.....	10
Missouri.....	1	Maryland.....	9
New York.....	1	New York ¹	86
Ohio.....	1	Whooping cough:	
Typhus fever:		Alabama.....	146
Alabama.....	5	California.....	1,440
Undulant fever:		Idaho.....	8
Alabama.....	1	Illinois.....	1,826
California.....	5	Maryland.....	723
Illinois.....	5	Michigan.....	1,097
Maryland.....	1	Minnesota.....	190
Michigan.....	3	Missouri.....	610
Minnesota.....	3	New York.....	2,580
Missouri.....	5	Ohio.....	3,100
New York.....	19	Porto Rico.....	153
Ohio.....	6	West Virginia.....	374
West Virginia.....	1		

ADMISSIONS TO HOSPITALS FOR THE INSANE, AUGUST, 1930

Reports for the month of August, 1930, showing new admissions to hospitals for the insane were received by the Public Health Service from 113 hospitals, located in 36 States, the District of Columbia, and the Territory of Hawaii. The 113 hospitals had 177,500 patients on August 31, 1930; 94,619 males and 82,881 females, the ratio being 114 males per 100 females.

The following table gives the number of new admissions for the month of August, 1930, by psychoses:

Psychoses	Male	Female	Total
1. Traumatic psychoses.....	10	5	15
2. Senile psychoses.....	138	131	269
3. Psychoses with cerebral arteriosclerosis.....	197	111	308
4. General paralysis.....	208	69	277
5. Psychoses with cerebral syphilis.....	24	11	35
6. Psychoses with Huntington's chorea.....	2	3	5
7. Psychoses with brain tumor.....	1	1	2
8. Psychoses with other brain or nervous disease.....	19	16	35
9. Alcoholic psychoses.....	124	14	138
10. Psychoses due to drugs and other exogenous toxins.....	10	6	16
11. Psychoses with pellagra.....	12	20	32
12. Psychoses with other somatic disease.....	26	35	61
13. Manic-depressive psychoses.....	165	243	408
14. Involution melancholia.....	26	41	67
15. Dementia præcox (schizophrenia).....	323	247	570
16. Paranoia and paranoid conditions.....	26	32	58
17. Epileptic psychoses.....	53	36	89
18. Psychoneuroses and neuroses.....	20	37	57
19. Psychoses with psychopathic personality.....	16	7	23
20. Psychoses with mental deficiency.....	65	43	108
21. Undiagnosed psychoses.....	123	83	206
22. Without psychosis.....	181	61	242
Total.....	1,769	1,252	3,021

During the month of August, 1930, there were 3,021 new admissions to the hospitals, 58.6 per cent of these new admissions being males and 41.4 per cent females, the ratio being 141 males per 100 females. Four hundred and forty-eight of the new admissions were reported as being undiagnosed or "without psychosis." There were 2,573 new admissions for whom provisional diagnoses were made. Of these 2,573 patients, cases of dementia præcox constituted 22.2

¹ Exclusive of New York City.

per cent; manic-depressive psychoses, 15.9 per cent; psychoses with cerebral arteriosclerosis, 12.0 per cent; general paralysis, 10.8 per cent; and senile psychoses, 10.5 per cent. These five classes accounted for 71.2 per cent of the new admissions for whom diagnoses were made.

The following table shows the number of patients in the hospitals and on parole on August 31, 1930:

	Male	Female	Total
Patients on books Aug. 31, 1930:			
In hospitals.....	85,986	75,841	161,827
On parole or otherwise absent but still on the books.....	8,633	7,040	15,673
Total.....	94,619	82,881	177,500

Of the 177,500 patients, 8,633 males and 7,040 females were on parole or otherwise absent but still on the books at the end of the month: 9.1 per cent of the males, 8.5 per cent of the females, and 8.8 per cent of total number of patients.

PLAGUE-INFECTED RAT TRAPPED IN LOS ANGELES, CALIF.

On April 22, 1932, plague infection was reported confirmed in a rat which was trapped in Los Angeles, Calif., 23 miles from the port, San Pedro.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 34,050,000. The estimated population of the 91 cities reporting deaths is more than 32,490,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended April 16, 1932, and April 18, 1931

	1932	1931	Estimated expectancy
<i>Cases reported</i>			
Diphtheria:			
46 States.....	798	929	-----
98 cities.....	351	424	726
Measles:			
45 States.....	16,909	20,734	-----
98 cities.....	6,395	8,447	-----
Meningococcus meningitis:			
46 States.....	92	147	-----
98 cities.....	40	78	-----
Poliomyelitis:			
46 States.....	21	24	-----
Scarlet fever:			
46 States.....	6,316	5,455	-----
98 cities.....	3,109	2,452	1,494
Smallpox:			
46 States.....	417	1,036	-----
98 cities.....	43	140	67
Typhoid fever:			
46 States.....	157	137	-----
98 cities.....	30	30	30
<i>Deaths reported</i>			
Influenza and pneumonia:			
91 cities.....	898	1,090	-----
Smallpox:			
91 cities.....	0	0	-----

City reports for week ended April 16, 1932

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during non-epidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1923 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cas., estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland.....	0	0	0	1	1	32	7	4
New Hampshire:								
Concord.....	0	0	0		0	1	0	1
Manchester.....	0	0	0		0	0	0	1
Nashua.....	0	0	0		0	0	0	0
Vermont:								
Barre.....	0	0	0		0	0	0	0
Burlington.....	0	0	0		0	0	0	0
Massachusetts:								
Boston.....	84	27	2	1	0	70	66	20
Fall River.....	4	3	0	1	0	72	2	2
Springfield.....	21	2	2		0	65	19	2
Worcester.....	0	3	0		0	1	19	8
Rhode Island:								
Pawtucket.....	0	0	0		0	0	0	0
Providence.....	3	7	3		0	63	6	10
Connecticut:								
Bridgeport.....	3	4	2		2	7	0	2
Hartford.....	3	4	2		0	4	8	3
New Haven.....	20	0	1		0	4	20	2
MIDDLE ATLANTIC								
New York:								
Buffalo.....	20	9	3		2	5	1	26
New York.....	232	218	87	35	29	223	213	219
Rochester.....	2	4	0		0	110	16	12
Syracuse.....	1	2	1		0	507	7	5
New Jersey:								
Camden.....	4	6	1	1	2	1	1	6
Newark.....	29	13	4	4	0	30	97	11
Trenton.....	2	3	0		2	5	6	4
Pennsylvania:								
Philadelphia.....	81	59	7	17	13	6	56	58
Pittsburgh.....	51	13	6	5	5	364	23	22
Reading.....	12	1	1		0	1	0	4
EAST NORTH CENTRAL								
Ohio:								
Cincinnati.....	6	6	6		9	1	1	12
Cleveland.....	67	21	7	51	2	934	82	17
Columbus.....	6	2	6	1	1	6	2	4
Toledo.....	17	3	0		0	24	0	6
Indiana:								
Fort Wayne.....	0	2	4		0	0	0	0
Indianapolis.....	38	3	0		3	5	183	11
South Bend.....	1	1	0		1	6	0	0
Terre Haute.....	0	1	0		1	3	0	1
Illinois:								
Chicago.....	108	86	34	3	6	668	22	39
Springfield.....	2	0	0	1	0	0	2	0

City reports for week ended April 16, 1932—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—contd.								
Michigan:								
Detroit.....	94	37	15	3	3	322	56	26
Flint.....	8	2	0	21	1	266	50	4
Grand Rapids.....	3	1	0		3	145	15	0
Wisconsin:								
Kenosha.....	1	0	0		0	0	0	1
Madison.....	14	0	0		1	1		
Milwaukee.....	70	9	2	4	4	1,068	23	9
Racine.....	13	3	0		0	202	58	0
Superior.....	3	0	0		0	0	24	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth.....	5	0	0		1	0	3	2
Minneapolis.....	15	10	3		1	13	15	6
St. Paul.....	7	4	1	1	1	0	10	2
Iowa:								
Davenport.....	2	0	0			0	0	
Des Moines.....	0	1	2			0	0	
Sioux City.....	2	1	3			0	4	
Waterloo.....	9	0	0			0	0	
Missouri:								
Kansas City.....	18	3	10		0	10	5	14
St. Joseph.....	0	0	0		0	0	1	5
St. Louis.....	14	28	8	3	3	11	5	13
North Dakota:								
Fargo.....	1	0	0		0	21	0	1
Grand Forks.....	0	0	0			0	0	
South Dakota:								
Aberdeen.....	0	1	0			10	0	
Sioux Falls.....	0	0	0			0	0	
Nebraska:								
Omaha.....	7	3	0		0	1	1	4
Kansas:								
Topeka.....	27	0	0		0	1	9	0
Wichita.....	5	1	1		1	325	8	2
SOUTH ATLANTIC								
Delaware:								
Wilmington.....	3	2	0		0	8	0	1
Maryland:								
Baltimore.....	102	20	7	8	6	4	120	21
Cumberland.....	0	0	0		0	5	0	1
Frederick.....	0	0	0	1	0	0	0	0
District of Columbia:								
Washington.....	21	12	5	2	0	2	0	18
Virginia:								
Lynchburg.....	6	1	0		1	0	0	0
Norfolk.....	1	1	0		0	0	1	8
Richmond.....	2	2	0		1	0	0	6
Roanoke.....	1	0	1		2	0	0	2
West Virginia:								
Charleston.....	0	1	1	2	1	54	0	8
Huntington.....	0	1	1			2	0	
Wheeling.....	0	0	0		0	4	0	0
North Carolina:								
Raleigh.....	4	0	1		0	12	0	1
Wilmington.....	1	0	0		0	0	0	1
Winston-Salem.....	3	0	1		0	3	3	1
South Carolina:								
Charleston.....	1	0	0	86	0	1	0	2
Columbia.....	2	0	2		0	57	0	10
Greenville.....	4	0	0			9	0	
Georgia:								
Atlanta.....	9	2	6	11	3	0	0	11
Brunswick.....	0	0	0		0	1	0	1
Savannah.....	4	0	1	4	1	0	0	3
Florida:								
Miami.....	14	2	1	2	0	3	0	1
Tampa.....	4	1	0		1	0	0	1

City reports for week ended April 16, 1932—Continued

Division, State, and city	Chick- en pox, cases reported	Diphtheria		Influenza		Meas- les, cases reported	Mumps, cases reported	Pneu- monia, deaths reported
		Cases, esti- mated expect- ancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington.....	0	1	0	0	0	0	0	2
Lexington.....	1		4	10	0	1	12	4
Tennessee:								
Memphis.....	5	2	1		2		2	12
Nashville.....	6	0	0		1	0	0	7
Alabama:								
Birmingham.....	5	2	0	25	3	0	2	7
Mobile.....	1	1	1		0	0	0	2
Montgomery.....	4	0	1			0	4	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith.....	1	0	1			0	0	
Little Rock.....	6	0	0		0	0	1	2
Louisiana:								
New Orleans.....	0	10	23		0	0	0	0
Shreveport.....	9	0	1		0	7	9	6
Oklahoma:								
Muskogee.....	3		1			48	1	
Oklahoma City.....	2	1	1	20	4	1	1	15
Texas:								
Dallas.....	6	5	8				1	5
Fort Worth.....	17	1	1		3	1	0	3
Galveston.....	0	0	0		0	0	0	0
Houston.....	1	4	3		1	2	0	10
San Antonio.....	0	2	0		5	0	9	4
MOUNTAIN								
Montana:								
Billings.....	0	0	0		0	1	0	0
Great Falls.....	4	0	0		0	1	0	0
Helena.....	1	0	0		0	3	0	0
Missoula.....	0	0	0		0	0	0	1
Idaho:								
Boise.....	0	0	0		0	0	2	0
Colorado:								
Denver.....	39	7	1		1	150	60	7
Pueblo.....	20	0	1		0	0	0	2
New Mexico:								
Albuquerque.....	6	0	0		0	43	9	2
Arizona:								
Phoenix.....	0	0	0		0	9	0	4
Utah:								
Salt Lake City.....	34	2	5		0	0	6	0
Nevada:								
Reno.....	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle.....	24	2	5			193	8	
Spokane.....	22	2	0			2	0	
Tacoma.....	9	1	1		0	40	1	2
Oregon:								
Portland.....	8	7	1	3	0	120	4	2
Salem.....	3	0	0		0	1	10	0
California:								
Los Angeles.....	138	29	37	51	2	12	22	8
Sacramento.....	33	2	9		0	35	3	3
San Francisco.....	77	11	6		0	218	10	11

City reports for week ended April 16, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuber- cul- osis, deaths re- ported	Typhoid fever			Whoop- ing cough, cases re- ported	Deaths, all causes
	Cases, esti- mated expect- ancy	Cases re- ported	Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		
NEW ENGLAND											
Maine:											
Portland.....	3	5	0	0	0	0	0	0	0	13	19
New Hampshire:											
Concord.....	0	3	0	0	0	0	0	0	0	0	16
Manchester.....	2	0	0	0	0	2	0	0	0	0	23
Nashua.....	0	0	0	0	0	0	0	0	0	0	0
Vermont:											
Barre.....	0	1	0	0	0	0	0	0	0	0	6
Burlington.....	0	1	0	2	0	0	0	0	0	0	11
Massachusetts:											
Boston.....	86	180	0	0	0	9	1	0	0	31	237
Fall River.....	4	16	0	0	0	2	1	0	0	2	38
Springfield.....	12	7	0	0	0	0	0	0	0	4	32
Worcester.....	10	56	0	0	0	2	1	0	0	18	41
Rhode Island:											
Pawtucket.....	1	0	0	0	0	0	0	0	0	0	24
Providence.....	13	26	0	0	0	3	0	0	0	8	70
Connecticut:											
Bridgeport.....	10	5	0	0	0	3	0	0	0	2	29
Hartford.....	5	6	0	0	0	1	0	0	0	7	35
New Haven.....	5	27	0	0	0	1	0	0	0	13	47
MIDDLE ATLANTIC											
New York:											
Buffalo.....	28	135	0	0	0	5	9	0	0	31	143
New York.....	321	1,019	0	0	0	103	0	1	0	196	1,645
Rochester.....	11	64	0	0	0	3	0	0	0	4	87
Syracuse.....	15	31	0	0	0	0	0	0	0	71	65
New Jersey:											
Camden.....	5	36	0	0	0	0	0	0	0	2	31
Newark.....	34	34	0	0	0	4	0	0	0	48	86
Trenton.....	5	6	0	0	0	3	0	0	0	5	30
Pennsylvania:											
Philadelphia.....	103	267	0	0	0	29	2	2	1	159	529
Pittsburgh.....	19	70	0	0	0	4	0	1	0	60	168
Reading.....	5	20	0	0	0	3	0	0	0	18	27
EAST NORTH CENTRAL											
Ohio:											
Cincinnati.....	24	50	1	0	0	7	0	0	0	0	158
Cleveland.....	39	89	0	0	0	25	1	0	1	190	238
Columbus.....	10	4	1	8	0	6	0	5	0	26	66
Toledo.....	14	5	0	0	0	8	0	0	0	120	67
Indiana:											
Fort Wayne.....	4	4	3	0	0	0	0	0	0	6	21
Indianapolis.....	12	15	7	1	0	6	0	0	0	23	0
South Bend.....	4	4	1	0	0	1	0	0	0	2	17
Terra Haute.....	1	4	1	0	0	0	0	0	0	2	20
Illinois:											
Chicago.....	126	221	2	0	0	39	1	0	0	124	656
Springfield.....	4	9	1	0	0	0	0	1	0	8	0
Michigan:											
Detroit.....	116	220	0	0	0	19	0	0	0	176	228
Flint.....	13	12	1	0	0	1	0	0	0	18	26
Grand Rapids.....	12	3	0	0	0	0	0	0	0	3	25
Wisconsin:											
Kenosha.....	3	3	0	0	0	0	0	0	0	15	3
Madison.....	2	0	0	0	0	0	0	0	0	27	0
Milwaukee.....	30	31	0	1	0	7	0	0	0	171	111
Racine.....	4	1	0	0	0	0	0	0	0	7	10
Superior.....	3	0	1	0	0	0	0	0	0	0	11
WEST NORTH CENTRAL											
Minnesota:											
Duluth.....	7	1	0	0	0	1	0	0	0	4	23
Minneapolis.....	34	60	2	0	0	5	0	0	0	17	82
St. Paul.....	28	24	1	0	0	2	0	0	0	16	65

City reports for week ended April 16, 1932—Continued

Division, State, and city—	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—contd.											
Iowa:											
Davenport.....	1	4	2	0		0	0		0		
Des Moines.....	9	13	3	3		0	0		0		35
Sioux City.....	2	3	1	4		0	0		0		2
Waterloo.....	1	0	0	1		0	0		0		3
Missouri:											
Kansas City.....	22	16	1	0	0	6	0	0	0	44	97
St. Joseph.....	3	1	0	0	0	0	0	0	0	2	32
St. Louis.....	59	24	3	0	0	10	1	1	0	50	204
North Dakota:											
Fargo.....	2	3	0	0	0	1	0	0	0	0	11
Grand Forks.....	0	0	0	0		0	0		0		
South Dakota:											
Aberdeen.....	1	0	0	0		0	0		0		4
Sioux Falls.....	1	0	0	0		0	0		0		0
Nebraska:											
Omaha.....	4	9	5	2	0	1	0	0	0	3	58
Kansas:											
Topeka.....	3	0	1	0	0	0	0	0	0	29	9
Wichita.....	2	0	1	0	0	0	0	0	0	1	26
SOUTH ATLANTIC											
Delaware:											
Wilmington.....	6	13	0	0	0	1	0	0	0	9	27
Maryland:											
Baltimore.....	40	82	0	0	0	20	1	1	1	127	240
Cumberland.....	0	0	0	0	0	0	0	0	0	0	7
Frederick.....	1	0	0	0	0	1	0	0	0	3	2
District of Col.:											
Washington.....	25	21	0	0	0	10	0	0	0	23	157
Virginia:											
Lynchburg.....	0	0	0	0	0	0	0	0	0	20	17
Norfolk.....	1	4	0	0	0	1	0	0	0	14	34
Richmond.....	4	12	0	0	0	5	0	0	0	3	56
Roanoke.....	2	4	0	0	0	0	0	0	0	1	19
West Virginia:											
Charleston.....	0	2	1	0	0	0	0	0	0	2	20
Huntington.....	2	2	0	0		0	0		0	0	
Wheeling.....	1	2	0	0		0	1		0	21	8
North Carolina:											
Raleigh.....	0	0	0	0	0	0	0	0	0	2	6
Wilmington.....	0	1	0	0	0	0	0	0	0	14	5
Winston-Salem.....	0	16	1	0	0	1	0	0	0	28	12
South Carolina:											
Charleston.....	1	1	0	0	0	2	0	1	0	0	25
Columbia.....	0	0	0	0	0	1	1	0	0	11	26
Greenville.....	0	0	1	0		0	0		0		
Georgia:											
Atlanta.....	6	2	2	0	0	5	0	0	0	4	61
Brunswick.....	0	0	0	0	0	0	0	2	1	0	3
Savannah.....	0	2	0	0	0	1	0	2	0	4	23
Florida:											
Miami.....	0	0	0	0	0	0	1	0	0	3	26
Tampa.....	1	0	0	0	0	0	1	0	0	0	23
EAST SOUTH CENTRAL											
Kentucky:											
Covington.....	2	0	1	0	0	0	0	0	0	0	24
Lexington.....		1		5	0	2		0	0	4	12
Tennessee:											
Memphis.....	11	3	2	0	0	5	1	5	0	16	86
Nashville.....	2	1	0	0	0	5	0	0	0	6	38
Alabama:											
Birmingham.....	2	2	0	0	0	5	0	1	0	16	60
Mobile.....	0	1	0	8	0	3	1	0	0	0	26
Montgomery.....	0	0	0			0	0		0		

City reports for week ended April 16, 1932—Continued

Division, State and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith.....	0	1	0	0			0	0		0	
Little Rock.....	2	0	0	0	0	0	0	0		1	2
Louisiana:											
New Orleans.....	11	4	0	1	0	0	2	1	0	2	
Shreveport.....	0	1	0	0	0	1	0	0	0	4	38
Oklahoma:											
Muskogee.....		0		1				1			0
Oklahoma City.....	4	6	3	4	0	2	1	0	1	0	59
Texas:											
Dallas.....	4	5	2	0	0	3	1	0	0	3	53
Fort Worth.....	2	5	4	2	0	4	0	0	0	0	46
Galveston.....	0	1	0	0	0	2	0	1	0	0	13
Houston.....	3	5	3	0	0	6	0	1	0	0	71
San Antonio.....	1	0	0	1	0	10	0	0	1	0	74
MOUNTAIN											
Montana:											
Billings.....	0	0	0	0	0	0	0	0	0	0	7
Great Falls.....	1	0	0	0	0	1	0	1	0	0	6
Helena.....	0	0	1	0	0	0	0	0	0	0	3
Missoula.....	1	1	0	0	0	0	0	0	0	0	2
Idaho:											
Boise.....	0	0	0	2	0	0	0	0	0	0	7
Colorado:											
Denver.....	13	21	0	0	0	9	0	0	0	31	68
Pueblo.....	2	0	0	0	0	1	0	0	0	4	9
New Mexico:											
Albuquerque.....	0	7	0	0	0	2	0	0	0	0	8
Arizona:											
Phoenix.....	1	1	0	0	0	5	0	0	0	0	
Utah:											
Salt Lake City.....	2	2	0	0	0	2	0	0	0	2	30
Nevada:											
Reno.....	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle.....	8	8	2	0			1	0		7	
Spokane.....	6	1	8	0			0	0		5	
Tacoma.....	2	2	4	5	0	0	0	0	0	3	27
Oregon:											
Portland.....	4	4	9	18	0	2	0	1	0	5	58
Salem.....	0	0	1	0	0	0	0	0	0	13	
California:											
Los Angeles.....	34	57	5	0	0	27	1	2	0	65	263
Sacramento.....	2	2	0	0	0	5	0	0	0	8	33
San Francisco.....	21	8	1	0	0	9	1	1	1	16	151

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)			
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths	
NEW ENGLAND										
Massachusetts:										
Boston.....			2	0	0	0	0	0	1	0
MIDDLE ATLANTIC										
New York:										
Buffalo.....			1	3	0	0	0	0	0	
New York.....			6	6	1	1	0	0	0	

City reports for week ended April 16, 1932—Continued

Division, State, and city	Meningo-coccus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC—continued									
New Jersey:									
Newark.....	1	0	2	0	0	0	0	0	0
Pennsylvania:									
Philadelphia.....	4	2	0	0	0	0	0	0	0
Pittsburgh.....	1	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati.....	0	1	0	0	0	0	0	0	0
Cleveland.....	2	2	0	0	0	0	0	0	0
Indiana:									
Indianapolis.....	5	1	0	0	0	0	0	0	0
Terre Haute.....	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago.....	7	2	3	2	0	0	0	0	0
Michigan:									
Detroit.....	3	0	1	0	0	0	0	0	0
Wisconsin:									
Milwaukee.....	0	1	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis.....	1	1	0	0	0	0	0	0	0
Missouri:									
St. Louis.....	1	0	1	1	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore.....	1	0	0	1	0	0	0	0	0
District of Columbia:									
Washington.....	1	1	0	0	0	0	0	0	0
South Carolina:									
Charleston.....	0	0	0	0	3	0	0	0	0
Georgia:									
Atlanta.....	2	0	0	0	0	0	0	0	0
Savannah ¹	0	0	0	0	0	1	0	0	0
Alabama:									
Birmingham.....	0	0	0	0	1	0	0	0	0
Mobile.....	0	0	0	0	1	0	0	0	0
Montgomery.....	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
Shreveport.....	0	0	0	0	0	1	0	0	0
Oklahoma:									
Muskogee.....	0	0	1	0	0	0	0	0	0
Oklahoma City.....	0	2	0	1	0	0	0	0	0
Texas: ¹									
Dallas.....	0	0	0	0	2	2	0	0	0
Fort Worth.....	0	0	0	0	0	2	0	0	0
San Antonio.....	1	0	0	0	0	0	0	1	0
MOUNTAIN									
Colorado:									
Denver.....	1	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles.....	0	0	0	0	0	0	0	3	0
San Francisco.....	0	0	0	0	1	1	0	0	0

¹ Typhus fever, 3 cases: 1 case at Savannah, Ga., and 2 cases at Houston, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended April 16, 1932, compared with those for a like period ended April 18, 1931. The population figures used in computing the rates are estimated

mid-year populations for 1931 and 1932, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 34,000,000. The 91 cities reporting deaths have more than 32,400,000 estimated population.

Summary of weekly reports from cities, March 13 to April 16, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1931^a

DIPHTHERIA CASE RATES

	Week ended—									
	Mar. 19, 1932	Mar. 21, 1931	Mar. 26, 1932	Mar. 1931	Apr. 2, 1932	Apr. 4, 1931	Apr. 9, 1932	Apr. 11, 1931	Apr. 16, 1932	Apr. 18, 1931
98 cities.....	62	65	52	78	47	53	51	65	54	66
New England.....	65	67	65	70	38	46	62	84	29	79
Middle Atlantic.....	54	64	56	63	44	48	53	59	49	62
East North Central.....	48	72	31	82	29	64	46	86	44	83
West North Central.....	95	73	55	163	78	42	27	63	49	63
South Atlantic.....	49	73	60	61	37	47	37	49	49	65
East South Central.....	12	23	6	76	6	29	40	18	17	23
West South Central.....	162	71	112	64	158	85	92	54	119	74
Mountain.....	43	17	9	87	17	44	52	35	60	17
Pacific.....	89	51	70	69	57	53	70	57	110	43

MEASLES CASE RATES

98 cities.....	732	1,041	727	1,208	846	1,122	860	1,327	982	1,316
New England.....	860	1,527	599	1,479	777	1,106	607	1,503	765	1,340
Middle Atlantic.....	578	1,158	598	1,321	621	1,250	560	1,422	554	1,544
East North Central.....	1,167	558	1,203	722	1,573	726	1,688	830	2,160	759
West North Central.....	316	492	156	651	398	532	388	704	724	589
South Atlantic.....	302	3,448	232	3,885	245	3,814	343	4,554	298	4,350
East South Central.....	23	1,004	19	1,650	6	1,515	23	1,768	0	1,627
West South Central.....	40	51	158	47	206	88	49	68	30	102
Mountain.....	388	1,288	603	1,140	664	661	1,006	844	1,336	922
Pacific.....	1,443	394	1,449	519	1,262	359	1,312	500	952	417

SCARLET FEVER CASE RATES

98 cities.....	488	389	478	403	413	371	423	362	477	382
New England.....	724	676	731	697	633	577	774	474	796	584
Middle Atlantic.....	786	392	755	454	632	404	625	413	744	415
East North Central.....	394	395	397	378	345	377	360	337	399	382
West North Central.....	195	589	197	580	205	585	226	538	267	518
South Atlantic.....	371	342	382	311	345	291	318	356	310	307
East South Central.....	110	467	100	564	92	399	87	470	40	587
West South Central.....	89	102	49	78	46	95	53	105	56	112
Mountain.....	215	305	233	209	129	157	250	174	207	278
Pacific.....	147	110	133	104	122	92	145	104	148	116

SMALLPOX CASE RATES

98 cities.....	5	22	4	17	4	14	6	19	7	22
New England.....	0	0	0	0	2	0	0	0	0	0
Middle Atlantic.....	0	0	0	0	0	0	0	1	0	2
East North Central.....	4	8	2	7	4	9	4	6	6	19
West North Central.....	17	130	17	99	2	78	9	96	13	92
South Atlantic.....	0	0	0	4	0	2	8	18	0	10
East South Central.....	12	12	35	12	35	12	52	0	46	53
West South Central.....	13	95	0	78	3	71	10	81	7	95
Mountain.....	17	9	0	44	26	0	9	17	17	9
Pacific.....	11	43	15	22	13	16	23	53	27	27

see footnotes at end of table.

Summary of weekly reports from cities, March 13 to April 16, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1931—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Mar. 19, 1932	Mar. 21, 1931	Mar. 26, 1932	Mar. 28, 1931	Apr. 2, 1932	Apr. 4, 1931	Apr. 9, 1932	Apr. 11, 1931	Apr. 16, 1932	Apr. 18, 1931
96 cities.....	4	4	5	4	5	4	3	5	5	5
New England.....	2	2	5	2	0	2	2	2	0	2
Middle Atlantic.....	1	2	3	2	3	3	1	5	2	4
East North Central.....	2	2	3	2	4	2	2	3	4	2
West North Central.....	2	8	4	2	2	4	0	0	2	4
South Atlantic.....	2	16	12	12	8	14	16	16	12	8
East South Central.....	29	0	19	0	6	0	23	6	35	12
West South Central.....	23	10	20	7	13	10	0	3	10	7
Mountain.....	17	0	9	0	0	9	0	0	9	9
Pacific.....	2	8	6	10	17	2	6	8	6	10

INFLUENZA DEATH RATES

91 cities.....	37	32	36	29	29	23	25	18	20	17
New England.....	10	19	17	14	17	2	5	19	7	7
Middle Atlantic.....	39	23	36	20	34	17	23	12	23	12
East North Central.....	40	28	41	25	24	18	22	14	20	10
West North Central.....	32	47	23	35	17	12	23	15	20	29
South Atlantic.....	49	40	36	32	39	40	61	30	29	32
East South Central.....	50	115	44	127	56	127	75	70	38	76
West South Central.....	61	35	84	55	40	69	40	45	20	45
Mountain.....	43	35	43	61	62	26	34	17	9	17
Pacific.....	12	34	5	41	2	14	0	19	5	10

PNEUMONIA DEATH RATES

91 cities.....	188	184	193	180	167	171	151	155	124	161
New England.....	156	183	225	156	165	127	192	173	129	144
Middle Atlantic.....	238	216	243	220	203	223	186	168	162	180
East North Central.....	133	132	119	125	113	120	79	118	74	127
West North Central.....	192	215	239	178	204	150	189	253	143	245
South Atlantic.....	233	269	272	263	235	222	204	200	167	188
East South Central.....	201	210	201	191	194	172	201	178	194	293
West South Central.....	205	180	199	211	172	238	205	169	91	173
Mountain.....	233	122	138	131	121	157	129	191	86	113
Pacific.....	93	101	72	98	88	53	72	60	56	67

¹ The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1932 and 1931, respectively.

² Columbia, S. C., and Montgomery, Ala., not included.

³ Columbia, S. C., not included.

⁴ Montgomery, Ala., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended April 9, 1932.—
The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended April 9, 1932, as follows:

	Cerebro-spinal fever	Influenza	Typhoid fever
Prince Edward Island ¹			
Nova Scotia.....		27	
New Brunswick.....			1
Quebec.....			12
Ontario.....	1	264	5
Manitoba ¹			
Saskatchewan ¹			
Alberta.....			1
British Columbia.....			1
Total	1	291	20

¹ No case of any disease included in the table was reported during the week.

*Ontario Province—Communicable diseases—Comparative—Four weeks ended March 26, 1932.—*The Department of Health of the Province of Ontario, Canada, reports cases of certain communicable diseases for the four weeks ended March 26, 1932, and the corresponding period of 1931, as follows:

Disease	Four weeks 1932		Four weeks 1931	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis.....	5	3	5	
Chancroid.....	1		1	
Chicken pox.....	794		972	
Conjunctivitis.....	36			
Diphtheria.....	116	8	130	5
Erysipelas.....	10	4		
German measles.....	35		67	
Gonorrhoea.....	127		145	
Influenza.....	1,518	44	105	35
Jaundice.....	7			
Lethargic encephalitis.....	4	1		2
Measles.....	3,375		258	
Mumps.....	797		721	
Paratyphoid fever.....	1		11	
Pneumonia.....	1	206		275
Polio-myelitis.....			1	
Puerperal septicemia.....	1	2		1
Scarlet fever.....	426	3	766	2
Septic sore throat.....	8	1	11	
Smallpox.....	2		16	
Syphilis.....	121	1	153	1
Tuberculosis.....	152	47	135	72
Typhoid fever.....	4		21	3
Undulant fever.....	1		10	
Whooping cough.....	465	2	316	5

Quebec Province—Communicable diseases—Week ended April 9, 1932.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended April 9, 1932, as follows:

Disease	Cases	Disease	Cases
Chicken pox	62	Scarlet fever	81
Diphtheria	20	Tuberculosis	50
Erysipelas	4	Typhoid fever	12
German measles	15	Whooping cough	34
Measles	250		

DENMARK

Communicable diseases—January, 1932.—During the month of January, 1932, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	258
Chicken pox	76	Paratyphoid fever	14
Diphtheria and croup	306	Poliomyelitis	14
Erysipelas	256	Puerperal fever	8
German measles	3	Scabies	1,000
Gonorrhoea	956	Scarlet fever	228
Influenza	10,174	Typhoid fever	2
Lethargic encephalitis	6	Undulant fever (Bact. abort. Bang)	40
Measles	2,902	Whooping cough	3,071

UNION OF SOUTH AFRICA

Johannesburg—Vital statistics—Year ended June 30, 1931.—During the year ended June 30, 1931, births and deaths were reported in the several population groups, whites, natives, Eurafri-cans, and Asiatics, in Johannesburg, Union of South Africa, as follows:

	Whites	Natives	Eurafri-cans	Asiatics
Number of births	4,906	1 2,024		
Birth rate per 1,000 population	24.6			
Number of deaths	2,028	3,349	357	181
Death rate per 1,000 population	10.2	22.3	17.9	22.6
Deaths under 1 year per 1,000 births	79.1		206.3	121.2

¹ This number includes native and colored births.

NOTE.—The population of Johannesburg, estimated as of June 30, 1931, was as follows: Whites, 199,203; natives, 150,000; Eurafri-cans, 20,000; Asiatics, 8,000.

Deaths from certain causes reported in Johannesburg during the year ended June 30, 1931, together with death rates per 1,000 population, are shown in the following table:

Cause of death	Number of deaths				Death rate per 1,000 pop			
	Whites	Natives	Eurafricans	Asiatics	Whites	Natives	Eurafricans	Asiatics
Bronchitis, acute.....	25	108	13	4	0.12	0.72	0.65	0.50
Bronchitis, chronic.....	49	13	7	7	.24	.08	.35	.85
Cancer.....	159	23	7	2	.79	.15	.35	.25
Cerebral hemorrhage and softening.....	48	21	5	3	.24	.14	.25	.37
Congenital malformation, premature and early infancy.....	145	219	37	11	.72	1.46	1.85	1.37
Diarrhea and enteritis.....	157	615	62	31	.78	4.10	3.10	3.87
Diphtheria and croup.....	6	5			.03	.03		
Heart disease.....	323	110	26	23	1.62	.73	1.30	2.85
Influenza.....	32	9	1	1	.16	.06	.05	.12
Measles.....	5	1		1	.02	.006		.12
Meningitis.....	32	63	4	1	.16	.42	.20	.12
Nephritis (acute) and Bright's disease.....	95	49	13	8	.47	.32	.65	1.00
Pneumonia.....	278	1,057	91	46	1.39	7.03	4.55	5.75
Scarlet fever.....	2				.01			
Silicosis.....	45	6			.22	.04		
Tuberculosis, pulmonary.....	69	210	23	8	.34	1.40	1.15	1.00
Tuberculosis, other forms.....	6	51	4		.03	.34	.20	
Other respiratory diseases.....	44	37	2	1	.22	.23	.10	.12
Typhoid fever.....	20	129	8	3	.10	.86	.40	.37
Violence.....	131	327	21	9	.65	2.18	1.05	1.12
Whooping cough.....	2	12	3		.01	.08	.15	

YUGOSLAVIA

Communicable diseases—January, 1932.—During the month of January, 1932, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax.....	30	5	Paratyphoid fever.....	11	1
Cerebrospinal meningitis.....	7	3	Scarlet fever.....	424	51
Diphtheria and croup.....	683	91	Sepsis.....	19	9
Dysentery.....	22		Tetanus.....	10	6
Erysipelas.....	179	14	Typhoid fever.....	175	28
Leprosy.....	1		Typhus fever.....	11	
Measles.....	567	9			

Indo-China (see also table below):																								
Pronpenn.....	C	1	4	P			1	1																
Saigon and Cholon.....	D	1					1	1																
.....	D	1					1	1																
Iraq:																								
Amara.....	C	4	5	3																				
.....	D	1	3	4																				
Amara Province.....	D	86	80	3																				
.....	D	85	24	3																				
Basra.....	D	157	73	2																				
.....	D	84	86																					
Basra Province.....	D	42	10																					
.....	D	19	6																					
Dinwaniyah.....	C	1																						
Dinwaniyah Province.....	D	61	23																					
.....	D	44	15																					
Iwaniyah.....	D	23																						
.....	D	44	15																					
Iwaniyah.....	D	15																						
Kut Province.....	D	20																						
.....	D	14																						
Muntafiq Province.....	D	209	84	2																				
.....	D	160	51	3																				
Nasiriyah.....	D	38	13	8																				
.....	D	28	13	7																				
Nasiriyah.....	D	2																						
Japan: Taiwan—Kelung.....	C																							
Percia:																								
Abadan.....	C	1	3	1																				
Abwaz.....	C	12	103	47																				
.....	D	7	96	39																				
Khorramabad.....	D																							
.....	D																							
Mohammerah.....	D																							
.....	D																							
Philippine Islands: † Capiz Province.....	D	1																						
.....	D	70	12	27																				
Siam:		59	9	19																				
Ayudhaya Province.....	C																							
.....	D																							
Bangkok.....	D			1																				
.....	D																							
Bangkok.....	D																							
.....	D																							
On vessel:																								
S. S. Angora at Rangoon from Calcutta.....	C																							
.....	D																							
S. S. Narbada at Rangoon from Calcutta.....	C																							
.....	D																							

† Figures for cholera in the Philippine Islands are subject to correction.

Place	Sep-tem-ber, 1931	Octo-ber, 1931	No-ven-ber, 1931	De-cem-ber, 1931	Jan-uary, 1932	Feb-ru-ary, 1932	March, 1932
British East Africa (see also table above): Kenya.....	C	14	44	41	17	33	
Ecuador:							
Province—							
Chimborazo.....	C	13	8		8	13	
Loja.....	C	4	11		11		
Indo-China.....	C	4	3	9	16	1	12
Madagascar (see also table above):	D	4	1	5	9	1	6
Ambatolampy Province.....	C						
Ambositra Province.....	D	1	8	142	23	23	
Antsirabe Province.....	D	1	5	37	121	166	
Maevatanana Province.....	D	19	17	27	56	53	
Miarinarivo Province.....	D	19	17	27	51	51	
Moramanga Province.....	D			4			
Tananarive Province.....	D	14	18	10	14	15	
Tamatave Province.....	D	12	16	9	14	16	
Tananarive Province.....	D	12	13	25	30	13	
Tamatave Province.....	D	11	11	26	29	13	
Tananarive Province.....	C	65	120	186	248	203	
Tamatave Province.....	D	63	117	178	241	196	
Tananarive Province.....	D	2	8	27	21	11	
Tamatave Province.....	D	2	7	11	9		
Peru.....							
Departments—							
Cajamarca.....	C		14		3		
Cuzco.....	C		5				
Huanuco.....	D						
Ica.....	D						
Lima.....	C	1	1	1	2	1	
Piura.....	D		8	7	1		
Tarma.....	D		7				
Trujillo.....	D		8				
Wanca.....	D		7				
Yumbel.....	D		8				
Cuzco.....	D		12	16	1	1	
Huanuco.....	D		7				
Ica.....	D		8				
Lima.....	C	1	1	1	2	1	
Piura.....	D		8				
Tarma.....	D		7				
Trujillo.....	D		8				
Wanca.....	D		7				
Yumbel.....	D		8				
Cuzco.....	D		12	16	1	1	
Huanuco.....	D		7				
Ica.....	D		8				
Lima.....	C	13	6	2			
Piura.....	D		8				
Tarma.....	D		2				
Trujillo.....	D		4				
Wanca.....	D		4				
Yumbel.....	D		31	4			
Cuzco.....	D		13				
Huanuco.....	D		5				
Ica.....	D		10				
Lima.....	C	10	1	19			
Piura.....	D		2	10			
Tarma.....	D		4	7			
Trujillo.....	D		1	12			
Wanca.....	D		7	16			
Yumbel.....	D		12	16			
Cuzco.....	D		8	7			
Huanuco.....	D		8				
Ica.....	D		8				
Lima.....	C	12	6	1			
Piura.....	D		8				
Tarma.....	D		7				
Trujillo.....	D		8				
Wanca.....	D		8				
Yumbel.....	D		8				
Cuzco.....	D		14				
Huanuco.....	D		5				

1 Reports incomplete.

Foochow.....	C	P		P		P		P		P		P		P		P		P
Hankow.....	D		18	29	47	11	32	15	1	2	1	1	6	12	7	17	9	12
Hong Kong.....	D		6	12	1	1		2	2	7	19	19	9	3	7	6	8	2
Manchuria-Dairen.....	D				1	1		4	6	2	9	9	3	3	1	7	7	7
Nanking.....	D				2			1		1								
Shanghai.....	D				1													
Foreigners only.....	C	P	21	77	115	43	48	40	32	48	30	44	45	30	29	13	30	22
Including natives.....	C	P	13	2	31	41	11	17	13	24	18	17	8	15	17	6	7	7
Swatow.....	C				2			1		1								
Tientsin.....	C				1							2						
Tientsin.....	D							1					1		6	1		
Chosen (see table below).....	C																	
Colombia: Cali.....	C				1			1										
Dutch East Indies: Batavia.....	D				1			1										
Egypt:																		
Alexandria.....	C																	
Cairo.....	C				1													
Suez.....	D												2	3	1	1	5	1
France (see table below).....	D																	
Germany: Aix-la-Chapelle.....	C																	
Gold Coast (see table below).....	C																	
Great Britain:																		
England and Wales.....	C	P	220	216	198	68	55	55	49	70	73	73	42	76	61	41	95	70
London.....	C	P	58	129	118	100	24	36	22	18	44	38	32	22	28	23	23	55
London and Great Towns.....	C	P	128	179	191	152	60	45	37	46	59	57	53	34	57	56	37	86
Guatemala (see table below).....	C																	
Honduras:																		
Colaba.....	C		14															
Puerto Castilla.....	D																	
Tegucigalpa.....	D		1	1	8						1	2						
Tela.....	D																	
Trujillo.....	D																	
India:			1															
Bassein.....	C	P	1,461	1,152	2,288	795	1,184	1,276	1,331	1,628	2,397	2,745	2,839	6	8	4	7	7
Bombay.....	D		224	246	1,066	180	293	288	2	2	493	645	2,665					
Calcutta.....	D					3	1	3	1	3	2	5	13					
Cochin.....	D					1	2	2	2	2	1	1	4	4	3	1	4	2
Karachi.....	D					7	3	7	10	9	25	35	33	22	44	50	43	38
Medras.....	D					3	3	3	8	6	7	18	23	14	30	36	35	30
Medras.....	D					2	2	12	9	9	1	3	3	2	2	1	1	6
Medras.....	D		13	5	7	2	1	2	1	5	5	3	7	15	9	15	12	15
Medras.....	D		2		2		2	1		4	2	2		6	4			6

123 cases of smallpox with 8 deaths were reported at Vancouver, British Columbia, from Jan. 1 to Feb. 18, 1932.

459 cases of smallpox with 15 deaths were reported in Honduras from July, 1931, to Feb. 18, 1932.

Mexico (see also table below).																						
Chihuahua.....	D	4	2	1	1	2								1	1						1	1
Durango.....	D	7	5	10	8	1								6	6							
Jalisco (State)—Guadalajara.....	D	4	1			3								1	1							
Mexico City and surrounding territory.....	D													6	6							
Monterrey.....	D		2			1								1	1							
San Luis Potosi.....	D		1			2								2	2							
Torreón.....	D		2	7	2	2								1	1							
Torreón.....	D		2	2	2	1								3	1							
Morocco (see table below).																						
Netherlands: Friesland—Opsterland.....	C	454	69	15		181								36								
Nigeria.....	D	141	15	1		107								13								
Poland.....	C		3																			
Poland.....	C		2	1		1																
Panama: Chiriqui.....	C	48	78	91	108	38								22	31						7	21
Lisbon.....	C					2								2							1	4
Oporto.....	C					2								2							1	1
Salvador.....	C																				50	15
Siam.....	C					13								1							20	10
Sierra Leone.....	C																				2	2
Straits Settlements.....	C					2															4	3
Straits Settlements.....	C					2															1	2
Sudan (Anglo-Egyptian).....	D			2	2	2								3	3						3	5
Sudan (Anglo-Egyptian).....	D			2	2	2															1	1
Sweden: Malmo.....	D																					
Syria (see table below).	D																					
Tunisia: Tunis.....	C																					9
Tunisia: Tunis.....	C																				21	17
Turkey: (see also table below) Istanbul.....	C																				1	8
Union of South Africa:																					50	15
Cape Province.....	C		P	P	P																1	1
Orange Free State.....	C		P	P	P																3	3
Transvaal.....	C		P	P	P																5	1
On vessels:																						
Brazilian ship Jabotao at New Orleans from Brazil.....	C																					
S. S. Tacoma at Manila from Shanghai.....	C																					
S. S. Crestington Court at Yokohama from Shanghai.....	C																					
S. S. Bellington Court at Yokohama from Shanghai.....	C																					
S. S. Victoria City at Brisbane from Shanghai.....	C																					
S. S. Bellasco at Mobile from Habana, Cuba, and Hull, England.....	C																					
S. S. Frauentals at Suez from Calcutta.....	C																					
S. S. Urawajima Maru at Osaka from Shanghai.....	C																					
S. S. President Jackson at Yokohama from San Francisco via Honolulu.....	C																					
S. S. Hong Kheng at Singapore from Amoy, via Swatow and Hong Kong.....	C																					

1 Imported case.

Place	Sep-tem-ber, 1931	Octo-ber, 1931	No-ven-ber, 1931	December, 1931			January, 1932			February, 1932			March, 1932		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-29	1-10	11-20	
				C											
D															
Gold Coast.....															
Indo-China (see also table above).....	39	47	120	144	41	324	11	107	191	145	208	309	230	275	
Ivory Coast.....	13	16	22	17	21	55	11	52	85	47	96	86	109	113	
Syria: Beirut.....	D														
	D														
	O						2	3							

TYPHUS FEVER

Place	Sept. 20-17, 1931	Oct. 18-14, 1931	Nov. 15-12, 1931	Dec. 13-9, 1931	Week ended—													
					January, 1932				February, 1932				March, 1932				April, 1932	
					16	23	30	6	13	20	27	5	12	19	26	2	9	
Algeria:																		
Algiers.....	C	2		4														
Constantine Department.....	C	38	3	5														
Geryville.....	C																	
Oran.....	C	1	1															
Bulgaria.....	C	2	4	22	16	12	13	3	1	29	36							
	D			3	2	2	3	1		3	3							
Chile:																		
Antofagasta.....	C	1		1														
Santiago.....	C	34	3															
China:																		
Hankow.....	C																	
Shanghai.....	C																	
Swatow.....	C	1																
Chosen (see table below).....	C																	
Colombia: Call.....	C																	
Czechoslovakia (see table below).....	D																	

1 A suspected case.

Portugal: Oporto.....	C	18	3	63	108	62	83	1	79	74	94	10
Rumania.....	D	3	9	6	10	2	1	8	51	6	7	27
Tunisia: Tunis.....	D	3	3	26	2	2	1	1	13	14	11	31
Turkey (see table below).	D			2					1	2	2	3
Union of South Africa:												
Cape Province.....	C		P	P	P	P	P	P	P	P	P	
Municipality of East London.....	C		P	P	P	P	P	P	P	P	P	
Natal.....	C		P	P	P	P	P	P	P	P	P	
Orange Free State.....	C		P	P	P	P	P	P	P	P	P	
Transvaal.....	C		P	P	P	P	P	P	P	P	P	
Venezuela: Caracas (see table below).	C	1										
Yugoslavia (see table below).	C											
On vessel: At Antofagasta, from Iquique and points north.....	C				1							

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Place	October, 1931	November, 1931	December, 1931	January, 1932	February, 1932	March, 1932	Place	October, 1931	November, 1931	December, 1931	January, 1932	February, 1932	March, 1932
Chosen: Seoul.....	24	4			5		Lithuania.....	C	5	9			10
Czechoslovakia.....	1	1			1		Turkey.....	D	1				3
Greece.....	18	1	10	1			Venezuela: Caracas.....	D	11	14	14	5	2
Latvia.....	1	4	3	4	4		Yugoslavia.....	D	2	1	2	3	
	12	1	6										
			1										
			12										

¹ Typhus fever was reported in Peru from May to November, 1931, 143 new cases being reported during the months of October and November. The disease did not spread to the coastal regions.

