PUBLIC HEALTH REPORTS

VOL. 39 FEBRUARY 15, 1924. No. 7

IS THE PROPHYLACTIC USE OF DIPHTHERIA ANTITOXIN JUSTIFIED?[1]

By JAMES A. DOULL, Associate Professor of Epidemiology, School of Hygiene and Public Health, the Johns Hopkins University; and ROY P. SANDIDGE, Passed Assistant Surgeon, United States Public Health Service.

For a period after its discovery, it was hoped that not only was diphtheria antitoxin to serve as a specific cure for the disease, but that it would also become universally used as an immunizing agent. Experimentally, antitoxin was soon put on a sound basis and our knowledge regarding its power to protect animals from the effects of diphtheria toxin became very exact. Very early, however, it was found, clinically as well as by animal experiment, that the protection given was temporary, lasting in some cases only two weeks or less, and although it thus became apparent that its field as a preventive was to be limited, it was still thought probable that it could be of considerable use among persons who had been in immediate contact with the disease, such as family and institutional contacts.

Experience has largely justified this hope, and to-day the use of antitoxin as a prophylactic is quite generally urged by departments of health and is a routine practice in many of our large infectious-disease hospitals to protect patients suffering from other diseases from cross infection with diphtheria. Frequently in these institutions the immunes are first eliminated by means of the Schick test.

In the extensive experience afforded by nearly three decades, cases have been reported from time to time in which ill effects and even death have followed injections of the antitoxin, and these reports have caused the advisability of its prophylactic use to be questioned. One recent writer, Hitchens (1923), in discussing such an accident, has even gone so far as to say that "medical opinion generally is rapidly coming over to the side of believing it advisable to eliminate the prophylactic use of antitoxin, depending upon frequent examination of the throats of contacts and giving a sufficient dose of antitoxin therapeutically at the earliest opportunity." On the other hand, such an eminent authority as Park (1920) states that "the use of antitoxin immunizing injection has been very effectual in infected families and institutions."

[1] From the Department of Epidemiology, School of Hygiene and Public Health, the Johns Hopkins University.

EXTENT TO WHICH PROPHYLACTIC ANTITOXIN IS USED.

The extent to which antitoxin is used as a prophylactic is not definitely known, and no doubt varies widely in different sections of the country. In Chicago, according to the report of the health department (1923, p. 68), a very high proportion (78 per cent) of family contacts are stated to be treated. In Baltimore the records of 508 consecutive cases of diphtheria studied by workers in the department of epidemiology of the School of Hygiene and Public Health, Johns Hopkins University, show that of 967 family contacts of 10 years and under, 274, or 28.3 per cent, received such injections. The tendency seems to be to omit this procedure if the case is hospitalized, since among 155 contacts of hospitalized cases only 17, or 11 per cent, were treated, as compared to 31.7 per cent of 812 contacts of cases treated at home.

THE ALTERNATIVE TO ITS USE.

The alternative which is advocated in lieu of prophylactic antitoxin is a careful examination of the contacts each day by a physician and the use of therapeutic doses of antitoxin at the earliest indication of clinical infection. While this can not be expected to diminish the risk of infection, it should lessen the risk of death; but there are certain serious limitations to the protection afforded by even the most careful surveillance. Among these are the difficulty of making an early diagnosis in laryngeal diphtheria and the fact that in this class of cases antitoxin alone is so often ineffective. Also, the difficulties in making a careful daily examination of young children are often underestimated. If considered impracticable in hospital practice, it is improbable that such examination will ever prove satisfactory under home conditions.

THE PROBLEM CONSIDERED AS A COMPARISON OF TWO RISKS.

The question as to whether or not to give prophylactic antitoxin would seem to resolve itself into this: Does the family or institutional contact of a case of diphtheria run a greater risk of death from the prophylactic injection of antitoxin or from diphtheria in default of this prophylaxis?

THE FIRST RISK, THAT OF DEATH FROM ANTITOXIN.

The sensitizing effect of an injection of horse serum is well known, and in certain laboratory animals second injections, after a certain period of time, will produce fatal anaphylaxis. In man, however, although there may be a severe immediate reaction and a hastened appearance of the ordinary symptoms of serum sickness, death following a second injection is extremely rare. In fact, Longcope (1920), in speaking of the immediate general reaction which may

follow a second injection of horse serum, states that "the immediate reaction, though it may be severe, has, as far as the statistics of Park and Nemmser and Cuno show, never caused death when the inoculation is made subcutaneously." More recently, however, Dean (1922) has reported the case of a soldier who died shortly after receiving a fourth dose of antitetanic serum.

On the other hand, certain individuals seem to have a natural hypersensitiveness or idiosyncrasy to horse serum, and it is among these that the cases of collapse and of death following a primary injection of antitoxin have occurred. These have been reviewed by Rosenau and Anderson (1906), Gillette (1909), Park (1913), and others. In some instances in which autopsies have been obtained great enlargement of the thymus gland has been found, and it has been considered that death was due to "status lymphaticus." In many cases, also, there is a history of asthma or other respiratory disease which in some instances in children may have been attributable to enlargement of the thymus. In the particular case, to which Hitchens (1923) referred, and which was reported by Sumner (1923), the child's "eyes would become inflamed and her nose would run whenever she took a drive behind horses."

The total number of such deaths does not suffice to determine the risk at issue, as the number of individuals who have received antitoxin is, of course, unknown. From New York City, however, valuable records are available. Park (1913) states that among 105,000 persons given treatment or immunizing injections of diphtheria antitoxin by inspectors of the health department of New York City there were only two deaths attributable to the injections. It is not stated how many of these were therapeutic and how many prophylactic injections, but presumably the great majority were given for prophylactic purposes, as it is stated elsewhere that in the years 1906–1912, 77,882 contacts in New York City received immunizing injections. (See Table III below.) In addition Park reports that among 30,000 hospitalized cases of diphtheria and 16,000 cases of scarlet fever given antitoxin there had been no deaths from the injections. This record, which is probably the most reliable statistical evidence available, shows one death among approximately 75,000 persons treated.

THE SECOND RISK, THAT OF DEATH FROM DIPHTHERIA.

To compare the risk of death from antitoxin with that of death from diphtheria to which a family contact of a diphtheria patient is subject, it is necessary, as the first step, to determine the attack rates among groups of family contacts receiving antitoxin as compared with those not receiving it. The excess of the latter over the former will show the greater risk of attack experienced by the nonimmunized. In other words, there is a certain risk of attack and death in both

groups, and it is the excess risk to which the nonimmunized are subject in which we are interested. But one who attempts thus to measure this risk finds that statistics in sufficient detail are very scanty.

Records of secondary cases among contacts not given prophylactic injections.—From the annual reports of the departments of health of the cities of Providence (Chapin, 1913, p. 85) and of Chicago (1919, p. 375), and from a study in Paris by Netter (1902), it is possible to gain some idea of the secondary attack rate among family contacts who did not receive prophylactic doses of antitoxin. This information has been summarized in Table I.

TABLE I.—*Secondary attack rates among nonimmunized family contacts of diphtheria patients.*

City.	Nonimmunized contacts.			
	Age.	Number exposed.	Number attacked.	Per cent attacked.
Paris	"Children"	491	87	17.72
Providence [1]	10 years and under	[2] 8,999	1,691	18.79
Do	All ages	[2] 28,231	2,516	8.91
Chicago	Not stated	717	67	9.34

[1] Cases from families where diphtheria bacilli were found.
[2] An unknown number of immunized are included among the exposed persons in Providence.

The data of this table show that a comparatively large proportion of family contacts is attacked. These attack rates are, however, not strictly comparable to one another as different localities, periods of time, and ages are represented. In general it may be stated that under certain conditions the secondary attack rates among children not given antitoxin is likely to be quite high. In fact it is probable that at times one in five of young family contacts may be attacked.

With reference to the probable efficacy of prophylaxis it is useful to note just where secondary cases fall in point of time. The time of occurrence of secondary cases in the studies of Chapin and Netter is given in Table II. For Chicago the information is not available.

TABLE II.—*Time of occurrence of secondary cases in diphtheria.*

Time of occurrence of secondary cases after primary case.	Providence, 1904–1913.[1]		Paris, 1901.[2]	
	Number.	Per cent of total (1699).	Number.	Per cent of total (87).
Within 24 hours	77	4.5	8	9.2
Within 7 days	819	48.2	38	43.7
Within 21 days	1,218	71.7	([3])	.....
Within 28 days	1,528	89.9	81	93.2

[1] Chapin (1913, pp. 87–88). [2] Netter (1902). [3] Not stated.

In each of the two series the great majority of the cases (approximately 85 per cent) occur between the second and the twenty-eighth day following the primary case. In Providence 57 per cent occurred between the second and the tenth day. There is usually time apparently for the administration of antitoxin before the onset of the second case; and the period during which special protection is demanded is comparatively short.

Records of secondary cases among contacts given prophylactic injections.—Data concerning subsequent attacks of diphtheria in children to whom prophylactic injections of antitoxin have been given are extremely fragmentary. In some of the available records institutional and family contacts are massed together, and in others the ages of the contacts are not given. For convenience, such material as has seemed useful has been grouped in Table III.

TABLE III.—*Secondary attack rates among "immunized" contacts of diphtheria patients.*

References.	Number of contacts receiving antitoxin.	Number of secondary cases.	Per cent attacked.	Remarks.
Biggs and Guerard (1896)	17,516	131	0.75	Family and institutional contacts; ages not given.
Netter (1902)	502	[1] 13	2.58	Family contacts; "children."
Chicago (1919)	3,743	33	.88	Family contacts; ages not given.
Chicago (1923)	8,083	22	.27	Do.
New York City (1906–1912)	77,882	180	.23	Family contacts: only cases occurring between the second and thirtieth day are included.
Pennsylvania (1905–1916)	76,997	1,120	1.45	Family contacts: ages not given.
Vermont (1912)	883	18	2.04	Do.
Baltimore (1904–1915)	4,015	21	.52	Do.
Chapin (1910–1914), Providence.	145	[2] 2	1.38	Family contacts; 10 years and under.

[1] Seven of these cases occurred within 24 hours after administration of antitoxin.
[2] A total of two cases occurred among all immunized contacts. As the ages of these two are not given, both are regarded as of 10 years or under.

When the attack rates among immunized contacts as given in Table III are compared with those among the nonimmunized contacts as shown in Table I, the differences are so great and so consistent as to be of unmistakable significance. However, the data in the two tables, and even those reported by different observers in the same table, are obviously not fully comparable, as they refer to different periods of time, to different localities, and to contacts insufficiently defined as to age distribution and other important considerations. For this reason it seems of value to present more uniform and detailed records of secondary attack rates among immunized and nonimmunized children in the same locality and during the same period of time.

The use and effect of prophylactic antitoxin in Baltimore.—Data for such a comparison are available in the records of diphtheria cases in Baltimore studied by the workers in this department during the

years 1920–1923 in cooperation with the city department of health. These records refer to all cases of diphtheria investigated from November 1, 1920, to March 31, 1923, excepting only those occurring in families in which there were no contacts 10 years of age or under; and it is believed that these cases may be considered a fair sample of those occurring in the city under usual conditions. The number of cases included in the study is comparatively small, but as the records are based upon personal investigation in each family the facts are well established.

Table IV shows the number of immunized and nonimmunized contacts aged 10 years and under in families in which the primary case was treated at home and in families in which the primary case was hospitalized. It is seen that the contacts receiving prophylactic doses of antitoxin belong chiefly to the families of nonhospitalized cases. Incidentally, also, it is seen that the attack rate among the nonimmunized contacts of hospitalized cases is appreciably smaller (4.4 per cent) than among the contacts of cases treated at home (9.4 per cent), in which respect our records agree with the much more extensive experience of Chapin (1905).

TABLE IV.—*Effect of immunization among family contacts of diphtheria cases, Baltimore. Secondary cases and attack rates among family contacts who did and did not receive antitoxin.*

Classification of contacts.	No antitoxin given.			Prophylactic given.		
	Number of exposed children.	Number of cases.	Per cent attacked.	Number of exposed children.	Number of cases.	Per cent attacked.
Contacts of hospitalized cases	138	6	4.4	17	0	0.0
Contacts of nonhospitalized cases	555	52	9.4	257	3	1.2
Total contacts, age 10 years and under	693	58	8.4	274	3	1.1

The attack rate (8.4 per cent) among those children not receiving prophylactic antitoxin is very much higher than the rate (1.1 per cent) among those receiving it. In order, however, to make the time of exposure as nearly equal as possible for all contacts, we have classified separately, first, the contacts of all hospitalized cases; second, the contacts of all fatal cases; and third, all contacts who removed from home and remained away during the whole period of quarantine. The attack rates in these groups of nonhospitalized cases are given in Table V. In this table also the lower attack rate (4 per cent) among contacts who removed from home may be noted, although the number exposed is small. This lower rate among contacts who removed is also in agreement with the experience of Chapin (1903).

TABLE V.—*Effect of immunization of family contacts in diphtheria.—Secondary cases and attack rates among children receiving and not receiving antitoxin for several groups of contacts, age 10 years and under. (Hospitalized cases are excluded.)*

Contact group.	Contacts not given antitoxin.			Contacts given antitoxin.		
	Number of children.	Subsequent diphtheria.		Number of children.	Subsequent diphtheria.	
		Cases.	Per cent.		Cases.	Per cent.
I. Contacts of fatal cases	17	1	5.9	6	0	0.0
II: Contacts of nonfatal cases:						
(*a*) Removed from home	50	2	4.0	9	0	0.0
(*b*) Remained at home	488	49	10.0	242	3	1.2
Total	555	52	9.4	257	3	1.2

The contacts of nonfatal cases treated at home form the group which it was thought would be the fairest for study. In this group there are 730 children, of whom 242 received antitoxin as a prophylactic and 488 did not. Of the former only three, or 1.2 per cent, were attacked; whereas of the latter, 49, or 10 per cent, developed diptheria. The three cases among children receiving antitoxin developed on the eleventh, twentieth, and fiftieth day after injection.

In such a comparison as this it is important to determine whether or not the children receiving antitoxin were as susceptible as the other group as far, at least, as can be estimated from the study of (1) sanitary status and, more important, (2) age distribution. There is evidence that children of the same age living in the poorer districts of a city are more largely Schick negative than children of the same age living under better conditions. On the other hand, the former live under conditions of presumably greater exposure, since satisfactory isolation is rarely possible in the home. Of the 242 contacts receiving a prophylactic injection of antitoxin, 37, or 15.3 per cent, were recorded as living in "poor" sanitary surroundings, whereas of the 488 not receiving antitoxin, 130, or 26.6 per cent, were so classified. In each of the two groups approximately the same proportion (16 per cent) are recorded as living in "excellent" environment. The difference with regard to sanitary status does not appear to be great enough to be of any importance in this particular problem.

With regard to age, of the 242 receiving antitoxin, 16, or 6.6 per cent, were under 6 months, whereas of the 488 not treated, 24, or 4.9 per cent, were in this age group. As children under 6 months are so largely naturally immune, it is important to note that there is so little difference between the two groups in this respect. The group receiving antitoxin, however, has 52.5 per cent in the most susceptible age period, between 6 months and 5 years, whereas

of those not receiving antitoxin only 47 per cent were in this age group. On the basis of age alone, therefore, at least as high an attack rate would be expected among the "immunized" children. The importance of age in the problem is illustrated in Table VI.

TABLE VI.—*Effect of immunization on family contacts in diphtheria.—Secondary cases and attack rates among children of different ages receiving and not receiving antitoxin. (Contacts of hospitalized and fatal cases, and contacts who removed are excluded.)*

Age.	Contacts not receiving antitoxin.			Contacts receiving antitoxin.		
	Number.	Cases.	Per cent.	Number.	Cases.	Per cent.
Under 6 months	24	1	4.2	16	0	0.0
6 months-5 years	229	33	14.4	127	2	1.6
6 years-10 years, inclusive	235	15	6.4	99	1	1.0
Total	488	49	10.0	242	3	1.2

Table VI illustrates the fact that protection is most required between 6 months and 5 years of age. Of the 229 exposed children of this age not given antitoxin, one in seven actually developed diphtheria.

The "excess risk" of attack to the nonimmunized.—Our records, therefore, confirm the previous observations, cited in Tables I and III, with regard to the material reduction in risk of attack to those given prophylactic antitoxin.

The total risk of attack for untreated family contacts of 10 years and under is, for Baltimore, 10 per cent. The use of antitoxin lowers this risk from 10 per 100 to 1.2 per 100. The excess risk undergone by untreated children of this age group is therefore 8.8 attacks per 100.

The risk of death to the nonimmunized.—Just what such an excess in risk of attack means in terms of mortality can not be definitely stated, since there are no available data on the fatality rates of secondary cases of diphtheria. As these cases would presumably be diagnosed earlier and come under treatment more promptly, it is reasonable to suppose that the case mortality is lower among secondary than among primary cases. On the other hand, a comparison of the age distribution of primary and secondary cases of diphtheria shows a higher proportion of secondary cases at those ages where the highest case mortality is known to prevail.

In Baltimore (Baltimore health department, 1921) in the year 1921, 602 cases of diphtheria with 62 deaths were reported in children under five years of age—a case fatality rate of 10.3 per cent; and in the year 1920 (Baltimore health department, 1920) the case fatality rate for this group was 11.9 per cent. Among children

under 10 years of age there were, in 1921, 1,110 cases, with 83 deaths—a case fatality rate of 7.5 per cent. If, therefore, we assume for children of 10 years and under a case fatality rate of 7 per cent, and also assume that this rate applies to secondary as well as primary cases, we would have in the nonimmunized group of children an attack rate of 10 per cent, with a case fatality of 7 per cent. Among the immunized the attack rate is 1.2 per cent with presumably the same death risk.

This may be stated as shown below:

Diphtheria death risk to family contacts at a case fatality rate of 7 per cent.

Family contacts of 10 years and under.	Attack rate.	Case fatality rate.	Death risk.
	Per cent.	*Per cent.*	
Nonimmunized	10.0	7.0	0.10 × 0.07 = 0.00700, or 1 in 143.
Immunized	1.2	7.0	0.012 × 0.07 = 0.00084, or 1 in 1,190.
Excess among nonimmunized	8.8	7.0	0.088 × 0.07 = 0.00616, or 1 in 162.

The "excess" risk of death, then, to the nonimmunized at a case fatality rate of 7 per cent is 0.00616; that is, one death for every 162 exposed children.

Let us assume, however, a very much lower case fatality rate among secondary cases, so low that it may not be disputed, say 2 per cent. The excess risk to the nonimmunized would then be expressed as shown below:

Diphtheria death risk to family contacts at a case fatality rate of 2 per cent.

Family contacts of 10 years and under.	Attack rate.	Case fatality rate.	Death risk.
	Per cent.	*Per cent.*	
Nonimmunized	10.0	2.0	0.10 × 0.02 = 0.00200, or 1 in 500.
Immunized	1.2	2.0	0.012 × 0.02 = 0.00024, or 1 in 4,166.
Excess among nonimmunized	8.8	2.0	0.088 × 0.02 = 0.00176, or 1 in 568.

With such a low case fatality rate as 2 per cent it is seen that the excess risk of death is 0.00176; *that is, one death for every 568 contacts.*

Now the risk of death in a child as a result of the administration of antitoxin must be admitted to be an extremely small one, somewhere, as nearly as we can judge from available data, in the neighborhood of 1 in 75,000 (0.0000133). This risk, it need scarcely be pointed out, should be added to that of the immunized in the above calculations. It is so small, however, that it has been omitted. There is also the possibility that it may be even further reduced. The most practical way to reduce this risk would seem to be by not immunizing under any circumstances children giving a history of asthma, chronic bronchitis, or of any symptoms which should arouse

the suspicion of hypersusceptibility to horse serum. To simply place these children under observation, however, and subject them to the risk of attack with the consequent need of a large therapeutic dose of antitoxin is obviously a somewhat illogical proceeding. Removal of the patient to hospital certainly renders the family contact less liable to attack, but the best procedure at present known is the *removal of such contacts from the infected home.* This removal confers a high degree of protection, as Chapin (1903) long ago pointed out. In our cases, removal of contacts is a frequent occurrence, usually to the homes of friends or relatives. Institutional care would certainly be better and might be arranged by health departments. On removal, such children should be first examined clinically to determine the possibility of "status lypmhaticus." If this condition is suspected, observation would appear to be the only course available. If not, the Schick test should be applied, and children found negative may be allowed to return to their homes, as there will be no necessity for them to receive antitoxin. If Schick-positive, the intracutaneous test for hypersensitiveness to horse serum is the next procedure, so that, in the event of an attack, desensitization may be attempted if necessary.

SUMMARY.

1. In Baltimore, according to the records of 508 consecutive cases of diphtheria, 10 per cent of the family contacts of 10 years and under who were not given prophylactic antitoxin subsequently developed diphtheria, mostly within 30 days.

2. Of the children of the same age group who were given prophylactic antitoxin only 1.2 per cent were attacked.

3. This experience is in agreement with the experience of other writers with regard to the low secondary attack rates among immunized children and the very much higher rates among children not so treated.

4. At a case fatality rate of 2 per cent the risk of death from diphtheria undergone by unprotected children over that of children given prophylactic antitoxin is, for children of 10 years and under, in Baltimore, one death to 568 family contacts.

5. The best statistical record of deaths from antitoxin shows one death among approximately 75,000 persons injected.

6. When, for any special reason, it is considered inadvisable to administer antitoxin as a prophylactic, the child should be guarded from infection by being removed from the infected home. On removal, such a child should be given the advantage of medical supervision and modern diagnostic methods.

7. The evidence presented emphasizes especially the question of young contacts. It is realized that adults and older children may be

subjected to daily examination, and possibly Schick tested. It is probable, indeed, that in time this policy might be extended to all children of school age. Young children, however, constitute a special problem because of difficulties of examination and of diagnosis and because of much greater liability to attack. Among these children the use of prophylactic antitoxin is clearly not only justified but demanded.

REFERENCES.

Baltimore:
(1904–1915) Annual Reports of the Health Department of the City of Baltimore for the years 1904–1915 (with the exception of the year 1905).
(1920) Annual Report of the Health Department of the City of Baltimore for the year 1920: Tables 19 and 23.
(1921) Annual Report of the Health Department of the City of Baltimore for the year 1921: Tables 7 and 15.

Biggs, H., and Guerard, A. R. (1896): The use of antitoxic serum in the treatment of diphtheria under the supervision of the New York City Department of Health, with a résumé of the published reports on the subject. Medical News, New York. Vol. 69 (Dec. 26, 1896), p. 738.

Chapin, C. V.:
(1903) Annual Report of the Superintendent of Health, Providence, R. I., for the Year 1903, p. 82. (See also subsequent reports.)
(1905) Annual Report of the Superintendent of Health, Providence, R. I., for the Year 1905, p. 29. (See also subsequent reports.)
(1910–1914) Annual Reports of the Superintendent of Health, Providence, R. I., for the Years 1910–1914, inclusive.
(1913) Annual Report of the Superintendent of Health, Providence, R. I., for the Year 1913.

Chicago:
(1919) Report and Handbook of the Health Department of the City of Chicago, for the Years 1911–1918.
(1923) Report and Handbook of the Health Department of the City of Chicago, for the Years 1919–1921.

Dean, H. R. (1922): The histology of a case of anaphylactic shock occurring in man. Jour. of Path. and Bact., vol XXV, No. 3 (July, 1922), p. 305.

Gillette, H. F. (1909): Untoward results from diphtheria antitoxin, with special reference to its relation to asthma. New York State Jour. Med., vol. 9, No. 9 (Sept., 1909), p. 373.

Hitchens, A. P. (1923): Should diphtheria antitoxin be used prophylactically? The Army Med. Bull., No. 5 (May 15, 1923), p. 140.

Longcope, W. T. (1920): Article on "Serum disease, protein intoxication, urticaria, and angio-neurotic oedema," Nelson's Loose-Leaf Medicine, Vol. II.

Netter, A. (1902): Les injections preventives de serum anti-diphtherique dans les familles. Presse Medicale, April 23, 1902, pp. 387–389.

New York (1906–1912): Annual Reports of the Department of Health of the City of New York for the Years 1906–1912, inclusive.

Park, W. H.:
(1913) Is serum anaphylaxis a danger of sufficient importance to limit our use of protective sera in the treatment or prevention of disease? Trans. Assoc. of Amer. Physicians, Vol. XXVIII (1913), p. 95.
(1920) Prevention of individual infectious diseases, in "Public Health and Hygiene," by W. H. Park. Lea and Febiger, Phila. and New York, 1920, p. 102.

Pennsylvania (1905–1916): Reports of the Commissioner of Health of the State of Pennsylvania for the years 1905–1916, inclusive.

Rosenau, M. J., and Anderson, J. F., (1906): A study of the cause of sudden death following the injection of horse serum. Hyg. Lab. Bull., No. 29, United States Public Health Service. (April, 1906.)

Sumner, F. W. (1923): Sudden death from anaphylactic shock. Brit. Med. Jour., Vol. I, (March 17, 1923), p. 465.

Vermont (1912): Report of the State Board of Health, Vermont, 1910–1911, Part I, p. 42.

THE PREPARATION OF A CRYSTALLINE PICRATE HAVING THE ANTINEURITIC PROPERTIES OF VITAMINE B.

By ATHERTON SEIDELL, Ph. D., Chemist, Hygienic Laboratory, United States Public Health Service.

Experiments extending over many years have shown that a highly active vitamine extract can be prepared from brewer's yeast by utilizing, at one stage of the process, the selective adsorption by fuller's earth of the active constituent of the yeast solution. It has been found that the antineuritic fraction obtained by this procedure can be precipitated as a relatively insoluble picrate and this latter separated into at least two definitely crystalline compounds, one of which possesses a high degree of antineuritic activity.

The method of preparing the fuller's earth vitamine adsorption product ("activated solid") and the concentrated vitamine extract from it has been described in detail elsewhere.[1] An analysis of this well-dried extract for inorganic constituents unexpectedly showed that it contained a considerable amount of a potassium salt. This contamination must, no doubt, have been derived from the fuller's earth by substitution of bases during the extraction of the "activated solid" with saturated barium hydroxide solution. On account of subsequent difficulties, which might result from the presence of potassium in solutions from which it was hoped to separate the vitamine base by combining it with picric acid, it appeared desirable to eliminate the potassium before beginning the picric acid precipitation. The procedure for this was as follows:[2]

The sample of vitamine extract, the solids of which may contain as much as 30 per cent of potassium acetate, is dissolved in water and diluted to a definite volume. An aliquot of this solution is evaporated to dryness and the residue ignited. The resulting ash is titrated with 0.1 normal sulphuric acid, using methyl orange as indicator. On the basis of this titration the calculated amount of normal sulphuric acid, equivalent to the bases present, is added to

[1] Seidell: J. Am. Chem. Soc., 44, 2042–51, 1922.

[2] This method was developed and the earlier picric acid precipitations were made in collaboration with Prof. Gabriel Bertrand, of the Pasteur Institute of Paris, to whom I am deeply indebted for the many courtesies extended to me while working in his laboratory. A brief description of this step of procedure has been published in the Bull. soc. chim. biologique, 5, 794 (1923).

the main portion of the vitamine solution. This mixture is then distilled under diminished pressure to near dryness. The residue is stirred with approximately 66 per cent ethyl alcohol and the insoluble potassium sulphate removed by filtration. The alcoholic filtrate contains solids in which the content of ash is now about 3 per cent. Feeding tests on pigeons, made by the procedure described elsewhere,[3] show that the alcoholic filtrate retains all of the antineuritic activity of the vitamine extract from which it is prepared. The protective dose of the solids in this alcoholic filtrate was usually found to be 4 milligrams, given on alternate days to pigeons fed only on polished rice. It was, however, later found that a group of new pigeons, all under 1 year of age and weighing considerably more than the older pigeons, required from two to three times this dose for adequate protection. Thus, evidence was obtained that in testing samples of the antineuritic vitamine by feeding experiments on pigeons trustworthy results require that the birds be of nearly the same age.

The precipitation of the active material by picric acid has been found, after many experiments, to be best accomplished by adding to the concentrated 66 per cent alcoholic solution of the purified vitamine extract, an amount of picric acid, dissolved in methyl alcohol, approximately equal in weight to the solids present in the alcoholic vitamine solution. The precipitate, which appears when the two solutions are mixed, redissolves in the beginning, but usually remains in suspension toward the end of the addition of the picric acid solution.

As will be noted, the precipitate as above obtained, is in contact with a mixture of ethyl and methyl alcohols. Addition of water to the supernatant liquid results in a yellow cloud, thus indicating a lower solubility of the picrate in aqueous than in alcoholic solution. Furthermore, it was found that on gradual removal of the alcohol by evaporation under diminished pressure and replacing it with water the texture of the precipitate was improved in that it became more granular. In one case physiological tests of a picrate prepared without the addition of water to replace the evaporated alcohol, and of another removed after most of the alcohol had been replaced by water, showed that the latter was of higher activity. It was also found that of the several crops of picrate which may be successively removed during the evaporation of the aqueous alcoholic solvent, those which separate in the beginning are the more active. Those which are obtained after the clear supernatant liquid fails to yield a cloud on addition of water are of distinctly low activity.

[3] Seidell: Pub. Health Rep., 37, 1519–1523, 1922.

The filtrate from the final crop likewise shows only slight protection when tested on pigeons.

The precipitated picrates can be most conveniently separated by centrifugation, and should be washed one or more times by stirring with small portions of water, centrifuging, and decanting. The first crop, after drying, will usually be about equal in weight to the solids of the vitamine extract used for its precipitation. In most cases the protective dose of this product for pigeons has been found about equal to that of the vitamine solids of the alcoholic extract. This shows that the principal part of the active material is now combined with picric acid in a relatively insoluble form. Approximately, quantitative experiments have shown a conversion to the crude picrate of somewhat more than 80 per cent of the vitamine originally present in the extract.

A superficial examination of the active crude picrate indicates that it is not homogeneous. Small particles, more highly colored than the main portion of the material, can frequently be discerned. Under the microscope numerous more or less spherical masses, characterized by projecting spines, can be seen, and also a few bright reddish yellow particles.

When 1 gram of the product is suspended in 100 c. c. of water and the mixture shaken constantly at about 30° C. for one-half hour, approximately one-fourth of the original sample remains undissolved. Physiological tests of the undissolved residue, in comparison with the first crop of picrate obtained by evaporation of the 100 c. c. of solution, showed only a slight difference in activity, and this was in favor of the undissolved residue. The protective dose was, however, in both cases approximately the same as that of the original crude picrate. Hence, recrystallization from water appears not to effect a satisfactory separation of the active part of the mixed picrate.

Experiments with acetone gave more promising results. Using this solvent it has been found that two crystalline picrates can be separated, and that one of these possesses a high degree of antineuritic activity.

The several steps of the procedure have been studied with reasonable care, but it is by no means certain that the details described here represent the best conditions for the isolation of the active compound. All that can be said is that the following method permits the separation of a crystalline, highly active antineuritic picrate, in quantities sufficient for physiological and chemical studies.

Five grams of the active crude picrate are extracted by stirring 3 minutes with 8 c. c. of 95 per cent acetone (a mixture of 95 c. c. of pure acetone and 5 c. c. of H_2O). The mixture is centrifuged and the clear reddish yellow acetone solution decanted. This extraction is

repeated in the same manner with 4 c. c. of 95 per cent acetone and then with 2 c. c. and finally with 1 c. c. The undissolved residue amounts to about 2.5 gms. To the somewhat less than 15 c. c. of acetone extract, 10 c. c. of water are added. A small amount of permanent flocculent precipitate may separate. The mixture is then allowed to evaporate in a partially evacuated desiccator containing sulphuric acid. When the volume has been reduced about one-third, an additional 2 c. c. of water are added. This produces a further amount of the flocculent precipitate. The evaporation is continued and the loss of acetone is replaced by the addition of another 2 c. c. of water. When the removal of the acetone has proceeded far enough, the further addition of water produces no precipitate. At this point the yellow crystalline solid which has gradually accumulated may be conveniently removed by filtering on a small perforated porcelain disk and paper filter, and should be washed with a few small portions of water. The dried product will weigh about 1.7 grams, and will be found appreciably more active than the crude picrate from which it was separated.

A further purification of this 95 per cent acetone soluble part of the crude picrate is made by repeating the above process. In case a quantity less than 5 gms. is used, the proportion of 95 per cent acetone and water should be modified accordingly. With 2.5 gms. of the once purified product a yield of 1.7 gms. of the twice-crystallized picrate was obtained. This product consists of aggregates of more or less irregularly shaped slightly reddish to pale yellow, transparent, crystalline flakes, sharply distinct from rods or needles. When heated in a capillary tube they contract, darken slowly, and usually decompose completely below 160° C. In doses as low as 2 milligrams daily they protect fully grown young pigeons from loss in weight on a diet of polished rice.

That portion of the original crude picrate remaining undissolved after the above-described extractions with 95 per cent acetone, when dissolved in dilute acetone and the clear solution allowed to crystallize, yields well-characterized pale yellow rods or prismatic crystals of a distinctly different appearance from those obtained from the 95 per cent acetone extract. These melt with decomposition at about 202° and show very little, if any, activity when tested on pigeons.

It should be mentioned that the above procedure for separating the two picrates depends, in the first place, upon a solubility difference in 95 per cent acetone, which is certainly not as sharp as might be desired; and, secondly, upon a fractional crystallization from a mixture of acetone and water, the conditions of which in respect to maintenance of the ratio of the two solvents, which appears to be an important factor, can not be satisfactorily controlled.

Combustion analyses of the two picrates gave results which were in fairly close agreement and which correspond reasonably well with the empirical formula, $C_6H_{18}O_2N_3 \cdot OH \cdot C_6H_2(NO_2)_3$, thus indicating that the two products are very closely related and possibly may be different tautomeric forms of the same compound.

So far, in the course of the work, there have been prepared four different lots of the 95 per cent acetone soluble crystals from three different batches of fresh brewer's yeast obtained at widely different seasons of the year. In each case the product has corresponded in appearance and properties with the description given above and has been found to be unmistakably active when tested on pigeons.

For these tests, which have extended over a period of 12 weeks, 48 pigeons have received doses of the crystals, varying from 2 to 12 milligrams, given on alternate days for periods of 8 to 14 days. According to the test as now applied, this period is ample to demonstrate adequate protection. In only two cases was there a significant loss in weight; in one of these a growth in the mouth of the pigeon was observed, and in the other the exceptionally rapid decline, which could not be checked by massive doses of vitamine, was probably occasioned by pneumonia. In the case of all birds receiving the larger doses there was invariably a marked gain in weight. The lower limit of protection with the purest material has so far not been determined.

In the earlier work reported in the literature upon the isolation of the antineuritic vitamine, mention is made by Suzuki, Shimamura, and Odake [4] of a crystalline picrate having antineuritic properties, prepared by them from an extract of rice polishings. A very small yield was obtained and few tests of its activity could be made. It was stated to separate in the form of clusters of needles, and a microphotograph of the crystals was given. Since, in the present work, it has been found that the rod or needlelike form of the picrate is much the less active, it appears probable that the needles obtained by Suzuki, Shimamura, and Odake owe their activity to an admixture of the flaky crystals here described, which could not have been removed by the procedure they followed.

In regard to the question as to whether the activity of the crystals here described may not be attributed to an exceptionally small amount of some adsorbed or occluded ingredient, it should be mentioned that, although the latter fractions obtained in the crystallization of the acetone extract are less active than the former, which is suggestive of a certain type of adsorption, these less active fractions consist largely of rods which have a distinctly higher melting point than the antineuritic crystalline flakes. This is indicative of a

[4] Suzuki, Shimamura, and Odake: Biochem. Ztschr., 43, 83-153, 1912.

simple fractional crystallization and makes it improbable that the activity of the lower melting picrate is due to any adsorbed superactive material.

There has been a tendency in the past to regard vitamines as substances comparable with enzymes and toxines in their instability and marked activity of infinitesimal doses. Acceptation of this view has, no doubt, deterred many from work on this problem, since the possibility of isolating substances of the nature of enzymes is very remote. It is distinctly encouraging, therefore, to obtain evidence that the antineuritic vitamine performs its function in doses of convenient magnitude and withstands ordinary laboratory manipulations. Assuming a satisfactory demonstration of these points, the final solution of the true chemical nature of vitamines may be anticipated with certainty.

VITAL STATISTICS, ENGLAND AND WALES, 1923.

Provisional Figures Show Lowest Death and Infantile Mortality Rates on Record.

The birth rate, death rate, and infantile mortality rate for England and Wales for 1923, as revealed by the provisional figures furnished by the Registrar General and published in The Medical Officer, January 26, 1923, show the lowest birth rate ever recorded for England and Wales, except that during the war years 1917–1919, and the lowest death rate and infantile mortality rate ever recorded.

In the following table the death rate for England and Wales relates to the whole population, but that for London and the groups of towns to the civil population only.

Birth rate, death rate, and infantile mortality rate for England and Wales for the year 1923.

[Provisional figures.]

	Birth rate per 1,000 total population.	Death rate per 1,000 population. (Crude rate.)	Deaths under 1 year per 1,000 births.
England and Wales	19.7	11.6	69
105 county boroughs and great towns, including London	20.4	11.6	73
157 smaller towns (populations from 20,000 to 50,000 in 1921)	19.8	10.6	68
London	20.2	11.2	61

81737°—24——2

IRISH VITAL STATISTICS AND POPULATION CHANGES.

WHOLE OF IRELAND.

The enormous drain from emigration on the population of Ireland is brought out in a recent return issued by the Registrar General. According to the report,[1] the population of the whole of Ireland, estimated at more than 8,000,000 in 1847, had dropped to 4,494,000 (estimated) in 1921. The last census figure, that obtained in 1911, was 4,383,608, an increase of slightly more than 110,000 being shown during the 10-year period 1912–1921.

The report states that before the war the yearly excess of births over deaths averaged between 25,000 and 30,000, but that the average number of emigrants was greater than this excess, resulting in a gradual decrease in the population. During the war the excess of births over deaths decreased, dropping to 10,000 in 1918; but at the same time emigration almost ceased. The annual excess of births over deaths has now returned to the former figures, but the emigration figures have remained lower than formerly.

The emigration figures for Ireland for the last 70 years are interesting. It is stated that since 1852—a record year, with 190,322 emigrants—the number of emigrants has been gradually decreasing. In 1914, 30,073 persons left Ireland. From 1915 to 1919 about 24,000 persons emigrated; in 1920 the number was 15,531; and in 1921 it was 13,635. Figures later than 1921 are not available on the old basis, as the Royal Irish constabulary, charged with collecting them, has ceased to exist. The total number of emigrants recorded during the period 1851–1921 was stated to be 4,351,834.

THE IRISH FREE STATE.

The estimated population of the Irish Free State at midyear 1923 was 3,165,000 persons. Since the last census, that of 1911, only estimates of the population have been made. For obvious reasons no attempt was made to take a census in Ireland in the regular census year of 1921. According to the census of 1911, the population of the 26 counties now comprised in the Free State was 3,139,688. In 1913 the estimate was 3,131,000, showing an estimated increase in the last 10 years of 34,000.

According to the return recently made, there were reported in the Irish Free State for the quarter ended September 30, 1923, 15,428 births, equivalent to an annual rate of 19.5 per 1,000 of the estimated population, and 8,741 deaths, or an annual death rate of 11.0 per 1,000 estimated population at midyear 1923 (3,165,000 persons). In England and Wales the birth rate for the same quarter was 19.8, and the death rate 9.5.

[1] The Medical Officer, London, Jan. 26, 1924.

It is stated that when the figures for the year shall have been compiled the death rate for Ireland for 1923 will probably be the lowest on record.

THE PROGRAM FOR ORAL HYGIENE IN THE PUBLIC SCHOOLS OF MINNEAPOLIS, MINN.—ERROR IN STATEMENT OF AUTHORSHIP.

The article entitled "The Program for Oral Hygiene in the Public Schools of Minneapolis, Minn.," published in Public Health Reports for December 21, 1923, pages 3028 to 3032, should have been credited to Dr. F. Denton White, supervisor of oral hygiene in the Minneapolis public schools, instead of to Dr. F. E. Harrington. The article was in fact a digest of a report that was made by Doctor White to the director of the department of hygiene.

CIVIL SERVICE EXAMINATIONS.

Medical Officers.

Public Health Service (Medical Officer, Grades A and B).—The entrance salary for assistant medical officer, Public Health Service, is $2,400 to $3,000 a year, and for associate medical officer is $3,000 to $3,600. Any person appointed who is not over 30 years of age may subsequently take the examination prescribed by law for the Regular Corps before he reaches his thirty-second year. Persons between 32 and 40 years of age may take the examination for the Regular Corps after they have performed five years of creditable service under their appointment as assistant medical officer or associate medical officer, as the case may be.

Applications will be rated as received until June 30, 1924.

Information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C.; the secretary of the United States Civil Service Board, Customhouse, Boston, Mass., New York, N. Y., New Orleans, La., Honolulu, Hawaii; Post Office, Philadelphia, Pa., Atlanta, Ga., Cincinnati, Ohio, Chicago, Ill., St. Paul, Minn., Seattle, Wash., San Francisco, Calif., Denver, Colo.; Old Customhouse, St. Louis, Mo.; Administration Building, Balboa Heights, Canal Zone; or to the chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

Graduate Nurse.

Applications will be rated as received until June 30. The examination is to fill vacancies in the United States Veterans' Bureau and in the Indian and Public Health Services at entrance salaries ranging from $720 to $2,500 a year. Appointees to positions in the Public Health and Indian Services are allowed the increase of $20 a month

granted by Congress in addition to the basic salary. In the Indian Service appointees are allowed laundry of uniform, furnished quarters, heat, and light; and in the Public Health Service appointees are allowed quarters, subsistence, and laundry.

Applicants must have been graduated from a recognized school of nursing requiring a residence of at least two years in a hospital having a daily average of 30 patients or more, giving a thorough practical and theoretical training. Applicants must also show evidence of State registration, unless living in a State where there is no registration for nurses, in which case it must be stated in the application that the State requires no registration for nurses.

Competitors will not be required to report for examination at any place, but will be rated on their education, training, and experience.

Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the board of United States civil-service examiners at the post office or customhouse in any city.

DEATHS DURING WEEK ENDED FEBRUARY 2, 1924.

Summary of information received by telegraph from industrial insurance companies for week ended Feb. 2, 1924, and corresponding week of 1923. (From the Weekly Health Index, Feb. 5, 1924, issued by the Bureau of the Census, Department of Commerce.)

	Week ended Feb. 2, 1924.	Corresponding week, 1923.
Policies in force	56, 439, 738	52, 001, 474
Number of death claims	11, 415	11, 762
Death claims per 1,000 policies in force, annual rate	10. 5	11. 8

Deaths from all causes in certain large cities of the United States during the week ended Feb. 2, 1924, infant mortality, annual death rate, and comparison with corresponding week of 1923. (From the Weekly Health Index, Feb. 5, 1924, issued by the Bureau of the Census, Department of Commerce.)

City.	Week ended Feb. 2, 1924.		Annual death rate per 1,000, corresponding week, 1923.	Deaths under 1 year.		Infant mortality rate, week ended Feb. 2, 1924.[2]
	Total deaths.	Death rate.[1]		Week ended Feb. 2, 1924.	Corresponding week, 1923.	
Total	8,311	14.2	16.2	1,112	1,159	.....
Akron	29	7.3	12.0	6	10	63
Albany[3]	40	17.6	20.9	3	3	66
Atlanta	90	20.6	16.6	15	12	.....
Baltimore[3]	252	16.7	19.1	36	38	105
Birmingham	72	18.7	13.3	5	10	.....
Boston	209	14.0	21.2	23	40	64
Bridgeport	32	11.6	16.0	3	4	47
Buffalo	160	15.3	18.5	33	16	140
Cambridge	37	17.2	20.6	5	8	87
Camden[3]	48	19.8	27.3	12	12	190
Canton	22	11.2	13.1	5	3	105
Chicago[3]	727	12.9	14.1	116	129	107
Cincinnati	138	17.6	26.2	14	22	88
Cleveland	202	11.5	11.4	33	27	86

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births—an annual rate based on deaths under 1 year for the week and estimated births for 1923. Cities left blank are not in the registration area for births.
[3] Deaths for week ended Friday, Feb. 1, 1924.

Deaths from all causes in certain large cities of the United States during the week ended Feb. 2, 1924, infant mortality, annual death rate, and comparison with corresponding week of 1923. (From the Weekly Health Index, Feb. 5, 1924, issued by the Bureau of the Census, Department of Commerce.)—Continued.

City.	Week ended Feb. 2, 1924.		Annual death rate per 1,000, corresponding week, 1923.	Deaths under 1 year.		Infant mortality rate, week ended Feb. 2, 1924.
	Total deaths.	Death rate.		Week ended Feb. 2, 1924.	Corresponding week, 1923.	
Columbus	80	15.6	24.0	7	10	67
Dallas	43	11.9	15.4	8	6	.....
Dayton	33	10.2	18.0	6	5	101
Denver	69	13.0	17.3	6	10	.....
Des Moines	27	9.7	14.4	1	10	.....
Detroit	272	14.2	16.7	59	49	110
Duluth	27	13.0	7.8	4	2	86
Erie	26	11.7	16.7	5	6	103
Fall River [3]	40	17.2	16.8	9	3	127
Flint	28	11.8	19.0	8	5	138
Fort Worth	27	9.5	9.4	5	2	.....
Grand Rapids	32	11.2	9.3	4	4	62
Houston	38	12.4	10.4	7	4	.....
Indianapolis	100	14.9	19.2	10	12	76
Jacksonville, Fla	35	17.8	17.2	3	10	.....
Jersey City	85	14.2	14.3	14	9	101
Kansas City, Kans	30	13.3	14.0	4	4	80
Kansas City, Mo	81	11.7	15.6	9	18	.....
Los Angeles	256	19.1	16.4	22	25	68
Louisville	101	20.4	19.4	4	8	38
Lowell	32	14.4	18.6	6	6	107
Lynn	32	16.1	16.8	3	4	76
Memphis	88	26.6	22.4	12	9	.....
Milwaukee	98	10.4	13.3	17	14	78
Minneapolis	94	11.7	9 2	17	12	91
Nashville [3]	49	20.7	19.6	9	7	.....
New Bedford	34	13.4	19.6	7	13	109
New Haven	35	10.4	11.5	5	7	65
New Orleans	182	23.2	21.0	26	12	.....
New York	1,574	13.6	14.3	178	181	72
Bronx Borough	176	10.5	11.6	23	20	81
Brooklyn Borough	539	12.8	13.9	64	55	69
Manhattan Borough	684	15.8	16.0	72	85	70
Queens Borough	118	11.1	12.0	17	16	93
Richmond Borough	57	22.7	18.8	2	5	36
Newark, N. J	91	11.0	15.3	14	19	66
Norfolk	36	11.4	10.5	4	6	73
Oakland	71	15.0	12.8	10	4	125
Oklahoma City	12	6.0	.....	1	.....	.....
Omaha	64	16.0	12.8	6	5	64
Paterson	42	15.6	20.2	3	5	49
Philadelphia	562	15.0	19.3	63	77	80
Pittsburgh	232	19.3	21.3	43	39	146
Portland, Oreg	70	13.1	13.7	7	9	72
Providence	82	17.5	22.4	16	19	130
Richmond	54	15.3	23.9	7	13	82
Rochester	64	10.3	14.9	8	10	63
St. Louis	220	14.1	16.2	28	19	.....
St. Paul	67	14.3	17.2	6	5	52
Salt Lake City [3]	36	14.6	9.5	4	3	66
San Antonio	68	18.5	18.1	12	11	.....
San Francisco	158	15.0	16.2	15	16	90
Schenectady	21	10.9	11.6	3	5	85
Seattle	65	10.7	8.9	11	3	106
Somerville	26	13.5	18.5	2	4	54
Spokane	23	11.5	9.5	1	2	21
Springfield, Mass	34	11.9	13.0	1	4	17
Syracuse	40	11.1	15.3	7	8	87
Tacoma	28	14.2	10.3	5	1	115
Toledo	66	12.5	14.9	9	11	85
Trenton	30	12.1	22.9	6	10	98
Utica	27	13.4	19.7	2	5	43
Washington, D. C	150	17.9	25.3	22	19	127
Waterbury	18	9.4	11.1	2	7	45
Wilmington, Del	29	12.6	19.5	3	2	65
Worcester	57	15.2	18.5	1	7	12
Yonkers	22	10.5	12.1	2	2	[illegible]
Youngstown	37	14.6	15.0	4	8	-

[3] Deaths for week ending Friday, Feb. 1, 1924.

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 STATE SUMMARIES.

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

Reports for Week Ended February 9, 1924.

ALABAMA.

	Cases.
Chicken pox	64
Diphtheria	17
Influenza	161
Malaria	13
Measles	761
Pneumonia	204
Scarlet fever	11
Smallpox	34
Tuberculosis	31
Typhoid fever	11
Whooping cough	102

ARIZONA.

Chicken pox	5
Diphtheria	6
Measles	89
Mumps	9
Scarlet fever	13
Smallpox	1
Whooping cough	1

ARKANSAS.

Chicken pox	36
Diphtheria	5
Hookworm disease	1
Influenza	233
Malaria	21
Measles	148
Mumps	4
Paratyphoid fever	2
Pellagra	2
Scarlet fever	6
Smallpox	10
Tuberculosis	15
Typhoid fever	6
Whooping cough	36

CALIFORNIA.

	Cases.
Cerebrospinal meningitis—San Francisco	1
Diphtheria	175
Influenza	63
Lethargic encephalitis:	
Los Angeles	2
Oakland	1
San Francisco	1
Measles	930
Poliomyelitis—Los Angeles	1
Scarlet fever	282
Smallpox:	
Fullerton	8
Long Beach	50
Los Angeles	118
Los Angeles County	74
Manhattan Beach	12
Orange County	12
Pasadena	24
Pomona	14
Santa Monica	9
Scattering	58
Typhoid fever:	
Los Angeles	9
Scattering	16

COLORADO.
(Exclusive of Denver.)

Chicken pox	13
Diphtheria	29
Influenza	3
Measles	320
Mumps	47
Pneumonia	13
Scarlet fever	42
Smallpox	8
Tuberculosis	54
Typhoid fever	7
Vincent's angina	1
Whooping cough	4

CONNECTICUT.

	Cases.
Cerebrospinal meningitis	1
Chicken pox	86
Diphtheria	71
German measles	6
Influenza	13
Measles	180
Mumps	110
Pneumonia (lobar)	38
Scarlet fever	194
Smallpox	5
Trichinosis	2
Tuberculosis (all forms)	47
Typhoid fever	4
Whooping cough	51

DELAWARE.

Cerebrospinal meningitis—Newark	2
Chicken pox	8
Diphtheria	5
Influenza	6
Measles	3
Pneumonia	11
Scarlet fever:	
Wilmington	10
Scattering	7
Tuberculosis	6
Typhoid fever	1
Whooping cough	9

DISTRICT OF COLUMBIA.

Chicken pox	69
Diphtheria	10
Lethargic encephalitis	2
Measles	7
Scarlet fever	48
Smallpox	9
Tuberculosis	26
Whooping cough	10

FLORIDA.

Cerebrospinal meningitis	1
Diphtheria	17
Influenza	10
Malaria	11
Pneumonia	9
Scarlet fever	3
Smallpox	3
Typhoid fever	13

GEORGIA.

Chicken pox	23
Diphtheria	7
Dysentery (bacillary)	2
Hookworm disease	3
Influenza	57
Malaria	3
Measles	216
Mumps	20
Pneumonia	22
Scarlet fever	3
Septic sore throat	2
Smallpox	15
Tuberculosis (pulmonary)	12
Typhoid fever	4
Whooping cough	34

ILLINOIS.

	Cases.
Diphtheria:	
Adams County	11
Cook County	135
Kane County	8
Madison County	12
Scattering	78
Influenza	44
Measles	513
Pneumonia	429
Poliomyelitis—Cook County	4
Scarlet fever:	
Cook County	165
Kane County	22
La Salle County	10
Madison County	8
Peoria County	8
St. Clair County	12
Sangamon County	7
Tazewell County	13
Scattering	93
Smallpox	10
Tuberculosis	259
Typhoid fever	15
Whooping cough	115

INDIANA.

Cerebrospinal meningitis	1
Chicken pox	134
Diphtheria:	
Marion County	22
Scattering	76
Influenza	9
Pneumonia	6
Scarlet fever:	
Allen County	10
Elkhart County	19
Lake County	19
St. Joseph County	22
Scattering	70
Smallpox:	
Delaware County	46
Marion County	31
Steuben County	25
Scattering	102
Tuberculosis	34
Typhoid fever	5
Whooping cough	114

IOWA.

Diphtheria	15
Scarlet fever	66
Smallpox	5
Typhoid fever	2

KANSAS.

Cerebrospinal meningitis	1
Chicken pox	151
Diphtheria	44
German measles	3
Influenza	9
Lethargic encephalitis	1
Measles	998
Mumps	79
Pneumonia	66
Scarlet fever	100
Smallpox	17
Tuberculosis	78
Typhoid fever	1
Whooping cough	186

LOUISIANA.

	Cases.
Diphtheria	14
Hookworm disease	9
Influenza	110
Malaria	3
Measles	245
Pneumonia	59
Scarlet fever	11
Smallpox	17
Tuberculosis	43
Typhoid fever	15
Whooping cough	34

MAINE.

Chicken pox	74
Conjunctivitis (infectious)	1
Diphtheria	11
German measles	14
Influenza	5
Measles	147
Mumps	54
Pneumonia	23
Poliomyelitis	1
Scarlet fever	40
Tetanus	1
Tuberculosis	13
Typhoid fever	5
Vincent's angina	2
Whooping cough	68

MARYLAND.[1]

Cerebrospinal meningitis	1
Chicken pox	176
Diphtheria	44
German measles	17
Influenza	95
Lethargic encephalitis	1
Malaria	1
Measles	112
Mumps	30
Ophthalmia neonatorum	1
Pneumonia (all forms)	206
Poliomyelitis	1
Scarlet fever	178
Septic sore throat	1
Tuberculosis	49
Typhoid fever	8
Whooping cough	45

MASSACHUSETTS.

Anthrax	1
Cerebrospinal meningitis	4
Chicken pox	337
Conjunctivitis (suppurative)	13
Diphtheria	262
German measles	29
Influenza	7
Measles	769
Mumps	307
Ophthalmia neonatorum	36
Pneumonia (lobar)	119
Poliomyelitis	3
Scarlet fever	476
Septic sore throat	3
Trichinosis	1
Tuberculosis (all forms)	135
Typhoid fever	5
Whooping cough	112

MICHIGAN.

	Cases.
Diphtheria	170
Measles	531
Pneumonia	224
Scarlet fever	423
Smallpox	99
Tuberculosis	70
Typhoid fever	6
Whooping cough	73

MINNESOTA.

Chicken pox	157
Diphtheria	73
Influenza	1
Measles	328
Pneumonia	12
Scarlet fever	336
Smallpox	70
Trachoma	2
Tuberculosis	49
Typhoid fever	5
Whooping cough	16

MISSISSIPPI.

Diphtheria	14
Scarlet fever	1
Smallpox	5
Typhoid fever	10

MISSOURI.

Cerebrospinal meningitis	2
Chicken pox	61
Diphtheria	58
Influenza	59
Measles	640
Mumps	37
Pneumonia	23
Rabies	1
Scarlet fever	125
Septic sore throat	3
Smallpox	17
Trachoma	8
Tuberculosis	50
Typhoid fever	7
Whooping cough	63

MONTANA.

Diphtheria	14
Scarlet fever	43
Smallpox	48

NEBRASKA.

Chicken pox	15
Diphtheria	17
Measles	462
Mumps	7
Scarlet fever	31
Smallpox	3
Tuberculosis	2
Typhoid fever	2
Whooping cough	8

NEW JERSEY.

Cerebrospinal meningitis	1
Chicken pox	331
Diphtheria	112
Influenza	34

[1] Week ended Friday.

NEW JERSEY—continued.

	Cases.
Measles	396
Pneumonia	208
Poliomyelitis	1
Scarlet fever	209
Smallpox	21
Trichinosis	2
Typhoid fever	6
Whooping cough	90

NEW MEXICO.

Cerebrospinal meningitis	1
Chicken pox	11
Conjunctivitis	1
Diphtheria	14
Dysentery	1
Influenza	3
Malaria	1
Measles	62
Mumps	5
Pneumonia	6
Scarlet fever	10
Septic sore throat	1
Tuberculosis	19
Typhoid fever	2
Whooping cough	8

NEW YORK.

(Exclusive of New York City.)

Cerebrospinal meningitis	1
Diphtheria	173
Influenza	70
Lethargic encephalitis	1
Measles	1,345
Pneumonia	368
Poliomyelitis	1
Scarlet fever	475
Smallpox	8
Typhoid fever	38
Whooping cough	449

NORTH CAROLINA.

Chicken pox	176
Diphtheria	42
German measles	7
Measles	1,655
Scarlet fever	41
Smallpox	139
Typhoid fever	5
Whooping cough	380

OREGON.

Botulism	[1] 12
Chicken pox	10
Diphtheria:	
Portland	10
Scattering	5
Influenza	3
Lethargic encephalitis	2
Measles	342
Mumps	6
Pneumonia	[2] 9

OREGON—continued.

	Cases.
Scarlet fever:	
Marion County	9
Scattering	20
Smallpox:	
Portland	12
Scattering	8
Tuberculosis	14
Typhoid fever	3
Whooping cough	4

SOUTH DAKOTA.

Chicken pox	21
Diphtheria	2
Influenza	6
Measles	383
Pneumonia	19
Scarlet fever	82
Smallpox	1
Tuberculosis	7
Whooping cough	9

TEXAS.

Cerebrospinal meningitis	1
Chicken pox	60
Diphtheria	31
Dysentery	1
Influenza	126
Measles	899
Mumps	51
Pneumonia	23
Scarlet fever	16
Smallpox	37
Tuberculosis	24
Typhoid fever	7
Whooping cough	31

VERMONT.

Chicken pox	23
Diphtheria	3
Measles	167
Mumps	23
Pneumonia	4
Scarlet fever	25
Smallpox	2
Whooping cough	62

WASHINGTON.

Chicken pox	66
Diphtheria:	
Seattle	13
Scattering	24
Measles	2,155
Mumps	50
Pneumonia	2
Scarlet fever:	
King County	12
Seattle	16
Spokane	11
Scattering	33
Smallpox:	
Spokane	23
Scattering	12
Tuberculosis	53
Typhoid fever	3
Whooping cough	21

[1] Also 12 deaths.

[2] Deaths.

WEST VIRGINIA.

	Cases.
Diphtheria	7
Scarlet fever	17
Typhoid fever	22

WISCONSIN.

	Cases.
Milwaukee:	
Chicken pox	38
Diphtheria	12
German measles	1
Influenza	1
Lethargic encephalitis	1
Measles	5
Pneumonia	13
Scarlet fever	43
Smallpox	1
Trachoma	1
Whooping cough	33
Scattering:	
Cerebrospinal meningitis	1
Chicken pox	131
Diphtheria	55

WISCONSIN—continued.

Scattering—Continued.	Cases.
German measles	5
Influenza	28
Lethargic encephalitis	1
Measles	361
Pneumonia	32
Scarlet fever	349
Smallpox	33
Tuberculosis	27
Typhoid fever	9
Whooping cough	132

WYOMING.

Cerebrospinal meningitis	1
Chicken pox	17
Diphtheria	4
Measles	30
Scarlet fever	15
Tuberculosis	1
Typhoid fever	1
Whooping cough	8

Reports for Week Ended February 2, 1924.

DISTRICT OF COLUMBIA.

	Cases.
Cerebrospinal meningitis	1
Chicken pox	61
Diphtheria	5
Measles	13
Scarlet fever	42
Smallpox	12
Tuberculosis	24
Whooping cough	19

NORTH DAKOTA.

Chicken pox	14
Diphtheria	14

NORTH DAKOTA—continued.

	Cases.
Influenza	1
Measles	211
Pneumonia	26
Scarlet fever	58
Smallpox	11
Trachoma	6
Tuberculosis	4
Typhoid fever	2
Whooping cough	17

SUMMARY OF CASES REPORTED MONTHLY BY STATES.

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

State.	Cerebrospinal meningitis.	Diphtheria.	Influenza.	Malaria.	Measles.	Pellagra.	Poliomyelitis.	Scarlet fever.	Smallpox.	Typhoid fever.
December, 1923.										
Colorado	.....	219	3	.....	686	.....	1	219	1	22
Wyoming	.....	11	14	.....	453	.....	.....	33	.....	1
January, 1924.										
Connecticut	1	274	34	.....	810	.....	.....	741	2	10
Massachusetts	10	1,095	47	2	2,335	.....	14	2,084	2	31
Vermont	.....	36	.....	.....	548	.....	.....	65	31	2

CITY REPORTS FOR WEEK ENDED JANUARY 26, 1924.

Diphtheria.—The number of cases of diphtheria reported for the week ended January 26, 1924, by the cities included in the table was somewhat less than was reported by the same cities for the corresponding week of last year, but it was slightly larger than

the estimated expectancy, which is based on reports for previous years, excluding epidemics.

Influenza.—The reports of cases of influenza are incomplete, but some idea of the prevalence of the disease can be obtained from the number of deaths attributed to influenza and to pneumonia. The influenza deaths are about 66 per cent less than the number reported for the corresponding week of last year; and the pneumonia deaths have decreased about 21 per cent from last year's figures for the week.

Measles.—A steady increase in the number of cases of measles since the first of the year is shown by the tables. However, some increase in the prevalence of this disease is usual at this season of the year.

Scarlet fever.—The cities included in the table report about 21 per cent more cases of scarlet fever than they did for the corresponding week of 1923, and about 80 per cent more than the estimated expectancy. The increase appears to be general, as all groups of cities, except those in the Mountain States, report more cases than for the corresponding week of last year.

Smallpox.—The reports of smallpox show some improvement over the previous week, especially in the cities of the East North Central, South Atlantic, and Pacific Coast States.

City reports for week ended January 26, 1924.

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever, is the result of an attempt to ascertain from previous occurrence how many cases of the disease under consideration 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 week 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 of the number of cases reported for the week during nonepidemic years.

If reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1915 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviations 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.	Scarlet fever.	
		Cases, estimated expectancy.	Cases reported.	Cases reported.	Deaths reported.				Cases, estimated expectancy.	Cases reported.
New England:										
Maine—										
Lewiston	1	1	1	0	0	2	0	2	1	1
Portland	.....	2	4	0	0	4	.....	5	4	0
New Hampshire—										
Concord	.....	1	0	0	0	11	.....	0	1	0
Manchester	0	2	4	0	0	7	0	0	2	1
Vermont—										
Barre	0	0	0	0	0	1	0	0	1	0
Burlington	.....	1	3	0	0	0	.....	1	1	2

City reports for week ended January 26, 1924—Continued.

Division, State, and city.	Chicken pox, cases reported.	Diphtheria. Cases, estimated expectancy.	Diphtheria. Cases reported.	Influenza. Cases reported.	Influenza. Deaths reported.	Measles, cases reported.	Mumps, cases reported.	Pneumonia, deaths reported.	Scarlet fever. Cases, estimated expectancy.	Scarlet fever. Cases reported.
New England—Con.										
Massachusetts—										
Boston	92	68	79	2	1	105	15	18	50	141
Fall River	4	7	8	2	2	0	1	7	4	1
Springfield	7	5	3	1	0	27	11	3	8	13
Worcester	14	7	10	0	0	4	38	7	11	27
Rhode Island—										
Pawtucket	3	2	2	0	0	0	3	4	1	5
Providence	0	14	14	.....	2	2	0	5	8	67
Connecticut—										
Bridgeport	0	10	10	2	0	2	0	1	6	4
Hartford	.....	9	10	0	0	12	.....	0	6	53
New Haven	27	6	1	.....	1	2	32	1	7	16
Middle Atlantic:										
New York—										
Buffalo	0	28	18	2	0	15	0	7	20	34
New York	270	289	221	63	8	596	164	225	166	253
Rochester	8	13	5	1	0	3	1	5	11	11
Syracuse	34	9	6	0	0	47	3	4	16	64
New Jersey—										
Camden	.....	4	11	0	0	0	.....	9	1	3
Newark	54	30	20	17	0	37	0	19	24	17
Trenton	1	7	11	2	0	27	0	3	3	7
Pennsylvania—										
Philadelphia	187	73	149	3	4	35	87	81	56	95
Pittsburgh	58	24	32	1	2	8	36	55	22	41
Reading	0	5	6	0	0	2	0	1	2	5
Scranton	5	7	2	.....	1	6	0	10	4	1
East North Central:										
Ohio—										
Cincinnati	13	15	9	.....	1	63	6	14	10	6
Cleveland	60	34	33	9	4	8	97	28	40	25
Columbus	.....	6	7	.....	2	3	.....	2	8	21
Toledo	0	8	7	0	0	24	0	4	16	21
Indiana—										
Fort Wayne	0	4	8	0	0	5	0	3	2	5
Indianapolis	21	18	20	.....	1	8	123	8	14	3
South Bend	.....	1	3	0	0	2	.....	3	3	10
Terre Haute	4	2	2	0	0	4	0	6	2	1
Illinois—										
Chicago	184	158	124	17	7	80	76	61	150	151
Cicero	2	4	1	0	0	0	3	1	2	1
Springfield	1	2	1	3	3	1	0	5	3	1
Michigan—										
Detroit	70	79	56	4	5	65	37	36	78	97
Flint	13	10	7	0	0	48	11	5	8	11
Grand Rapids	.....	4	5	0	0	3	.....	3	7	16
Saginaw	4	1	4	0	0	6	1	3	2	14
Wisconsin—										
Madison	7	1	2	0	.....	1	1	.....	2	2
Milwaukee	67	20	21	0	.....	3	.....	.....	40	14
Racine	5	1	6	0	0	0	0	1	5	27
Superior	.....	1	0	0	0	2	.....	1	2	1
West North Central:										
Minnesota—										
Duluth	29	4	0	0	0	1	1	3	5	14
Minneapolis	89	24	33	.....	1	11	15	8	22	73
St. Paul	.....	12	17	0	0	36	.....	9	20	57
Iowa—										
Davenport	0	2	2	0	.....	0	1	.....	2	1
Des Moines	4	4	6	0	.....	27	0	.....	10	0
Sioux City	0	1	1	0	.....	4	0	.....	3	1
Waterloo	4	1	1	0	.....	0	3	.....	1	4
Missouri—										
Kansas City	5	12	9	1	2	86	5	21	11	17
St. Joseph	2	4	2	0	0	58	3	10	4	3
St. Louis	29	66	44	1	1	12	7	.....	26	63
North Dakota—										
Fargo	0	1	0	0	0	0	0	1	2	0
Grand Forks	1	1	0	0	.....	2	.....	.....	2	6
South Dakota—										
Sioux Falls	.....	0	4	0	0	53	.....	2	2	1
Nebraska—										
Lincoln	.....	3	7	0	0	90	.....	1	3	4
Omaha	8	8	5	0	0	35	.....	10	9	2

City reports for week ended January 26, 1924—Continued.

Division, State, and city.	Chicken pox, cases reported.	Diphtheria.		Influenza.		Measles, cases reported.	Mumps, cases reported.	Pneumonia, deaths reported.	Scarlet fever.	
		Cases, estimated expectancy.	Cases reported.	Cases reported.	Deaths reported.				Cases, estimated expectancy.	Cases reported.
West North Central—Continued.										
Kansas—										
Topeka	31	3	3	0	0	68	1	3	2	3
Wichita	20	3	5	0	0	45	109	3	4	1
South Atlantic:										
Delaware—										
Wilmington	.....	2	10	0	0	1	.....	0	3	10
Maryland—										
Baltimore	177	26	29	23	4	39	1	32	36	56
Cumberland	.....	0	0	2	0	1	.....	2	2	1
Frederick	.....	1	0	1	0	6	.....	0	.....	2
District of Columbia—										
Washington	58	19	10	0	0	9	0	26	23	35
Virginia—										
Lynchburg	6	1	1	0	0	0	1	1	0	2
Norfolk	0	2	1	0	0	45	0	5	2	4
Richmond	0	6	7	0	0	6	0	8	3	6
Roanoke	2	2	2	0	1	1	0	4	1	2
West Virginia—										
Charleston	0	1	2	0	0	0	0	1	1	0
Huntington	.....	1	1	0	0	0	.....	0	1	1
Wheeling	9	2	3	0	0	3	0	4	1	4
North Carolina—										
Raleigh	9	1	3	0	0	18	0	1	1	1
Wilmington	0	0	0	0	0	25	0	1	1	1
Winston-Salem	6	1	0	0	0	133	0	2	2	7
South Carolina—										
Charleston	1	2	0	0	1	17	0	6	2	2
Columbia	9	1	2	0	0	36	16	7	1	0
Greenville	2	0	0	0	0	22	1	1	1	1
Georgia—										
Atlanta	2	2	0	2	0	10	3	17	3	4
Brunswick	0	0	0	0	0	33	0	0	1	0
Savannah	0	1	1	7	0	20	0	11	1	4
Florida—										
St. Petersburg	1	.....	0	0	0	54	1	0	.....	0
Tampa	1	2	1	0	0	28	0	0	0	0
East South Central:										
Kentucky—										
Covington	0	1	0	0	0	3	0	1	1	4
Lexington	5	1	0	0	0	2	1	3	1	1
Louisville	8	13	6	1	0	2	2	11	5	4
Tennessee—										
Memphis	37	6	7	.....	2	65	7	11	1	8
Nashville	4	2	2	0	0	4	0	7	4	1
Alabama—										
Birmingham	11	2	1	8	1	39	7	15	3	5
Mobile	0	1	0	0	0	0	0	2	1	0
Montgomery	.....	1	1	1	0	8	.....	3	0	1
West South Central:										
Arkansas—										
Fort Smith	.....	1	0	0	.....	2	.....	.....	1	1
Little Rock	0	1	3	4	.....	15	2	.....	1	0
Louisiana—										
New Orleans	0	14	22	8	5	102	0	28	3	4
Shreveport	0	.....	0	0	0	32	0	5	.....	0
Oklahoma—										
Tulsa	5	2	0	0	0	1	0	0	1	1
Texas—										
Dallas	4	7	5	0	0	362	12	1	2	5
Galveston	0	2	0	0	0	0	0	2	1	0
Houston	.....	3	6	0	0	21	.....	6	1	4
San Antonio	1	1	5	.....	1	18	0	18	1	1
Mountain:										
Montana—										
Billings	1	1	0	0	0	42	0	1	1	3
Great Falls	7	1	1	0	0	138	0	0	1	4
Helena	2	.....	0	0	0	21	0	1	.....	1
Missoula	1	0	0	0	0	2	0	1	1	0
Idaho—										
Boise	0	0	1	0	0	2	0	0	1	1

City reports for week ended January 26, 1924—Continued.

Division, State, and city.	Chicken pox, cases reported.	Diphtheria. Cases, estimated expectancy.	Diphtheria. Cases reported.	Influenza. Cases reported.	Influenza. Deaths reported.	Measles, cases reported.	Mumps, cases reported.	Pneumonia, deaths reported.	Scarlet fever. Cases, estimated expectancy.	Scarlet fever. Cases reported.
Mountain—Contd.										
Colorado—										
Denver	35	11	18	0	0	25	2	10	10	11
Pueblo	2	6	4	0	0	168	6	3	2	2
New Mexico—										
Albuquerque	5	0	0	0	0	12	0	2	3	0
Utah—										
Salt Lake City	46	3	3	.....	1	325	14	4	5	2
Nevada—										
Reno	2	0	0	0	0	0	0	0	0	0
Pacific:										
Washington—										
Seattle	17	6	3	0	.....	1,148	1	.....	10	6
Spokane	25	5	4	0	.....	446	0	.....	3	43
Tacoma	6	2	3	0	.....	245	6	.....	2	1
California—										
Los Angeles	94	26	96	22	3	67	7	21	14	88
Sacramento	.....	3	6	.....	1	3	.....	2	1	2
San Francisco	23	26	69	3	3	112	6	15	15	56

Division, State, and city.	Population July 1, 1923, estimated.	Smallpox. Cases, estimated expectancy.	Smallpox. Cases reported.	Smallpox. Deaths reported.	Tuberculosis, deaths reported.	Typhoid fever. Cases, estimated expectancy.	Typhoid fever. Cases reported.	Typhoid fever. Deaths reported.	Whooping cough, cases reported.	Deaths, all causes.
New England:										
Maine—										
Lewiston	33,790	0	0	0	0	0	0	0	9	11
Portland	73,129	0	0	0	0	0	0	0	.....	18
New Hampshire—										
Concord	22,408	0	0	0	0	0	0	0	.....	14
Manchester	81,383	0	0	0	1	0	0	0	.....	25
Vermont—										
Barre	[1] 10,008	0	0	0	0	0	0	0	1	2
Burlington	23,613	0	0	0	0	0	0	0	.....	8
Massachusetts—										
Boston	770,400	0	0	0	9	1	0	0	7	214
Fall River	120,912	0	0	0	0	1	0	0	7	29
Springfield	144,227	0	1	0	1	0	0	0	2	46
Worcester	191,927	0	0	0	4	0	0	0	4	40
Rhode Island—										
Pawtucket	68,799	0	0	0	0	0	0	0	3	23
Providence	242,378	0	0	0	4	0	0	0	4	67
Connecticut—										
Bridgeport	[1] 143,555	0	0	0	0	0	0	0	0	24
Hartford	[1] 138,036	0	0	0	1	0	0	0	.....	33
New Haven	172,967	0	0	0	1	0	1	0	6	46
Middle Atlantic:										
New York—										
Buffalo	536,718	0	0	0	12	2	0	0	25	146
New York	5,927,625	0	1	0	[2] 106	11	9	1	83	1,435
Rochester	317,867	0	0	0	3	1	2	0	7	66
Syracuse	184,511	0	0	0	2	0	2	1	4	41
New Jersey—										
Camden	124,157	0	0	0	1	0	0	0	.....	37
Newark	438,699	0	1	0	5	1	1	1	11	109
Trenton	127,390	0	0	0	4	0	0	0	0	45
Pennsylvania—										
Philadelphia	1,922,788	0	4	0	46	5	5	0	54	546
Pittsburgh	613,442	0	0	0	10	1	1	0	38	197
Reading	110,917	0	0	0	0	1	1	1	0	43
Scranton	140,636	0	0	0	3	0	0	0	0	88

[1] Population Jan. 1, 1920.

[2] Pulmonary only.

City reports for week ended January 26, 1924—Continued.

Division, State, and city.	Population July 1, 1923, estimated.	Smallpox.			Tuberculosis deaths reported.	Typhoid fever.			Whooping cough cases reported.	Deaths, all causes.
		Cases, estimated expectancy.	Cases reported.	Deaths reported.		Cases, estimated expectancy.	Cases reported.	Deaths reported.		
East North Central:										
Ohio—										
Cincinnati	406,312	1	0	0	9	0	0	0	28	120
Cleveland	888,519	2	2	0	13	1	0	0	33	196
Columbus	261,082	1	0	0	5	1	0	0	.....	73
Toledo	268,338	2	3	0	4	1	0	0	0	69
Indiana—										
Fort Wayne	93,573	3	0	0	0	0	0	1	0	20
Indianapolis	342,718	3	4	0	10	0	0	0	2	89
South Bend	76,709	0	1	0	0	0	0	0	.....	18
Terre Haute	68,939	1	0	0	2	0	0	0	6	19
Illinois—										
Chicago	2,886,121	1	4	0	57	5	16	1	27	677
Cicero	55,968	0	0	0	0	0	0	0	0	5
Springfield	61,833	1	0	0	1	0	0	0	0	18
Michigan—										
Detroit	995,668	5	39	0	26	2	2	1	28	261
Flint	117,968	4	2	0	0	0	0	0	0	20
Grand Rapids	145,947	1	6	0	2	1	0	0	.....	33
Saginaw	69,754	0	0	0	0	1	0	0	5	17
Wisconsin—										
Madison	42,519	1	0	0	0	0	0	0	1	7
Milwaukee	484,595	4	0	0	6	1	0	0	50	.....
Racine	64,393	0	0	0	0	0	0	0	0	8
Superior	[1] 39,671	3	6	0	0	0	0	0	.....	11
West North Central:										
Minnesota—										
Duluth	106,289	1	11	0	2	1	0	0	1	24
Minneapolis	409,125	18	7	0	7	1	2	0	.....	93
St. Paul	241,891	18	16	0	5	1	0	0	.....	67
Iowa—										
Davenport	61,262	3	8	.....	.....	0	0	.....	0	.....
Des Moines	140,923	4	0	.....	.....	0	0	.....	0	.....
Sioux City	79,662	3	0	.....	.....	0	0	.....	0	.....
Waterloo	39,667	0	0	.....	.....	0	0	.....	6	.....
Missouri—										
Kansas City	351,819	7	0	0	7	0	0	0	4	116
St. Joseph	78,232	2	0	0	0	0	0	0	2	39
St. Louis	803,853	2	2	0	12	2	0	0	56	239
North Dakota—										
Fargo	24,841	1	0	0	0	0	0	0	0	9
Grand Forks	14,547	1	2	.....	.....	0	0	.....	.....	.....
South Dakota—										
Sioux Falls	29,203	1	0	0	0	0	0	0	.....	13
Nebraska—										
Lincoln	58,761	1	0	0	1	0	0	0	.....	13
Omaha	204,382	6	1	0	1	0	0	0	.....	57
Kansas—										
Topeka	52,555	0	0	0	0	0	0	0	4	19
Wichita	79,261	1	11	0	2	0	0	0	1	25
South Atlantic:										
Delaware—										
Wilmington	117,728	0	0	0	0	0	1	0	.....	34
Maryland—										
Baltimore	773,580	0	2	0	15	2	1	1	17	242
Cumberland	32,361	0	0	0	1	0	0	0	.....	10
Frederick	11,301	0	0	0	0	0	0	0	.....	3
District of Columbia—										
Washington	[1] 437,571	0	3	0	7	1	1	0	10	134
Virginia—										
Lynchburg	30,277	0	0	0	0	0	0	0	39	11
Norfolk	159,089	0	0	0	2	1	0	0	7	.....
Richmond	181,044	0	0	0	1	0	0	0	2	47
Roanoke	55,502	0	0	0	3	0	0	0	0	17
West Virginia—										
Charleston	45,597	0	0	0	2	1	1	0	0	16
Huntington	57,918	0	1	0	3	0	0	0	.....	18
Wheeling	[1] 56,208	0	0	0	1	1	6	0	8	13
North Carolina—										
Raleigh	29,171	0	1	0	2	0	0	0	4	12
Wilmington	35,719	0	0	0	1	0	0	0	0	8
Winston-Salem	56,230	2	3	1	5	0	0	0	20	16

[1] Population Jan. 1, 1920.

City reports for week ended January 26, 1924—Continued.

Division, State, and city.	Population July 1, 1923, estimated.	Smallpox.			Tuberculosis deaths reported.	Typhoid fever.			Whooping cough, cases reported.	Deaths, all causes.
		Cases, estimated expectancy.	Cases reported.	Deaths reported.		Cases, estimated expectancy.	Cases reported.	Deaths reported.		
South Atlantic—Continued.										
South Carolina—										
Charleston	71,245	0	1	0	2	1	0	0	0	36
Columbia	39,688	0	4	0	1	0	0	0	0	32
Greenville	25,789	0	1	0	0	0	0	0	8	7
Georgia—										
Atlanta	222,963	1	40	0	3	1	0	0	0	95
Brunswick	15,937	0	0	0	0	0	0	0	0	3
Savannah	89,448	0	0	0	0	1	0	0	0	41
Florida—										
St. Petersburg	24,403	.....	0	0	0	.....	0	0	0	10
Tampa	56,050	0	0	0	3	2	1	0	2	25
East South Central:										
Kentucky—										
Covington	57,877	0	0	0	1	1	0	0	0	15
Lexington	43,673	0	0	0	2	0	0	0	2	17
Louisville	257,671	1	0	0	8	0	0	0	0	81
Tennessee—										
Memphis	170,067	2	0	0	5	0	5	0	8	43
Nashville	121,128	0	0	0	4	1	0	1	15	48
Alabama—										
Birmingham	195,901	1	3	0	2	1	3	0	4	65
Mobile	63,858	0	0	0	1	0	0	0	0	22
Montgomery	45,383	0	0	0	0	0	0	0	.....	14
West South Central:										
Arkansas—										
Fort Smith	30,635	0	0	.....	.....	0	0	.....	.....	.....
Little Rock	70,906	0	0	.....	.....	0	0	.....	0	.....
Louisiana—										
New Orleans	404,575	4	0	0	15	3	2	1	0	184
Shreveport	54,590	.....	3	0	3	.....	0	1	0	28
Oklahoma—										
Tulsa	102,018	2	0	.....	.....	0	0	.....	0	.....
Texas—										
Dallas	177,274	2	0	0	4	0	0	0	4	54
Galveston	46,877	0	0	0	0	2	0	0	0	18
Houston	154,970	1	0	1	2	1	0	0	.....	42
San Antonio	184,727	0	0	0	11	1	2	0	0	64
Mountain:										
Montana—										
Billings	16,927	0	0	0	2	0	0	0	0	7
Great Falls	27,787	2	0	0	0	0	0	0	4	6
Helena	[1] 12,037	.....	0	0	0	.....	0	0	0	5
Missoula	[1] 12,668	1	1	0	0	0	0	0	0	1
Idaho—										
Boise	22,806	0	0	0	0	0	0	0	0	9
Colorado—										
Denver	272,031	15	0	0	19	1	0	0	11	89
Pueblo	43,519	0	0	0	2	0	0	0	0	10
New Mexico—										
Albuquerque	16,648	0	0	0	11	0	0	0	0	16
Utah—										
Salt Lake City	126,241	5	1	0	1	0	0	0	2	37
Nevada—										
Reno	12,429	0	0	0	1	0	0	0	0	6
Pacific:										
Washington—										
Seattle	[1] 315,685	6	4	.....	.....	0	1	.....	3	.....
Spokane	104,573	9	43	.....	.....	0	0	.....	5	.....
Tacoma	101,731	2	10	.....	.....	1	1	.....	0	.....
California—										
Los Angeles	666,853	1	139	0	31	2	1	0	4	256
Sacramento	69,950	1	1	0	1	1	1	0	.....	23
San Francisco	520,038	1	1	0	13	2	0	2	2	179

[1] Population Jan. 1, 1920.

City reports for week ended January 26, 1924—Continued.

Division, State, and city.	Cerebro-spinal meningitis.		Dengue.		Lethargic encephalitis.		Pellagra.		Poliomyelitis (infantile paralysis).		
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths	Cases.	Deaths.	Cases, est. expectancy.	Cases.	Deaths.
New England:											
Maine—											
Lewiston	1	0	0	0	0	0	0	0	0	0	0
Massachusetts—											
Boston	0	1	0	0	4	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	0	0	0	1	0
Middle Atlantic:											
New York—											
New York	3	2	0	0	5	3	0	0	1	2	2
Pennsylvania—											
Philadelphia	1	1	0	0	0	0	0	0	0	0	0
Pittsburgh	0	1	0	0	0	0	0	0	0	0	0
East North Central:											
Indiana—											
Indianapolis	0	1	0	0	0	0	0	0	0	0	0
Illinois—											
Chicago	0	0	0	0	1	0	0	0	0	1	0
Michigan—											
Detroit	4	0	0	0	0	1	0	0	0	2	1
West North Central:											
Minnesota—											
Minneapolis	1	0	0	0	0	0	0	0	0	0	0
Missouri—											
Kansas City	1	0	0	0	0	0	0	0	0	0	0
St. Louis	1	3	0	0	0	0	0	9	1	0	0
South Atlantic:											
Maryland—											
Baltimore	1	0	0	0	0	1	0	0	1	0	0
South Carolina—											
Columbia	0	0	0	0	0	0	0	2	0	0	0
Georgia—											
Atlanta	0	0	1	0	0	0	0	1	0	0	0
East South Central:											
Alabama—											
Birmingham	1	0	0	0	0	0	0	0	0	0	0
West South Central:											
Texas—											
Houston	0	0	.....	.....	.....	.....	0	1	0	0	0
San Antonio	0	0	0	0	0	0	0	1	.....	0	0
Mountain:											
Colorado—											
Denver	1	0	0	0	0	0	0	0	0	0	0
Pacific:											
California—											
Los Angeles	0	0	0	0	1	1	0	0	0	1	0
San Francisco	0	0	0	0	2	1	0	0	0	0	0

The following table gives a summary of the reports from 105 cities for the four-week period ended January 26, 1924. The cities included in this table are those whose reports have been published for all four weeks in the Public Health Reports. Seven of these cities did not report deaths. The aggregate population of the cities reporting cases was estimated at nearly 29,000,000 on July 1, 1923, which is the latest date for which estimates are available. The cities reporting deaths had nearly 27,700,000 population on that date. The number of cities included in each group, and the aggregate population, are shown in a separate table below.

Summary of weekly reports from cities, December 30, 1923, to January 26, 1924.

DIPHTHERIA CASES.

	1924, week ended—			
	Jan. 5.	Jan. 12.	Jan. 19.	Jan. 26.
Total	1,339	1,385	1,453	1,387
New England	172	123	130	141
Middle Atlantic	401	476	488	479
East North Central	341	352	333	305
West North Central	133	102	125	124
South Atlantic	59	86	112	72
East South Central	19	20	15	17
West South Central	46	36	38	41
Mountain	26	19	19	27
Pacific	142	171	193	181

MEASLES CASES.

Total	4,008	4,997	5,479	5,571
New England	175	161	176	170
Middle Atlantic	611	639	699	770
East North Central	283	356	328	296
West North Central	525	444	383	411
South Atlantic	553	439	499	507
East South Central	45	92	98	121
West South Central	352	375	370	552
Mountain	300	458	434	723
Pacific	1,164	2,033	2,492	2,021

SCARLET FEVER CASES.

Total	1,550	1,731	1,883	1,921
New England	281	287	330	327
Middle Atlantic	386	445	461	530
East North Central	413	404	487	419
West North Central	190	265	227	245
South Atlantic	122	113	128	142
East South Central	10	27	26	23
West South Central	22	20	21	15
Mountain	20	25	36	24
Pacific	106	145	167	196

SMALLPOX CASES.

Total	178	341	454	379
New England	0	2	0	1
Middle Atlantic	1	1	1	6
East North Central	28	58	92	64
West North Central	25	49	45	50
South Atlantic	37	52	81	55
East South Central	2	7	4	3
West South Central	2	10	6	3
Mountain	2	2	4	2
Pacific	81	160	221	195

TYPHOID FEVER CASES.

Total	63	81	77	69
New England	2	1	11	1
Middle Atlantic	11	29	30	21
East North Central	26	27	16	18
West North Central	3	1	3	2
South Atlantic	7	9	7	11
East South Central	6	0	3	8
West South Central	4	8	6	4
Mountain	1	2	0	0
Pacific	3	4	1	4

Summary of weekly reports from cities, December 30, 1923, to January 26, 1924—Continued.

INFLUENZA DEATHS.

	1924, week ended—			
	Jan. 5.	Jan. 12.	Jan. 19.	Jan. 26.
Total	46	76	68	70
New England	4	9	2	6
Middle Atlantic	13	24	32	14
East North Central	7	17	11	23
West North Central	0	4	10	4
South Atlantic	6	5	1	6
East South Central	3	6	4	3
West South Central	3	5	2	6
Mountain	2	1	0	1
Pacific	8	5	6	7

PNEUMONIA DEATHS.

Total	852	1,105	1,054	1,002
New England	52	80	78	51
Middle Atlantic	328	448	422	409
East North Central	182	203	202	177
West North Central	59	67	73	70
South Atlantic	97	143	132	129
East South Central	35	43	30	50
West South Central	28	44	47	60
Mountain	28	32	30	20
Pacific	43	45	40	36

Number of cities included in summary of weekly reports and aggregate population of cities in each group, estimated as of July 1, 1923.

Group of cities.	Number of cities reporting—		Aggregate population of cities reporting—	
	Cases.	Deaths.	Cases.	Deaths.
Total	105	98	28,898,320	27,694,454
New England	12	12	2,098,746	2,098,746
Middle Atlantic	10	10	10,304,114	10,304,114
East North Central	17	17	7,032,535	7,032,535
West North Central	14	12	2,515,330	1,686,636
South Atlantic	22	22	2,566,901	2,566,901
East South Central	7	7	911,855	911,855
West South Central	8	6	1,124,564	1,023,013
Mountain	9	9	546,445	546,445
Pacific	6	3	1,797,830	1,524,209

FOREIGN AND INSULAR.

INFLUENZA ON VESSEL.

Steamship "Demosthenes"—Table Bay, Union of South Africa.

On December 28, 1923, the steamship *Demosthenes* from England bound for Australia, arrived at Table Bay, Union of South Africa, with 29 cases of influenza on board occurring in passengers. The cases were stated to be mild. Passengers bound for Cape Town were allowed to land, no cases of the disease having occurred among them. The *Demosthenes* left London, England, December 5, 1923, for Brisbane, Australia, with 500 passengers. The vessel sailed December 29, 1923, from Cape Town.

BRAZIL.

Fatal Cases of Leprosy—Para.[a]

During the two weeks ended January 13, 1924, three deaths from leprosy were reported at Para, Brazil.

CANADA.

Communicable Diseases—Ontario—January, 1924 (Comparative).

Communicable diseases were reported in the Province of Ontario, Canada, during the month of January, 1924, as follows:

Disease.	January, 1924.		January, 1923.	
	Cases.	Deaths.	Cases.	Deaths.
Cerebrospinal meningitis	1	1	6	5
Chancroid	11	.....	3	.....
Chicken pox	971	.....	(1)	.....
Diphtheria	318	25	236	25
Gonorrhea	142	.....	160	.....
Influenza	20	6	115	39
Lethargic encephalitis	5	3	(1)	.....
Measles	1,222	7	331	4
Mumps	627	.....	(1)	.....
Pneumonia	.....	218	.....	362
Poliomyelitis (infantile paralysis)	.....	.....	2	1
Scarlet fever	870	13	368	10
Septic sore throat	14	1	(1)	.....
Smallpox	50	.....	43	.....
Syphilis	113	.....	147	.....
Tetanus	2	2	(1)	.....
Tuberculosis	172	89	169	117
Typhoid fever	38	5	59	10
Whooping cough	181	6	376	14

[1] Not reported in 1923.

[a] Public Health Reports, Feb. 1, 1924, p. 220.

Goiter.

During the period under report, two cases of goiter with one death were reported in the Province of Ontario. The disease was stated not to have been reported in 1923.

CELEBES ISLAND.

Epidemic Plague.

Epidemic plague was reported present, November 30, 1923, in Celebes Island, Malay Archipelago.

EGYPT.

Summary—January 1–December 27, 1923.

During the period January 1 to December 27, 1923, 1,518 cases of plague with 724 deaths, were reported in Egypt. The occurrence in cities and Provinces was reported as follows:

Cities—January 1–December 27, 1923.

City.	Cases.	Deaths.	First case.	Last case.
Alexandria	65	33	Jan. 7	Nov. 29
Cairo	2	2	Mar. 11	Dec. 25
Port Said	51	29	Jan. 26	Sept. 10
Suez	46	24	Mar. 2	Dec. 26

Provinces—January 1–December 27, 1923.

Province.	Cases.	Deaths.	First case.	Last case.
Assiout	370	211	Jan. 26	Aug. 6
Beni-Souef	63	23	Apr. 4	Dec. 2
Dakhalieh	2	2	July 31	Aug. 29
Fayoum	34	9	Mar. 25	July 27
Gharbieh	23	9	Apr. 11	Dec. 12
Girgah	337	193	Mar. 19	Dec. 13
Gizah	3	4	May 2	May 3
Kalioubiah	76	10	Apr. 26	Dec. 16
Kena	50	34	Mar. 8	Dec. 5
Menoufieh	290	98	Apr. 20	Dec. 27
Minia	106	43	Feb. 21	Oct. 30

HAWAII.

Plague-Infected Rodents—Honokaa.

The finding of three plague-infected rodents has been reported at Honokaa, Hawaii, as follows: January 8, 1924, two plague rodents: January 10, one plague rodent.

ITALY.

Malta Fever—Catania.

During the week ended December 30, 1923, three cases of Malta fever were reported at Catania, Italy.

JAMAICA.

Smallpox (Alastrim).

During the two weeks ended January 19, 1924, 33 new cases of smallpox (alastrim) were reported in the Island of Jamaica. Of these, two cases, occurring during the week ended January 12, were reported in the Parish of Kingston.

Typhoid Fever—Kingston and Vicinity.

During the same period, 41 cases of typhoid fever were reported at Kingston and the disease was stated to be present in the surrounding country with a number of cases reported.

Chicken Pox.

During the period under report, three cases of chicken pox were reported for the Island of Jamaica, of which one case occurred at Kingston.

MADAGASCAR.

Plague—Tananarive Province—November 1–15, 1923.

During the period November 1 to 15, 1923, there were reported in the Province of Tananarive, Madagascar, 39 cases of plague with 39 deaths, of which 10 cases with 10 deaths occurred in the town of Tananarive (population, 68,044; natives, 64,330, others, 3,714), and 29 cases with 29 deaths in other localities in the Province. The types of the disease were stated to be bubonic, pneumonic, and septicemic.

MALTA.

Communicable Diseases—December 1–15, 1923.

During the period December 1 to 15, 1923, communicable diseases were reported in the Island of Malta as follows: Bronchopneumonia, chicken pox, influenza, one case each; trachoma, 130 cases; undulant fever, 16 cases; whooping cough, 110 cases. (Population, 216,702.)

SUMATRA.

Dysentery—Typhoid Fever—Medan.

During the month of October, 1923, 37 cases of dysentery and 10 cases of typhoid fever with two deaths were reported at Medan, Island of Sumatra, Dutch East Indies.

Malaria—Batoe Bahra.[1]

During the period under report, 146 cases of malaria with 27 deaths were reported at Batoe Bahra, Island of Sumatra.

---

[1] Public Health Reports, Jan. 18, 1924, p. 134.

UNION OF SOUTH AFRICA.

Plague—Orange Free State.

An outbreak of plague was reported, December 27, 1923, on the Zandfontein Farm, Bothaville Area, Kroonstad District, Orange Free State, with seven cases (white, four; native, three) and three deaths (white, one; native, two). The death of one of the native cases occurred at Viljoenskroon. Investigations seem to indicate that the first patient became ill about December 16, 1923. The cases were stated to have all developed in closely associated persons.

VIRGIN ISLANDS.

Communicable Diseases—December, 1923.

Communicable diseases were reported in the Virgin Islands of the United States, during the month of December, 1923, as follows:

Disease and island.	Cases.	Remarks.	Disease and island.	Cases.	Remarks.
St. Thomas and St. John:			St. Croix:		
Chancroid	1	Imported.	Dengu	1	
Dengue	1		Dysentery	3	Entamebic, 2; unclassified, 1.
Dysentery	12	Unclassified.	Filariasis	21	Bancrofti.
Gonorrhea	7	2 imported.	Gonorrhea	2	
Trachoma	2		Schistomiasis	1	
Tuberculosis	3	From St. John, 1; chronic pulmonary, 1; acute pulmonary, miliary, 2.	Syphilis	2	Secondary.
			Trachoma	15	

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

The reports contained in the following tables must not be considered as complete or final as regards either the lists of countries included or the figures for the particular countries for which reports are given.

Reports Received During Week Ended February 15, 1924.[1]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
India				Nov. 25–Dec. 8, 1923; Cases, 3,491; deaths, 2,236.
Calcutta	Dec. 16–29	31	30	
Madras	Dec. 23–29	2	1	
Do	Dec. 30–Jan. 5	1		
Rangoon	Dec. 16–29	4	2	
Siam:				
Bangkok	Dec. 2–8	2	2	

PLAGUE.

Brazil:				
Bahia	Dec. 16–22	1	1	
Celebes Island	Nov. 30			Epidemic.
Egypt				Jan. 1–Dec. 27, 1923: Cases, 1,513; deaths, 724.
City—				
Alexandria	Jan. 1–Dec. 27	65	33	Last case, Nov. 29.
Cairo	do	2	2	Last case, Dec. 25.
Port Said	do	51	29	Last case, Sept. 10.
Suez	do	46	24	Last case, Dec. 26.

[1] From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended February 15, 1924—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Hawaii:				
Honolua				Jan. 8–10, 1924: Three plague-infected rodents.
India				Nov. 25–Dec. 8, 1923: Cases, 6,022; deaths, 4,447.
Bombay	Dec. 16–22	2	2	
Calcutta	Dec. 23–29	1	1	
Karachi	do	1		
Do	Dec. 30–Jan. 5	1	1	
Madras Presidency	Dec. 23–29	60	31	
Rangoon	Dec. 16–29	10	9	
Indo-China:				
Saigon	Dec. 2–8	1		
Java:				
East Java—				
Soerabaya	Nov. 18–24	1	2	
Madagascar:				
Tananarive Province				Nov. 1–15, 1923: Cases, 39; deaths, 39. Bubonic, pneumonic, septicemic.
Tananarive	Nov. 1–15	10	10	Other localities: Cases, 29; deaths, 29.
Siam:				
Bangkok	Dec. 2–8	1		
Straits Settlements:				
Singapore	Dec. 16–22	1	1	
Union of South Africa:				
Orange Free State—				
Kroonstad District	Dec. 16–27	7	3	At Zandfontein Farm, Bothaville Area. Cases, white, 4; native, 3; deaths, white, 1; native, 2.

SMALLPOX.

Brazil:				
Porto Rico	Dec. 30–Jan. 5		1	
Canada:				
British Columbia—				
Vancouver	Dec. 23–29	3		
Do	Dec. 30–Jan. 26	17		
Manitoba—				
Winnipeg	Dec. 30–Feb. 1	37		
New Brunswick—				
Restigouche County	Jan. 20–26	1		
Ontario				Jan. 1–31, 1924: Cases, 50.
Quebec—				
Montreal	Jan. 20–26	1		
China:				
Manchuria—				
Harbin	Dec. 10–22	23		
India				Nov. 25–Dec. 8, 1923: Cases, 1,999; deaths, 399.
Bombay	Dec. 9–22	8	3	
Calcutta	Dec. 16–29	4	4	
Karachi	Dec. 30–Jan. 5	2		
Madras	Dec. 23–29	8		
Do	Dec. 30–Jan. 5	5		
Rangoon	Dec. 23–29	2		
Indo-China:				
Saigon	Dec. 2–8	19	10	Including 100 square kilometers of surrounding country.
Jamaica				Jan. 6–19, 1924: Cases, 33 (alastrim).
Kingston	Jan. 6–19	2		
Java:				
East Java—				
Soerabaya	Nov. 18–24	39	4	
West Java—				
Batavia	Dec. 1–7	7	2	
Mexico:				
Mexico City	Dec. 30–Jan. 5	9		Including municipalities in Federal District.
Portugal:				
Lisbon	Dec. 23–29		2	
Do	Dec. 30–Jan. 12	11		
Oporto	Jan. 6–12	7	6	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended February 15, 1924—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Siam:				
Bangkok	Dec. 2-8	4	1	
Spain:				
Barcelona	Dec. 20-26		1	
Valencia	Jan. 7-13	32	6	
Straits Settlements:				
Singapore	Dec. 16-22	1		
Syria:				
Damascus	Nov. 23-Dec. 23	7		
Tunis:				
Tunis	Jan. 8-14		1	
Union of South Africa:				
Northern Rhodesia	Dec. 4-10	10		

TYPHUS FEVER.

Egypt:				
Alexandria	Jan. 8-14	1		
Cairo	Nov. 5-11	1	1	
Mexico:				
Mexico City	Dec. 30-Jan. 5	8		Including municipalities in Federal District.
Palestine:				
Jaffa	Jan. 1-7	1		

Reports Received from December 29, 1923, to February 8, 1924.[1]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Hongkong	Nov. 18-24	1		
India				Oct. 14-Nov. 24, 1923: Cases, 6,200, deaths, 3,917.
Calcutta	Nov. 11-Dec. 15	54	39	
Madras	Nov. 25-Dec. 22	13	4	
Rangoon	Nov. 11-Dec. 15	4	3	
Siam:				
Bangkok	Nov. 18-24	2		
Turkey:				
Constantinople	Dec. 2-8		1	

PLAGUE.

Azores:				
St. Michael Island	Oct. 20-Nov. 10	9	5	At localities 3 to 9 miles from port of Ponta Delgada.
Bolivia:				
La Paz	Oct. 1-31		3	
Brazil:				
Bahia	Nov. 11-Dec. 8	4	2	
British East Africa:				
Kenya—				
Mombasa	Oct. 14-20	1	1	Infected rats, 2. Dec. 9-15, 1923: Cases, 4; deaths, 2; removed from vessel arrived Dec. 11, 1923.
Nairobi	Nov. 1-21	40		In rural districts, several hundred.
Tanganyika				To Nov. 24, 1923: Cases, 39; deaths, 25.
Uganda	Aug. 1-Oct. 31	734	719	
Canary Islands:				
Las Palmas	Oct. 15-Nov. 15	14	14	
San Juan de la Rambla	Dec. 11	1		Locality 52 km. from Teneriffe.
Ceylon:				
Colombo	Nov. 11-Dec. 15	22	15	Plague rodents, 18.

[1] From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from December 29, 1923, to February 8, 1924—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Nanking	Dec. 16–29			Present.
Ecuador:				
Guayaquil	Nov. 16–Dec. 15	15	6	Rats taken: 35,070; found infected, 94.
Jipijapa	do			Present.
Quito	Nov. 1–30	11	1	
Vino del Milagro	Dec. 1–15	1		
Egypt				Jan. 1–Dec. 13, 1923: Cases, 1,479; deaths, 708.
City—				
Alexandria	Jan. 1–Dec. 13	65	33	Date of last case, Nov. 29, 1923.
Cairo	do	1	1	Date of last case, Mar. 1, 1923.
Port Said	do	51	29	Date of last case, Sept. 10, 1923.
Suez	do	42	23	Date of last case, Dec. 6, 1923.
Hawaii:				
Paauhau				Dec. 14, 1923: One plague rat.
India				Oct. 14–Nov. 24, 1923: Cases, 19,759; deaths, 12,988.
Bombay	Oct. 28–Dec. 8	3	3	
Karachi	Nov. 11–Dec. 22	41	33	
Madras Presidency	Nov. 4–Dec. 22	1,597	990	
Rangoon	Nov. 4–Dec. 15	10	6	
Indo-China:				
Saigon	Oct. 28–Nov. 17	18	6	Including 100 square kilometers in surrounding country.
Iraq:				
Bagdad	Nov. 11–Dec. 8	6	4	
Java				Oct. 1–31, 1923: Deaths, 902.
Province—				
Djokjakarta	Oct. 1–31		56	
Kedoe	do		252	
Pekalongan	do		25	
Samarang	do		218	
Surabaya	do		3	Nov 11–17, 1923: One case.
Soerakarta	do		348	
Madagascar:				
Tananarive Province	do	72	66	Bubonic, pneumonic, septicemic.
Tananarive town	Oct. 1–15	36	36	Other localities: Cases, 26; deaths, 24.
Paraguay:				
Asuncion	Dec. 18	6	4	
Peru				Nov. 1–Dec. 31, 1923: Cases, 38; deaths, 24.
Locality—				
Canete	Nov. 1–30	1	1	
Chancay	Dec. 1–31	2		
Chepen	Nov. 1–30	1		
Chiclayo	Nov. 1–Dec. 31	2	1	
Lima (city)	do	22	15	
Lima (country)	do	8	7	
Lurin	do	2		
Portugal:				
Lisbon	Dec. 13–21	7		
Portuguese West Africa:				
Angola—				
Loanda	Oct.–Nov	59	23	
Siam:				
Bangkok	Nov. 4–17	2	2	
Spain:				
Malaga	Dec. 17	2		
Straits Settlements:				
Singapore	Nov. 11–Dec. 8	3	3	
Syria:				
Beirut	Nov. 1–Dec. 10	3		
Turkey:				
Constantinople	Dec. 2–22	6	3	
Union of South Africa:				
Cape Province—				
Uitenhage district	Dec. 9–15			Plague rodent found vicinity Haarhoff's kraal farm.
Orange Free State—				
Wonderfontein farm	Dec. 2–8	4		Vicinity of Hoopstad. At Hoopstad, Dec. 9–15, 1923, one death of case previously reported.
On vessel:				
Ship	Dec. 11	4	2	At Mombasa, British East Africa.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from December 29, 1923, to February 8, 1924—Continued.

SMALLPOX.

Place.	Date.	Cases.	Deaths.	Remarks.
Algeria:				
Algiers	Nov. 1-30	1		
Arabia:				
Aden	Dec. 16-22	1		Imported.
Belgium:				
Brussels	do	10		
Bolivia:				
La Paz	Oct. 1-Dec. 31	45	15	
Brazil:				
Pernambuco	Nov. 4-Dec. 1	15	3	
Rio de Janeiro	Nov. 18-24	3	1	
Sao Paulo	Sept. 3-9	1		
British East Africa:				
Tanganyika Territory	Sept. 30-Oct. 27	14	1	
Uganda	Sept. 1-30	6	1	
Zanzibar	Sept. 1-Oct. 31	116	18	Sept. 1-30, 1923: In areas 27 miles from town of Zanzibar. Oct. 1-31, 1923: In vicinity, 1 case, 1 death. In Mkokotoni district, 30 cases, 14 deaths reported.
Canada:				
British Columbia—				
Vancouver	Dec. 2-22	7		
Manitoba—				
Winnipeg	Nov. 25-Dec. 29	21	3	
New Brunswick—				
Madawaska County	Dec. 8-15	1		
Ontario—				
Fort William and Port Arthur.	Dec. 16-29	5		Occurring at Fort William.
Quebec—				
Montreal	Nov. 30-Jan. 19	2		
Saskatchewan—				
Regina	Dec. 9-15	1		
Ceylon:				
Colombo	Nov. 11-17	1		Port case.
Chile:				
Concepcion	Oct. 1-Nov. 30		13	Nov. 12-Dec. 3, 1923: Deaths, 5.
Talcahuano	Nov. 26-Dec. 2	3		Dec. 22, 1923: Five cases present.
Valparaiso	Dec. 9-15		1	
China:				
Amoy	Nov. 18-Dec. 8			Present.
Chungking	Nov. 4-Dec. 15			Present and endemic.
Foochow	do			Present.
Hongkong	Oct. 28-Dec. 8	459	426	
Manchuria—				
Harbin	Nov. 12-Dec. 9	13		
Nanking	Dec. 2-15			Do.
Shanghai	Dec. 29			Prevalent.
Chosen (Korea):				
Seoul	Nov. 1-30	1		
Colombia:				
Buenaventura	Nov. 18-Dec. 15	8		
Ecuador:				
Esmeraldas	Nov. 16-30	4		
Quito	Nov. 1-30	167	26	
Egypt:				
Port Said	Nov. 21-Dec. 2	1		
Esthonia				Nov. 1-30, 1923: Cases, 32.
Greece:				
Saloniki	Oct. 22-Nov. 4		7	
Guadeloupe (West Indies)				Jan. 2-16, 1924: Present.
Basse Terre	Dec. 18			Present.
Do	Jan. 12			Do.
Marie Galante	Dec. 18			Off shore island; present.
Moule	Jan. 12			Present.
Pointe à Pitre	Dec. 18			Present in vicinity.
India				Oct. 14-Nov. 24, 1923: Cases, 4,545; deaths, 957.
Bombay	Oct. 28-Dec. 8	38	16	
Madras	Nov. 4-Dec. 22	15	3	
Rangoon	Nov. 4-Dec. 15	10	4	
Indo-China:				
City—				
Saigon	Nov. 4-Dec. 1	50	24	Including 100 square kilometers of surrounding country.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from December 29, 1923, to February 8, 1924—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Iraq:				
Bagdad	Oct. 24–Dec. 8	25	16	
Jamaica				Nov. 25–Dec. 29, 1923: Cases, 115.
Do				Dec. 30, 1923–Jan. 5, 1924: Cases,
Kingston	Nov. 25–Dec. 29	3		24. (Reported as alastrim.)
Do	Dec. 30–Jan. 5	2		
Java:				
East Java—				
Surabaya	Oct. 28–Nov. 10	180	24	
West Java—				
Batavia	Oct. 27–Nov. 30	53	10	
Latvia				Oct. 1–31, 1923: Cases, 3.
Mexico:				
Manzanillo	Dec. 4–10	5	1	
Mexico City	Nov. 25–Dec. 29	32		Including municipalities in Federal District.
Vera Cruz	Nov. 3–Dec. 30		4	
Do	Jan. 6–13		1	
Persia:				
Teheran	Sept. 24–Oct. 23		1	
Poland				Sept. 23–Nov. 3, 1923: Cases, 22; deaths, 3.
Portugal:				
Lisbon	Nov. 11–Dec. 22	19	8	
Oporto	Nov. 25–Dec. 29	39	23	
Do	Dec. 30–Jan. 5	15	7	
Siam:				
Bangkok	Oct. 28–Nov. 24	29	17	Nov. 25–Dec. 1, 1923: Epidemic.
Siberia:				
Dauria Station	Oct. 21			Present. Locality on Chita Railway, Manchurian frontier.
Sierra Leone:				
Sherbro District—				
Tagbail	Nov. 1–15	3		
Spain:				
Barcelona	Nov. 15–21		1	
Valencia	Nov. 25–Dec. 29	152	12	
Do	Dec. 30–Jan. 5	32	3	
Switzerland:				
Berne	Nov. 18–Dec. 22	12		Corrected.
Syria:				
Aleppo	Nov. 25–Dec. 1	1		In vicinity, at Djisr Choughour.
Damascus	Nov. 16–Dec. 15	4		
Tunis:				
Tunis	Oct. 27–Nov. 2	5	1	
Turkey:				
Constantinople	Nov. 11–Dec. 8	3		
Union of South Africa				Oct. 1–31, 1923: Colored, cases, 41; deaths, 2; white, cases, 3.
Cape Province	Oct. 28–Dec. 8			Outbreaks.
Natal	Oct. 28–Nov. 3			Do.
Orange Free State	Oct. 28–Nov. 24			Do.
Transvaal	Nov. 18–Dec. 1			Do.
Johannesburg	Nov. 25–Dec. 15	3		
Uruguay:				
Montevideo	Oct. 1–31	1		
On vessels:				
S. S. Torres	Jan. 14	1		At New Orleans quarantine station from Tampico, Mexico, via ports. Case in seaman signed on at Galveston, Tex., on outward voyage.
S. S. Vasari	Dec. 31	1		At Trinidad, West Indies, from Buenos Aires, Argentina. Vessel left Buenos Aires Dec. 15, 1923, for New York, via Santos, Rio de Janeiro, Trinidad, Barbados.

TYPHUS FEVER.

Algeria:				
Algiers	Nov. 1–Dec. 31	7	3	
Bolivia:				
La Paz	Oct. 1–Dec. 31	43	5	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from December 29, 1923, to February 8, 1924—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Bulgaria:				
Sofia				Nov. 18–Dec. 15, 1923: Paratyphus fever; cases, 17.
Chile:				
Antofagasta	Dec. 2–8	4		
Concepcion	Oct. 1–Nov. 30		4	Dec. 11–24, 1923: Deaths, 3.
Talcahuano				Dec. 5, 1923: 3 cases under treatment.
Valparaiso	Nov. 25–Dec. 15		29	Dec. 24, 1923: In hospital, 34 cases.
China:				
Antung	Nov. 12–Dec. 30	5		
Chungking	Nov. 18–24			Present.
Ecuador:				
Quito	Nov. 1–30	14	1	
Egypt:				
Alexandria	Nov. 19–Dec. 23	3		
Cairo	Sept. 10–Oct. 14	27	4	
Esthonia				Nov. 1–30, 1923: Paratyphus fever, cases, 8.
Finland				Dec. 1–15, 1923: Paratyphus fever, cases, 15.
Hungary				July 1–Aug. 31, 1923: Cases, 24.
Latvia				Oct. 1–31, 1923: Cases, 12; paratyphus fever, 7; recurrent typhus, 3.
Mexico:				
Mexico City	Nov. 25–Dec. 29	86		Including municipalities in Federal District.
Norway:				
Stavanger	Dec. 25–31	1		
Persia:				
Teheran	Sept. 24–Oct. 23		1	
Poland				Sept. 23–Nov. 3, 1923: Cases, 207; deaths, 24. Recurrent typhus, cases, 22.
Spain:				
Barcelona	Nov. 29–Dec. 12		2	
Madrid	Dec. 1–31		7	
Turkey:				
Constantinople	Nov. 11–Dec. 29	15	1	
Union of South Africa				Oct. 1–31, 1923: Colored, 287 cases, 58 deaths; white, 2 cases; total, 289 cases, 58 deaths.
Cape Province				Oct. 1–31, 1923: Colored, cases, 245; deaths, 47.
Do	Oct. 28–Dec. 8			Outbreaks.
Natal				Oct. 1–31, 1923: Colored, cases, 4 deaths, 3.
Do	Oct. 28–Nov. 3			Outbreaks.
Durban	Nov. 24–Dec. 1	73		Cases occurring among native stevedores in the harbor area of the port and confined to one barracks.
Orange Free State				Oct. 1–31, 1923: Colored, cases, 25; deaths, 8.
Do	Dec. 15			Outbreaks.
Transvaal				Oct. 1–31, 1923: Colored, cases, 13.
Do	Oct. 28–Dec. 1			Outbreaks.
Johannesburg	Nov. 11–Dec. 15	2		
Venezuela:				
Maracaibo	Dec. 16–22		1	
Yugoslavia:				
Croatia—				
Zagreb	Dec. 2–15	3		
Serbia—				
Belgrade	Nov. 25–Dec. 1	1		

YELLOW FEVER.

Brazil:				
Pernambuco City	Nov. 16	3	2	