PUBLIC HEALTH REPORTS

VOL. 40 JANUARY 30, 1925 No. 5

WORLD PREVALENCE OF HUMAN PLAGUE IN 1923*

The recent outbreak of human plague in Los Angeles, Calif., of both bubonic and pneumonic types, served to focus public attention for a short while in the United States on this ancient disease. The fact that there are endemic plague areas in this country tends to be lost sight of by the public in the relatively long intervals between outbreaks; the actual occurrence of human plague has again emphasized the possibility, in spite of constant vigilance, of an epidemic as long as infected rodents exist, and the necessity for a persistent campaign against this source of the disease.

A view of the world prevalence of plague points to another possibility—that there is always the chance of *new* endemic foci being established by imported infection. The world-wide distribution of the disease is not fully realized, perhaps, except by those whose especial duty it is to keep watch. Little appears in the current press about far-off epidemics or outbreaks. It may be pertinent, therefore, to summarize such information as is available concerning the world prevalence of human plague. Unfortunately, the more important data concerning plague-infected animals are too scanty to afford an adequate idea of the possible sources of the disease.

We have attempted, therefore, to utilize all official sources of published information on the prevalence of human plague during the year 1923. The compilation of these data has been greatly facilitated by the cumulative summaries published in the Public Health Reports (1) and by the systematic collection of epidemiological information by the Service of Epidemiological and Public Health Statistics of the Health Section of the League of Nations' Secretariat at Geneva (2). The publications of this service have, therefore, been freely used, and have been supplemented by the reports received by the Public Health Service and other publications containing summaries (3) (4) (5) (6). In spite of the multitude of sources of information from various countries, and in spite of the fact that plague is a universally notifiable disease, both by custom and in obedience to international sanitary conventions, it is ex-

* From the Statistical Office, United States Public Health Service.

tremely improbable that the available reports are complete. This is undoubtedly true so far as the number of cases is concerned, and it is quite likely that many localities where "sporadic" cases and even outbreaks have occurred are not included in the available data. We do not know, for example, what happened in interior China or Tibet. The reports for India, where the disease is most prevalent, do not show accurately the total number of cases, although there is every reason to believe that the reports of deaths are fairly complete for most of India. Any estimate or classification based on cases actually reported will fall considerably short of the actual incidence, and the lack of exact information on the fatality of the disease in different parts of the world precludes the possibility of accurate estimates of the number of cases based upon reported deaths.

TABLE 1.—*Cases of and deaths from plague notified throughout the world in 1923*

Locality	Cases	Deaths
AFRICA		
Algeria	5	3
Algiers	3	2
Oran	2	
St. Eugene		1
Angola	96	29
Canary Islands	46	27
Las Palmas	34	27
Teneriffe	10	
San Juan de la Rambla	•2	
Egypt	1,519	725
Cairo	2	2
Alexandria	67	33
Port Said	51	28
Suez	47	24
Provinces of Lower Egypt	392	119
Provinces of Upper Egypt	960	519
Kenya	1,090	
Madagascar	698	479
Tananarive	690	472
Diego-Suarez	5	4
Antsirabe	2	2
Tamatave	1	1
French Morocco	134	21
Casablanca	2	
Rabat Region	5	
Gharb Region	127	21
Mauritius	139	119
Nyasaland	7	
Senegal	1,221	846
Dakar	17	5
Rufisque	294	236
Thies	349	234
Baol	11	12
Cayor	404	216
Sine Saloum	133	139
Tanganyika: Singida (subdistrict of Dodoma)	36	74
AFRICA—continued		
Tunisia	31	
Beñ Gardane	29	
Tunis	2	
Uganda	948	914
Union of South Africa	20	12
St. Vincent Island (Cape Verde)	56	18
AMERICA		
Ecuador	126	42
Guayaquil	88	26
Brazil	53	34
Bahia	14	9
Pernambuco	16	4
Vino del Milagro	1	
Porto Alegre	22	21
Argentine Republic: Rosario	8	3
Hawaii: Honokoa	1	1
Mexico: Tampico	2	1
Paraguay: Asuncion	6	4
Peru	870	408
Ancash	6	
Arequipa	2	1
Cajamarca	138	47
Callao	15	9
Lambayeque	78	51
Libertad	185	90
Lima	294	136
Piura	152	74
United States: California	1	
Uruguay	3	1
Venezuela: Victoria	4	2
ASIA		
Celebes: Macassar	(1)	
Ceylon: Colombo	227	207
China:		
Amoy (Fokien Province)		33
Manchuria		1
Dutch East Indies		8,003
Hongkong	148	132
British India [2]		240,586

[1] Epidemic.

[2] See Tables 4 and 5 for distribution of plague in India.

TABLE 1.—*Cases of and deaths from plague notified throughout the world in 1923*—Continued

Locality	Cases	Deaths
ASIA—continued		
French Indo-China	1,040	844
Annam	111	78
Cochin-China	85	55
Cambodia	798	235
Iraq	708	413
Japan	1	1
Malay States (Federated)	11	10
Malay States (Unfederated)		
Johore		3
Palestine	21	4
Badrani	1	
Caiffa	2	1
Haiffa	3	
Jaffa	15	3
Persia:		
Mohammerah City	71	45
Abadan	481	409
Siam	399	329
Bangkok	178	156
Siberia: Transbaikalia, Matsiewskaya, Borzia Station, Haranhor	8	1
Straits Settlements: Singapore	55	60
Syria	21	
Beyrut	20	
Mount Libanon	1	
AUSTRALIA		
Sydney	1	1
EUROPE		
France: St. Ouen, suburb of Paris	14	
Greece	41	
Athens	4	
Piræus	26	
Lamia	1	
Syra	10	6
Italy: Torre Annunziata	1	
Portugal:		
Lisbon	15	2
Oporto		1
St. Michael Island	200	84
Castelo Branco	2	
Horta	1	
Russia:		
Kalmuk Region	[1] 11	[1] 7
Do	[2] 30	[2] 16
Government of Bukejev	[3] 334	[3] 310
Ural Region	[4] 90	[4] 89
Government of Astrakhan	14	14
Spain	52	
Barcelona	1	
Mijas	2	
Malaga	49	
Turkey: Constantinople	12	3

[1] July 14-25. [2] Dec. 8-Feb. 18, 1924. [3] Oct. 1-Mar. 8, 1924. [4] Oct. 19-Feb. 5, 1924.

In Table 1 the number of cases and deaths from plague (without distinction as to type) notified as having occurred in 1923 is set forth in considerable detail by countries and localities. In Figure 1 an attempt has been made to show the geographical distribution of the disease as well as the degree of its prevalence by countries.

Three extremely interesting points are suggested by this compilation of figures and the map, namely—

(1) The total incidence of the disease;

(2) Its world-wide prevalence; and

(3) The existence of not one or two but several, probably many, endemic areas.

Any assertion of what the total incidence of or mortality from plague in the world actually was during a given period of time would be unwarranted. At the same time, keeping in mind the incompleteness of the reports, it is possible to venture a crude estimate based on the information available. For the year 1923 a total of 255,362 deaths from plague were reported from all parts of the world. From those countries which reported both cases and deaths, a ratio of cases to deaths of about 1.5 was indicated. Even upon this rather high fatality rate (65 per cent), a total of 384,000 cases is indicated.

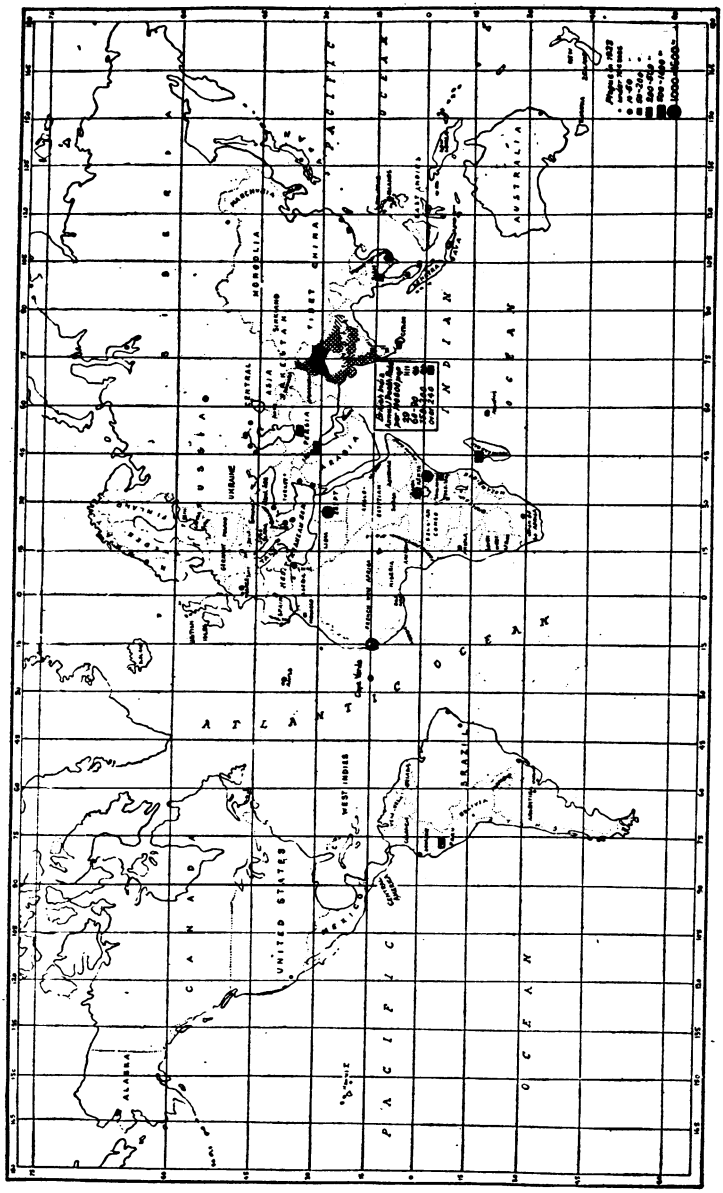

FIG. 1.—Redrawn from chart published in Epidemiological Intelligence No. 8, Health Section, League of Nations' Secretariat, Geneva

Probably it would be safe to say that not less than 400,000 cases of human plague occurred in the world during the year 1923, of which over 90 per cent were in India. Large as this figure is, it is almost insignificant when compared to the prevalence in certain prior years as, for example, 1903–4, 1904–5, or 1906–7 when over 1,000,000 deaths occurred in India alone each year. Even in 1917–18, the last great plague year in India, more than 800,000 people died in that country.

Yet, in spite of the concentration of its incidence in India, cases of plague were reported from nearly all parts of the world. No continent was entirely free from it, although only three cases were reported in North America in 1923 and one case (at Sydney) in Australia. It has been remarked that, upon the assumption that vectors of plague are in great measure limited to certain climates, the bubonic type of plague naturally is confined to certain latitudes. While it is perfectly clear that the disease is chiefly prevalent in certain areas of Africa and southern Asia and in islands in the same general latitude, it is equally evident from a glance at the map that epidemics actually occurred (and possibly endemic centers exist) in practically every well-inhabited quarter of the globe, except in those countries where a rigid quarantine has been maintained for many years or where international commerce touches lightly.

The fact that there is an endemic focus of plague in the United States possesses another significance than that of being a single source of danger; it is an evidence of the *spread of plague foci* in recent times. Four historic endemic areas in the world are usually referred to—the eastern and western slopes of the Himalayas, Arabia, and Uganda—from which the infection has spread and gained new footholds. The history of the disease is not easy to trace in the very incomplete records of the past, but the world-wide spread of the disease apparently has taken place in the last half century. More endemic centers have become established from which new foci may come. It is impossible, of course, from reports of cases or deaths alone to enumerate the present foci; careful surveys of the possible animal and insect carriers of the disease in all parts of the world would be necessary for accurate information. Even a rough interpretation of the present data is difficult because, without exhaustive research which would not always be profitable, it is impossible to distinguish between "sporadic" cases arising from endemic infection and "sporadic" cases that are imported. Yet if we adopt a crude but not wholly unreasonable limit and enumerate only the localities where, say, more than 10 cases or deaths were reported within the year or within recent years as possibly endemic, the number will be surprisingly large.

The extremely high prevalence in India, where 240,586 deaths were notified, and in Java, where 8,003 deaths were notified, marks these two countries as the principal plague areas at the present time. Other endemic plague areas with relatively high prevalence in 1923 were Egypt, Kenya, Senegal, Uganda, and the Azores (St. Michael Island), Madagascar, and Mauritius in Africa; Ecuador and Peru in South America; Ceylon, Java, French Indo-China, Persia, and Siam in Asia; and southeastern Russia in Europe. The endemic center in California was almost inoperative in so far as human beings were concerned.

Comparative data for several years previous to 1923 are given in Table 2 for most of the principal plague-infected localities.

TABLE 2.—*Prevalence of plague in most of the important endemic areas, 1919–1923*

[C=cases; D=deaths]

Country		1919	1920	1921	1922	1923
Africa:						
Algeria	C	4	32	195	19	6
Egypt	C	877	463	358	487	1,519
	D	473	269	153	228	725
Mauritius	C			375	98	139
	D			297	75	119
Nyasaland	C			2	0	7
Senegal	C	5,761	7,999	1,799	750	1,221
	D	4,276	5,879	1,241	428	846
Tanganyika	D			163	40	26
Uganda	D	1,022	1,732	5,871	1,305	914
Union of South Africa	C	0	12	33	10	20
	D	0	4	16	8	12
America:						
Ecuador—						
Guayaquil	C	66	187	270	56	94
	D	22	55	95	19	31
Hawaii	C	7	1	3	6	1
Peru	C	654	758	413	839	870
	D	340	392	205	379	408
United States: California	C	13	1	2	3	1
Asia:						
Ceylon	C				151	227
	D				100	207
Hongkong	C	464	138	150	1,181	148
	D			130	1,071	132
British India	D	74,284	99,368	69,682	76,369	237,057
Dutch East Indies: Java	D		8,918	9,727	10,943	8,003
French Indo-China	C			1,099	1,268	1,040
	D			947	1,093	844
Iraq	C			137	685	708
Japan	C	3	22	2	118	1
	D	2	16	0	79	1
Palestine	C			4	64	15
	D			1	19	5
Siam	C	229	172	130	135	167
	D	182	135	103	110	127
Straits Settlements	C	19	61	27	39	56
	D	16	55	27	39	60
Australia	C			106	46	1

India and Egypt were the only countries showing a greatly increased prevalence in 1923 over that of recent years; though for several localities a somewhat greater prevalence in 1923 than in 1922 is indicated. For India and Egypt certain additional details concerning plague prevalence are available.

The 1923 epidemic in India was the most severe since 1918, but the tendency for the past 20 years has been toward a greatly diminished prevalence. In annual comparisons for India it is customary to use the figures for the "plague years," i. e., the 12-month period from July 1 to June 30, since the close of the calendar year comes during the upward trend of the epidemic curve for most of the Provinces. Thus in Table 3 the plague mortality is shown by 5-year

PLAGUE MORTALITY IN INDIA, 1898-1923.

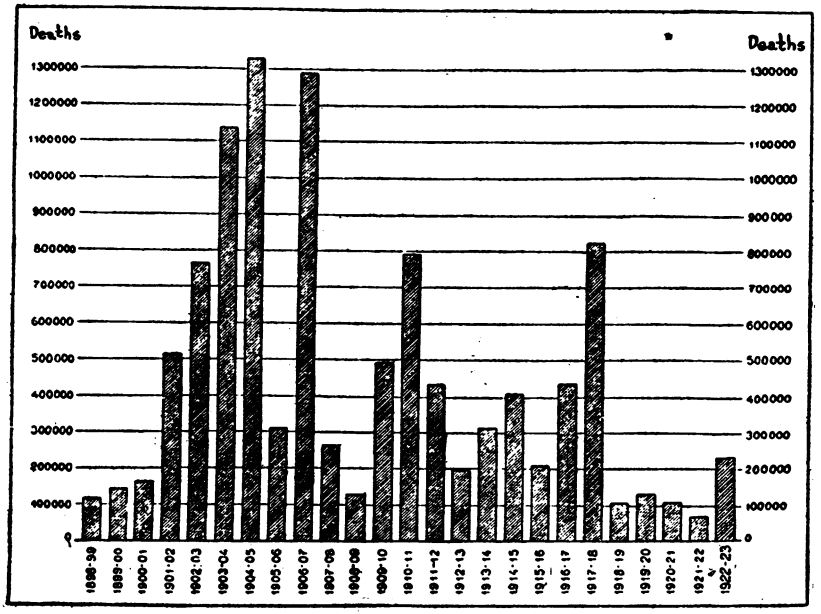

FIG. 2

periods for India as a whole, and the chief plague-infected Provinces from July, 1898, to June, 1923. The general decline is very marked both in the totals and the figures for the severely infected Provinces. Burma and Madras, the more mildly infected Provinces, show no decline in prevalence. Annual totals for the whole of India since the plague year 1898–99 are shown in the accompanying graph. The tendency for the severity of epidemics to decline in recent years and the wide variation in the severity of epidemics from year to year are both clearly shown.

TABLE 3.—*Plague mortality for quinquennial periods in certain Provinces of India and all of India, 1898–1923* [1]

Province	Population, census 1921	1898–1903	1903–1908	1908–1913	1913–1918	1918–1923	Total for 25 years
Punjab	20, 678, 393	439, 627	1, 647, 603	471, 350	433, 586	69, 340	3, 061, 506
United Provinces	45, 590, 946	115, 071	1, 002, 332	740, 288	528, 641	154, 763	2, 541, 095
Bombay Presidency	19, 338, 586	759, 778	824, 484	247, 185	463, 774	61, 080	2, 356, 301
Central Provinces	13, 908, 514	30, 828	141, 085	100, 175	106, 553	56, 505	435, 146
Bihar and Orissa	33, 998, 778	174, 449	345, 175	216, 351	219, 776	90, 482	1, 046, 233
Madras	42, 322, 270	24, 658	36, 948	34, 292	56, 782	50, 058	202, 738
Burma	13, 205, 564	16	26, 394	28, 453	35, 869	29, 081	119, 813
Total for all India	319, 075, 132	1, 707, 456	4, 325, 237	2, 042, 127	2, 179, 401	530, 170	10, 822, 331

[1] July 1 to June 30.

From Epidemiological Intelligence No. 8, Health Section, League of Nations' Secretariat, Geneva, 1924

TABLE 4.—*Deaths from plague in India, 1919–1923*

Province	1919–20	1920–21	1921–22	1922–23
Punjab	6, 552	1, 959	7, 876	41, 703
United Provinces	23, 483	25, 374	12, 039	76, 311
Bombay	12, 344	9, 926	4, 606	14, 821
Bihar and Orissa	18, 682	17, 202	8, 559	29, 519
Central Provinces	17, 972	4, 149	7, 561	23, 603
Madras	6, 875	18, 217	7, 179	11, 441
Burma	5, 464	3, 964	6, 517	8, 154
Bengal	77	58	136	80
Central India	3, 972	374	239	816
Hyderabad	20, 861	9, 404	733	9, 792
Mysore	5, 269	9, 675	6, 771	5, 797
Rajputana	42	849	4	
Delhi				2, 574
Jind State				1, 822
North-West Frontier Provinces				937
Bengalore				468
Kolhapur State				37
Total	121, 593	101, 151	62, 220	227, 815

From Epidemiological Intelligence No. 8, Health Section, League of Nations' Secretariat, Geneva, 1924.

The annual totals for several Provinces or administrative areas of India for the 4 most recent years are shown in Table 4. It is evident from these figures that plague has not been epidemic in the same year in all Provinces, but that each Province has shown a rather marked individual variation in severity. Thus the 1923 epidemic was severe, particularly in the Punjab and United Provinces. The complicated situation which is met with in a heavily infected area such as India has been well discribed in a few words by Dr. Norman White, after years of experience in India, as follows:

In most parts of India, rainfall in excess of normal at certain seasons of the year, with the consequent increased humidity that this entails, ensures conditions favourable to the epidemic evolution of plague. High atmospheric humidity at certain temperatures ensures conditions favourable to the development of the rat flea; it also, indirectly, favours the epidemic evolution of plague in several ways. As an example of the factors that influence the correlation between high atmospheric humidity and plague mortality, the following may be cited: In the Punjab and the United Provinces it is a common practice to hold up stocks of grain until the winter rains are well established. If the rains be plentiful (with

consequent high humidity) and the agricultural prospects promising, large quantities of grain are liberated and exported at a time when meteorological conditions are most favourable to the spread of plague. The added facilities thus afforded for the rapid diffusion of plague infection, by means of grain coming from and going to the rat-infested granaries of northern India, are of very great importance.

Taking all facts into consideration, there is unmistakable evidence that the prevalence of bubonic plague in India is on the wane. The plague situation in India is not so unmanageable now as it was a decade ago. The danger spots in each Province are known—places in which infection persists, and from which infection spreads year after year. The dangers inseparable from the rat-infested markets and grain stores, which, in spite of plague experience, still persist in every province, to the continued danger of the towns and villages concerned, are beginning to be realised. The uncontrolled traffic in grain and other rat-favoured merchandise still continues, however, to exercise its baneful influence, though each year provides striking evidence of the harm done. All these things demand attention if plague is ever to be eradicated from India and India kept plague free.

Of the 1,519 cases reported in Egypt in 1923, all but 18 were among the natives and over 60 per cent in the Provinces of Upper Egypt, chiefly Minia, Assiout, and Ghirga. Plague cases were notified in the important cities of Egypt as follows: Alexandria 67, Port Said 51, Suez 47, and Cairo 2. Most of the cases were bubonic in type, but 120 fatal cases of secondary pneumonic plague were reported.

Southeastern Russia has some important endemic foci of plague. In the Kalmuk region 11 cases and 7 deaths were reported in July; then no further cases were reported until a second outbreak between December 8, 1923, and February 18, 1924, when 30 cases and 16 deaths were reported. In the Government of Astrakan, 14 fatal cases were notified between December 24, 1923, and February 16, 1924. In the Ural region, 90 cases with 89 deaths were reported from October 19, 1923, to February 5, 1924. In the Kirghiz Republic (Government of Bukejev) 334 cases with 310 deaths were notified between October 1, 1924, and March 8, 1924. The principal epidemic in the previous year was reported in the Government of Bukejev, with 124 cases and 120 deaths notified from December 2, 1922, to February 28, 1923.

The fact that Peru is at present an important endemic area is not often commented upon in the literature, yet 408 deaths and 870 cases were reported in 1923 from eight localities, the principal reported centers being Lima, Libertad, Piura, and Cajamarca.

It has been suggested that the comparatively high ratio of cases to deaths indicates the occurrence of a relatively mild form of plague, but this does not necessarily follow. It may be due to a better system of reporting and more effective treatment, and there seems to be very good evidence that these factors must be considered

in attempting to analyze the reports of plague in both Peru and Ecuador.

The seasonal incidence of the disease differs. Even within India there are marked differences among the areas included in the reports. Taking the quarterly totals (Table 5) of plague deaths for the Provinces, where the disease has been most prevalent for 25 years as well as for 1923, it appears that in the eastern and north central section (Burma, Bengal, Bihar and Orissa, and the United Provinces) the season of greatest prevalence is clearly in the first half of the year, usually in the early spring; in the central, southern, and western section (Madras, Bombay, and the Central Provinces) the peak of incidence is considerably later in the year, usually in the autumn and the winter. For India in general a relatively low summer preva-

CASES OF PLAGUE NOTIFIED IN EGYPT, 1921-1923

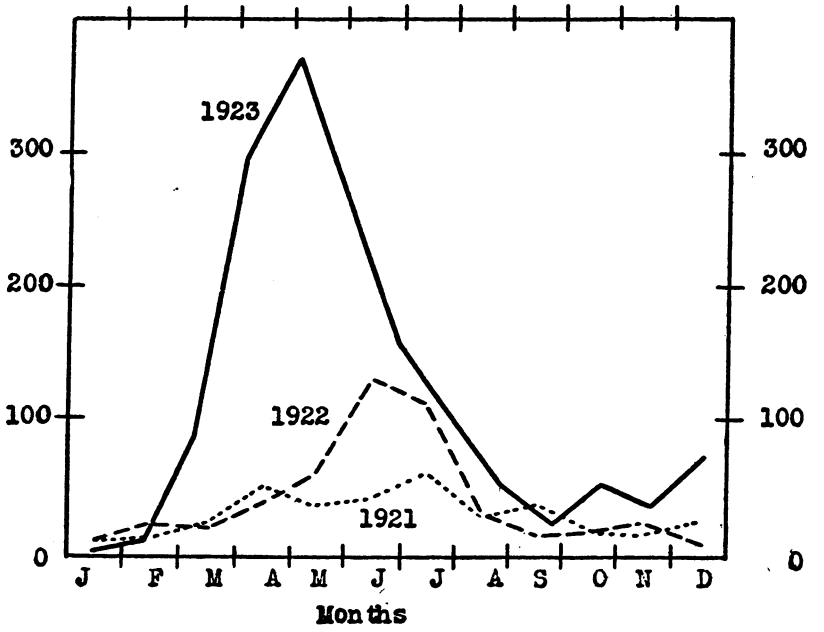

FIG. 3

lence of plague is indicated. This is in marked contrast to the situation in Egypt as shown by the graphs for 1921, 1922, and 1923 in Figure 3. Again, by reference to Table 6, we find that in Uganda, Kenya, and Tanganyika the summer season shows the highest incidence of the disease, although the peak did not occur in all of these countries in the same month. Even in such widely separated localities as Iraq and Hongkong we find a rather similar seasonal distribution. In Peru, on the other hand, the highest incidence occurred in January and February, 1923.

TABLE 5.—*Seasonal distribution of deaths from plague in India*

Province	Quarters of 1923				Total 1923	Quarterly average for 25 years				Annual average for 25 years
	I	II	III	IV		I	II	III	IV	
Bengal	.....	80	2	.....	82	1,187	1,354	137	111	2,789
Bihar and Orissa	20,357	7,131	119	1,215	28,822	27,261	10,031	591	3,937	41,821
United Provinces	53,239	16,442	303	4,104	74,088	59,615	30,276	1,205	10,459	101,555
Punjab	7,496	33,743	1,322	7,162	49,723	38,687	77,011	880	6,203	122,781
Central Provinces	18,241	1,843	2,056	4,157	26,297	9,372	1,302	1,748	5,091	17,514
Madras	5,286	884	3,123	2,426	11,719	3,314	342	1,564	2,901	8,121
Bombay	6,241	3,103	10,052	12,769	32,165	28,736	9,680	21,667	34,862	94,946
Burma	4,626	1,094	630	1,278	7,628	2,496	981	728	567	4,772

From Epidemiological Intelligence No. 8, Health Section, League of Nations' Secretariat, Geneva, 1924.

TABLE 6.—*Seasonal incidence of plague in 1923, by months*

[C=cases; D=deaths]

Country		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Africa:													
Algeria	C	0	0	0	0	2	0	0	3	0	0	1	0
Mauritius	C	18	6	8	2	6	4	3	8	8	25	26	25
	D	17	5	8	2	6	3	3	6	7	21	21	20
Tunis	C	0	0	0	29	0	0	1	0	0	0	1	0
Uganda	C	73	27	18	7	70	112	172	114	104	97	94	60
	D	73	27	15	5	66	114	164	107	104	94	89	56
Union of South Africa	C	0	0	0	0	0	0	0	0	0	7	4	9
	D	0	0	0	0	0	0	0	0	0	7	1	4
America:													
Peru	C	205	150	128	136	67	75	29	11	13	16	25	15
	D	85	72	55	62	24	49	15	5	8	8	19	6
Ecuador	C	5	14	15	1	1	0	5	13	8	15	7	42
	D	1	4	6	2	1	0	5	2	1	6	3	11
Asia:													
Dutch East Indies	D	1,039	818	685	487	471	441	469	507	578	902	942	1,064
Iraq (Mesopotamia)	C	3	10	18	100	375	152	29	2	2	1	1	15
	D	1	8	8	51	236	86	9	1	1	0	0	12
Palestine	C	0	0	0	0	2	7	3	1	2	0	0	0
	D	0	0	0	0	2	1	0	0	1	1	0	0
Siam	C	38	37	17	22	25	12	9	4	0	0	0	3
	D	32	22	15	15	21	10	6	4	0	0	0	2

BY FOUR WEEKS ENDED—

Country		Jan. 27	Feb. 24	Mar. 24	Apr. 21	May 19	June 16	July 14	Aug. 11	Sept. 8	Oct. 6	Nov. 3	Dec. 1	Dec. 29
Africa:														
Egypt [1]	C	3	11	89	295	371	267	155	102	48	21	51	35	71
	D	2	7	46	148	221	116	60	36	15	10	25	10	29
Kenya and the East African Republic	C	0	16	2	2	8	336	281	128	23	83	28	48	135
Tanganyika Territory	C	7	4	0	0	1	2	0	20	0	0	0	5	0
	D	6	4	0	0	1	2	0	12	0	0	0	1	0
Asia:														
Ceylon	D	21	25	11	16	10	9	17	7	23	16	10	11	24
Hongkong	C	2	1	2	10	13	58	36	17	6	3	0	0	0
	D	0	1	1	9	7	50	38	18	2	6	0	0	0
Malay States (Federated) [2]	C	0	0	0	0	0	11	0	0	0	0	0	0	0
	D	0	0	2	1	1	6	0	0	0	0	0	0	0
Singapore, Penang, Malacca	D	1	5	7	9	4	5	4	6	4	5	1	2	3

[1] Period ends one day later. [2] Period ends one day earlier.

Most of the plague outbreaks reported were of the bubonic type, and it is difficult to get accurate information as to cases of true pneumonic type. Where an epidemic of bubonic plague is in prog-

ress and some pneumonic cases are reported, they are very likely to have been bubonic plague with secondary pneumonic complications, as was the case in Egypt. The 90 cases of plague reported in the Ural region of Russia in the winter of 1923–24 were definitely stated to be of pneumonic type, as was the outbreak in the Bukejev government of the Kirghiz Republic in the winter of 1922–23 (124 cases). In February, 1923, an epidemic of plague of pneumonic form was reported at Macassar, Celebes Island, but no details are available. One fatal case of pneumonic plague was reported at Honokaa, Hawaii, one in Portuguese West Africa, and two were reported at Las Palmas, Canary Islands. Nearly every month a portion of the cases reported from Madagascar are stated to be pneumonic plague. It is obvious that pneumonic plague epidemics have been relatively infrequent in recent years and that no exact information concerning the amount of the pneumonic type of the disease can be obtained from the available reports.

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SOME PRELIMINARY OBSERVATIONS FROM A STUDY OF WATER FILTRATION PLANTS ALONG THE OHIO RIVER[1]

By H. W. STREETER, Sanitary Engineer, United States Public Health Service

Introductory

At a session of this conference held at Columbus a year ago, the writer had the privilege of describing some studies then being undertaken by the United States Public Health Service for the main purpose of determining what are the practical limitations in the bacterial efficiency of current water purification processes, having in mind

[1] From the United States Public Health Service Laboratory for Investigation of Stream Pollution, Cincinnati, Ohio. Presented at the Fourth Ohio Conference on Water Purification, Cincinnati, November 14, 1924.

particularly those dealing with highly polluted river waters. An important part of this study has consisted of a survey of the actual performance of 10 municipal filter plants of the rapid sand type located directly on the Ohio River and taking their raw water supplies from that stream. The collection of data in connection with this phase of the study, which has been in progress throughout the past year, has been completed recently, and a preliminary analysis of the data has given some results which are considered of sufficient interest to members of the conference to merit presentation at this time. In this connection it should be emphasized, however, that conclusions of a final nature can not be drawn from the data until their analysis has been completed and the results have been compared with those obtained from other surveys and experimental studies now in progress.

The 10 plants included in the Ohio River group may be divided roughly into two subgroups according to the extent of treatment given the water prior to its filtration. In the first subgroup, which we shall designate as Group I, are five plants, employing sedimentation in two separate stages; three of them (at Steubenville, Cincinnati, and Louisville, respectively), using primary plain sedimentation followed by coagulation and secondary sedimentation, and the remaining two plants (at Ironton and Portsmouth) using sedimentation with coagulation at both stages. The second subgroup of plants, Group II, comprises five plants employing coagulation followed by a single stage of sedimentation, these plants being located, respectively, at East Liverpool, Huntington, Ashland, Evansville, and Henderson. Aside from certain structural differences, these latter five plants are very similar to each other in type.

The data collected from each plant have comprised daily laboratory and operation records such as are ordinarily included in the monthly summaries transmitted by plants in Ohio to the State department of health. A special effort has been made to secure comparable laboratory data, and with minor exceptions it is believed that the effort has been more than reasonably successful.

The laboratory data to which statistical treatment has been given thus far have been the 20° C. and 37° C. plate counts, both on standard agar medium, and the *B. coli* index, determined in the raw water and at each successive stage of purification up to and including the final chlorinated effluent. These data have covered a continuous period of a full year for all plants except the one at Henderson, Ky., where unforeseen circumstances necessitated discontinuing observations at the end of seven months. For all plants except the one at Louisville, Ky., the year of observation started on July 1, 1923, and ended on June 30, 1924. In the case of Louisville the year began and ended two months later, owing to delay in completing the necessary arrangements for collaboration. The discussion which follows

will be devoted almost entirely to what the bacteriological data have thus far revealed as to the conditions of raw water pollution now being encountered at the several Ohio River plants and as to the character of effluents being produced from such water.

RAW WATER CONDITIONS

Reference to Table 1 will show the average bacterial character of raw water delivered to each plant; likewise the extreme variations in monthly average figures obtained during the period of observation. From the average *B. coli* index figures it would appear that the highest bacterial pollution of the river at water-works intakes is encountered at Ironton, an indication which is borne out by the 20° C. and 37° C. plate counts. The average *B. coli* index of the raw water at Ironton was 14,900 for the year covered by the observations. The *B. coli* index figures and the 37° C. counts, taken together, indicate two other zones of relatively high bacterial pollution, namely, at East Liverpool and at Evansville.

TABLE 1.—*Averages, maxima, and minima of monthly mean bacterial counts observed in the raw water supplies of 10 Ohio River plants during the year, July 1, 1923, to June 30, 1924*

Plant	48-hour agar count, 20° C			24-hour agar count, 37° C			*B. coli* index per 100 c. c.		
	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum
East Liverpool				4,420	8,760	1,500	2,680	11,600	18
Steubenville	[1] 1,650	[1] 2,400	[1] 656	760	1,690	130	330	1,010	48
Huntington				1,590	3,450	550	2,370	5,280	500
Ashland				1,040	1,490	400	11,500	41,700	1,000
Ironton	19,600	46,600	4,000	4,190	10,000	1,420	14,900	23,900	9,930
Portsmouth	9,910	32,100	1,410	1,350	3,650	600	3,490	6,200	800
Cincinnati	18,300	70,500	455	1,000	3,750	150	2,980	9,910	170
Louisville [2]	12,500	25,800	1,100	1,890	3,670	735	2,220	5,140	90
Evansville	15,800	65,600	720	4,980	11,100	2,160	3,940	7,600	1,270
Henderson [3]				5,290	9,610	2,860	1,740	3,250	850

[1] Feb.-June, 1924. [2] Sept., 1923-Aug., 1924. [3] July, 1923-Jan., 1924.

The factors [1] of direct sewage pollution, tributary inflow, and natural purification, which determine the ranges of pollution in successive zones of the Ohio River are so complex that they can not be discussed in a brief space. Moreover, as this paper is concerned chiefly with the relations between quality of raw water and the efficiency of artificial processes of purification, it is unnecessary to enter here into any discussion of these matters further than to state that the intakes for all the cities included in this study are located well above pollution from the cities which they serve and deliver water of as good quality as is obtainable in the zones of the river

[1] For a discussion of these factors see Public Health Bulletin No. 143, A Study of the Pollution and Natural Purification of the Ohio River. Part II: Report on Surveys and Laboratory Studies (especially pp. 68-75 and 324-335).

which are accessible. It is also worthy of note that the raw waters at Portsmouth, Cincinnati, Louisville, and Evansville are roughly, of similar quality, as indicated both by average and maximum counts.

For individual months of the period the range of variation in average bacterial content of the rivers is shown to be high. East Liverpool, with a maximum monthly *B. coli* index of 11,600 and a minimum of but 18, displays the greatest variation, though at other points, notably at Ashland and Ironton, higher maxima are noted. For individual days the raw water at Ashland shows the greatest

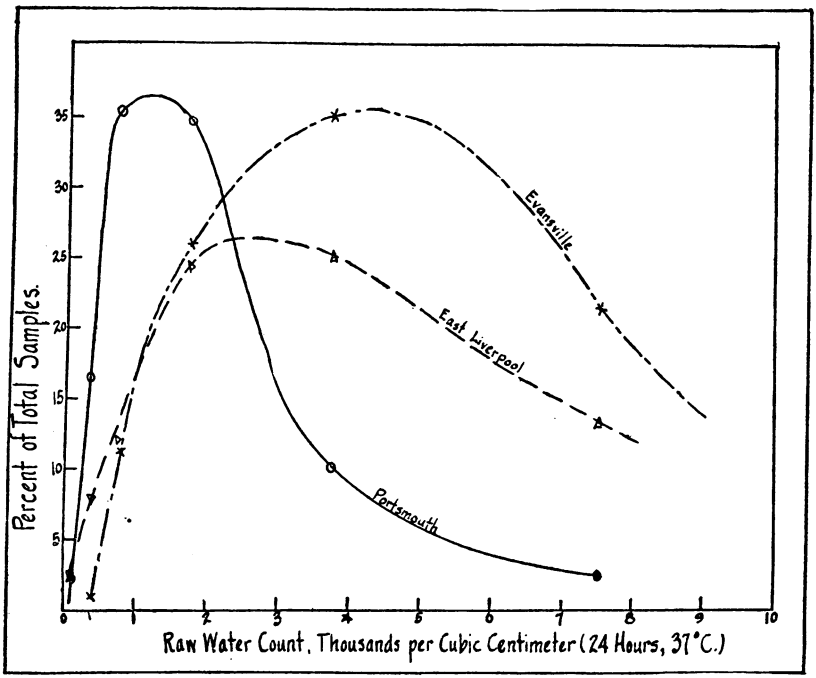

FIG. 1.—Frequency curves showing percentages of raw water samples giving bacterial counts of varying magnitudes

frequency of excessively high *B. coli* content, 7.4 per cent of the samples giving an index of over 100,000. The raw waters at East Liverpool, Ashland, Ironton, Portsmouth, Cincinnati, and Louisville all show more than 10 per cent of the samples having a *B. coli* index exceeding 10,000, the Ironton figure being 32 per cent.

In Figure 1 the character of frequency distributions obtained by plotting the percentages of the total number of raw water samples giving counts within specified ranges is illustrated by curves plotted from 37° counts on the raw water at East Liverpool, Portsmouth, and Evansville. These distributions, which are characteristic not only of the bacterial content of the raw water but also of that of the effluents from various stages of purification, are practically all of

the "skew" type illustrated in Figure 1. If, instead of plotting the actual counts as abscissae, we plot their logarithms, we obtain curves approaching very closely the symmetrical "normal frequency" curve, as shown in Figure 2. A number of other natural phenomena, such as rainfall, for example, tend to follow the same kind of frequency distribution.

The practical significance of this observation lies in the opportunity it affords for studying the possibilities for predicting on the basis of present observations, the frequencies with which the bacterial

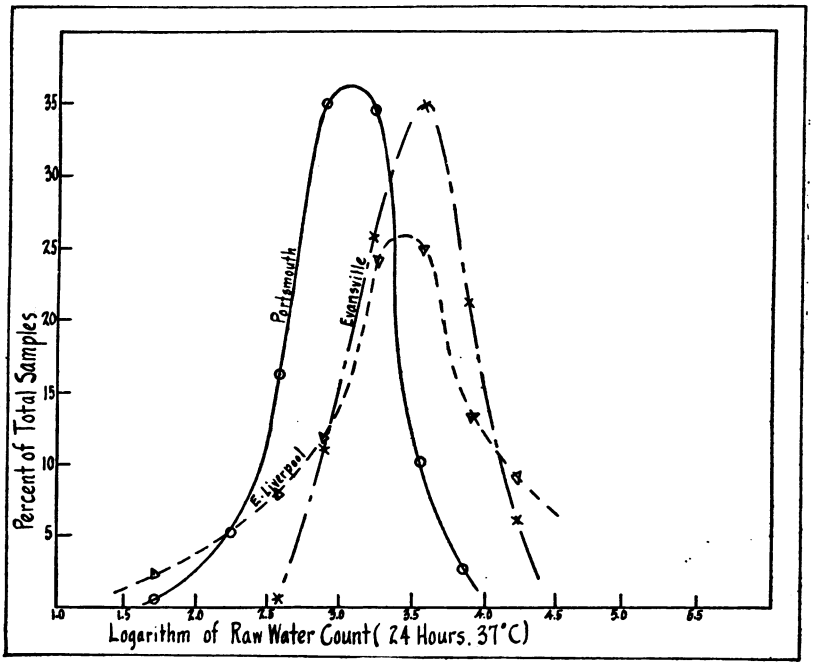

FIG. 2.—Curves of Figure 1 replotted with logarithms of raw water bacterial counts as abscissae

content of a given raw water or effluent may be expected to exceed certain specified limits as its average value increases from year to year. Without entering into a detailed discussion of this interesting phase of the subject, which would require too much space for the scope of the present paper, it may be noted that waters the bacterial content of which distributes itself in accordance with the type of frequency curve mentioned, tend to become disproportionately more dangerous as their average bacterial content increases, for the reason that the frequency with which their bacterial count exceeds certain higher limits may increase at a much faster rate than does its average value. This observation is in line with recent experience at a number of Ohio River plants, where the frequency of occurrence of raw water samples giving bacterial counts in the higher ranges has multiplied out of proportion to increases in the yearly average count. This

question is being given careful study in connection with the analysis of data from the various Ohio River and other plants, with a view to determining, if possible, whether there exists a critical limit in the average bacterial content of a raw water or an effluent beyond which a disproportionately rapid deterioration in its quality may be expected to occur during a fairly large proportion of a given period of time.

PURIFICATION EFFICIENCIES

Comparison of the various Ohio River plants with respect to their efficiencies of bacterial purification indicates some rather wide differences in a few individual cases, though on the whole the agreement between plants of similar type is shown to be reasonably close. This is particularly true of efficiencies measured in terms of the 37° count and the *B. coli* index, the 20° count giving somewhat less uniform figures.

In order to summarize in condensed form the average purification efficiencies observed for the group of Ohio River plants, taken as a whole, Table 2 has been prepared, giving the average percentages of bacteria *remaining* in the effluent from each stage of purification, as referred, first, to the raw water content and, second, to the influent water of that particular stage. The figures have been expressed as "per cents remaining" rather than as "per cents removed," in order to bring out more strikingly certain differences in the small quantities. The corresponding "per cent removed" is readily derivable from the figures as given, being 100 per cent minus the figure in each case.

TABLE 2.—*Average purification efficiencies of 10 Ohio River plants during observational year, as shown by percentages of raw and of influent water constituents, respectively, remaining in the effluent from each stage of purification*

	Per cent of raw water constitutent in—				Per cent of influent constitutent in—			
	Settled water	Applied water	Filter effluent		Settled water	Applied water	Filter effluent	
			Unchlorinated	Chlorinated			Unchlorinated	Chlorinated
Turbidity	33.8	8.9			33.8	20.7		
48-hour agar count, 20° C	33.0	10.8	4.1	0.72	33.0	26.3	38.3	18.8
24-hour agar count, 37° C	26.6	[1] 13.8	[2] 1.8	[3] 0.19	26.6	25.6	14.7	10.3
B. coli index	27.7	13.9	0.41	0.019	27.7	21.3	2.8	10.0

[1] Average for Group I plants=9.4 per cent; for Group II plants=18.2 per cent.
[2] Average for Group I plants=1.6 per cent; for Group II plants=1.9 per cent.
[3] Average for Group I plants=0.20 per cent; for Group II plants=0.19 per cent.

Based on the percentages derived from the 37° counts, as referred to the influent water, the bacterial efficiency of primary sedimentation is indicated as being about the same as that of secondary sedimenta-

tion, the "percentage remaining" figures being, respectively, 26.6 per cent and 25.6 per cent for the two stages, or the corresponding "percentages removed," 73.4 per cent and 74.4 per cent, respectively. Filtration, with a residual of 14.7 per cent and postfilter chlorination, with 10.3 per cent, show a slightly higher intrinsic efficiency than do the preliminary sedimentation stages, though the latter, of course, remove by far the greater proportion of the bacteria initially present in the raw water.

With one exception, the percentages derived from the 37° counts agree very closely with those based on the *B. coli* index. The exception noted refers to the much lower percentage (2.8 per cent) of *B. coli* in the filter effluent, when referred to the filter influent, as compared with the corresponding percentage (14.7 per cent) based on the 37° count. It is worthy of note that this discrepancy is found in the filtered water percentages for every individual plant in the study group, and at no other stage of purification is it manifest.

Based on the 37° count, the percentage of raw water bacteria remaining in the applied water averages 9.4 per cent for the plants of Group I, employing double sedimentation, and 12.8 per cent for those of Group II, employing single sedimentation. The advantage possessed by the former in the efficiency of removal of bacteria prior to filtration is thus shown to be considerable. Comparison of the percentages in the filtered and chlorinated effluents, however, indicates that this advantage does not extend beyond the filtration stage, at least to any marked extent. The percentages of raw water bacteria in the filter effluent are 1.6 per cent for Group I plants and 1.9 per cent for Group II plants, whereas in the final chlorinated effluent they are 0.20 per cent and 0.19 per cent, respectively. (*B. coli* results).

As regards the relation of bacterial purification efficiencies to the bacterial content of the raw or the influent water, the data thus far have indicated that such a relation exists though not always well defined nor manifest at every stage of purification. In general, the over-all percentage efficiency of purification tends to increase with the raw water count at a diminishing rate, with a tendency to become asymptotic to a fairly well-defined maximum value, apparently representing the upper limit of efficiency attainable by a given process. The type of relationship is illustrated in Figure 3 by two curves, one based on average data for three selected plants of Group I and the other on similar data for two plants of Group II, showing the decrease in the percentage of raw water bacteria remaining in the final effluent as the raw water count (37°) increases. The tendency for the residual percentages to reach a definite minimum is marked in both cases.

BACTERIAL QUALITY OF EFFLUENTS

As regards the average bacterial quality of effluents produced by the 10 Ohio River plants, the results of *B. coli* tests indicate that with the aid of chlorination a majority of the plants have been delivering effluents satisfying the present Treasury Department standard,[1] when considered as an average over the entire year. The highest average *B. coli* index for a single month recorded for any one of the plants was 2.2 per 100 c. c., two other plants having maxima of 1.8 and 1.9, respectively.

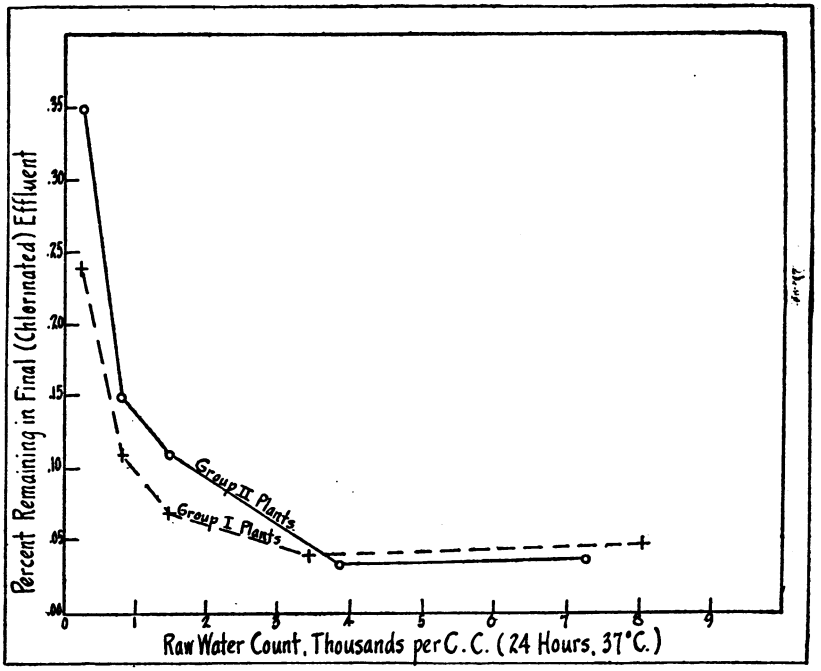

FIG. 3.—Relation between raw water bacterial counts and percentages of raw water bacteria remaining in final effluent

It is of interest to note the extent to which the same chlorinated effluents would satisfy, or fail to satisfy, the revised [2] Treasury Department standard with respect to average density of *B. coli*. In this case we find that three of the 10 plants delivered chlorinated effluents giving a positive test for the *B. coli* group in more than 10 per cent of the standard 10 c. c. portions tested (the actual figures being 37 per cent, 12.2 per cent, and 15.8 per cent, respectively). At

[1] See reprint No. 232, from the Public Health Reports, Vol. 29, No. 45, Nov. 6, 1914.

[2] The revised Treasury Department standard, as yet unpublished, specifies, as to bacterial content, substantially: (*a*) that not more than 10 per cent of the total number of standard 10 c. c. portions tested shall show the presence of organisms of the *B. coli* group, and (*b*) that not more than 5 per cent of all the standard samples shall show three or more positive tests out of the five 10 c. c. portions comprised in any single sample.

two of these three plants, more than 5 per cent of the samples (16.2 per cent and 6.8 per cent, respectively) gave three or more positive tubes out of each five tubes tested. Seven of the ten plants, therefore, delivered chlorinated effluents satisfying both provisions of the revised Treasury Department *B. coli* standard, and one of the remaining three plants satisfied the requirement as to the percentage of standard samples giving not more than three out of five positive 10 c. c. portions.

As regards the quality of the unchlorinated filter effluents, a considerably less favorable record is indicated. Taking the mean of the 12 monthly average *B. coli* index numbers as a measure of quality, we find that of the nine plants reporting results on the unchlorinated filter effluent, five gave an average index greater than 2.0 per 100 c. c. and seven an index greater than 1.0 per 100 c. c. All but one of the nine plants gave one or more monthly average indices greater than 2.0 and all of them exceeded an index of 1.0 in one or more months.

To sum up this phase of the matter, a large majority of the plants appear to be able to deliver chlorinated filter effluents meeting either the original or the revised Treasury Department standard with respect to *B. coli* content, when their record is considered for periods of a month or a year. Practically all of them, however, are unable to meet the standard without the aid of chlorination; that is to say, filtration processes alone, whether used in conjunction with single or with double coagulation and sedimentation, are unable to cope successfully with the present density of bacterial pollution of the Ohio River, if the measure of success be taken as the ability to meet either the original or the revised Treasury Department *B. coli* standard.

RELATION OF BACTERIAL CHARACTER OF EFFLUENTS TO THAT OF INFLUENTS

In a preliminary study of the performance of two Ohio River filtration plants, made by the Public Health Service several years ago,[1] evidence was found of an interesting and highly significant relation between the bacterial content of effluents delivered by water purification processes and the corresponding bacterial content of their influents. Thus it was found that whenever an increase or a decrease in the bacterial content of the influent occurs, there is a general tendency toward a corresponding, though not necessarily proportionate, change in the bacterial content of the effluent, either from a purification plant when considered as a whole, or from a given stage of the purification process. The practical importance

[1] The Loading of Filter Plants. H. W. Streeter. Jour. Am. W. W. Assoc., March, 1922; also reprint No. 737 from the Public Health Reports, Mar. 31, 1922, pp. 741-753.

of this relation, if confirmed as a matter of more general experience, lies in the possibility it offers for forecasting with some precision the limit of raw water pollution under which a purification plant of given type may be expected to deliver consistently an effluent of specified bacterial quality. To those who are concerned with the control of the pollution of streams used as sources of purified municipal water supplies, this question is one of primary importance in considering the specific limitations which must ultimately be imposed upon pollution of the raw water.

The results of the present survey of Ohio River plants have confirmed the existence of this relation in the case of every individual plant included in the survey group. In Tables 3 and 4 are given the results, in terms of the 37° count and the *B. coli* index, respectively, obtained by combining separately the data for plants of Group I and Group II into a table showing the corresponding bacterial counts observed at each successive stage of purification when grouped and averaged according to the individual raw-water counts falling within specified ascending ranges. With three exceptions in the two tables combined, it is noted that an increase in raw-water count is consistently accompanied by an increase in the effluent count at each successive stage of purification. The three exceptions noted are due principally to the undue weight unavoidably given to an irregular result from a single plant; in fact two of them (in Table 4) are based on observations available only at a single plant.

TABLE 3.—*Relation between raw-water count and corresponding counts in effluents at successive stages of purification*

[24-hour agar count, 37° C.]

Raw water count range	Average bacterial count per c. c.				
	Raw	Settled	Applied	Filtered	Disinfected
Group I plants					
0–500	221	68	29	3.1	0.5
501–1,000	826	228	108	12.1	1.0
1,001–2,000	1,480	328	123	7.8	1.1
2,001–5,000	3,440	739	232	18.4	1.3
Over 5,000	8,040	1,060	251	22.5	4.0
Group II plants					
0–500	286	----------	92	17	1.0
501–1,000	793	----------	181	25	1.5
1,001–2,000	1,530	----------	376	49	3.0
2,001–5,000	3,390	----------	626	58	5.9
Over 5,000	9,460	----------	1,950	278	22.4

TABLE 4.—*Relation between raw water B. coli index and corresponding indices at successive stages of purification*

[*B. coli* index per 100 c. c.]

Raw water B. coli index range	Average B. coli index per 100 c. c.				
	Raw	Settled	Applied	Filtered	Disinfected
Group I plants					
0–10	10	6.4	4.3	1.3	0.12
10–100	100	64	39	2.1	.20
100–1,000	1,000	361	126	3.8	.31
1,000–10,000	10,000	1,590	301	4.2	.59
Group II plants					
0–10	10	----------	7.9	2.6	1.2
10–100	100	----------	72	3.5	.68
100–1,000	1,000	----------	480	4.4	.96
1,000–10,000	10,000	----------	2,640	4.9	1.5
10,000–100,000	100,000	----------	1,800	6.2	3.5

An inspection of the *B. coli* figures in Table 4 shows that plants of the more highly elaborated type of Group I can be expected usually to deliver chlorinated effluents meeting the revised Treasury Department standard with a raw-water *B. coli* index in excess of 10,000 per 100 c. c. For plants of the Group II type, the limiting raw-water index would appear to be slightly in excess of 1,000 per 100 c. c.

In citing these figures, it should be emphasized that they are merely tentative and subject to the possibility of further revision after a more detailed analysis of the data has been completed. It may prove desirable, for example, further to subdivide the plants of Group I into two subgroups, one being represented by the plants at Ironton and Portsmouth, which employ not only double sedimentation but continuous double coagulation, and the other by plants of the Steubenville-Cincinnati-Louisville type, which use double sedimentation but not double coagulation. A preliminary comparison of the data from these two subgroups of plants has clearly indicated the advantage of double coagulation as a measure for further increasing the bacterial purification efficiency of plants employing primary plain sedimentation.

The limitations of space do not permit an elaboration of some other interesting angles of this study; for example, as to what it has thus far shown concerning the relation of raw-water turbidity to bacterial-purification efficiency. The relation appears to be a definite one, though the extent to which it is influenced by the fact that increased amounts of coagulants are usually applied when the raw-water turbidity increases, has not been given a sufficiently thorough study to justify any conclusions as to whether the mere presence of turbidity or some other contingent factor, such as coagulant dosage, has the more direct influence on the percentage efficiency of bacterial removal.

CONCLUSION

From the data thus far analyzed, the following definite conclusions may be drawn with reference to water-purification plants treating Ohio River water:

1. With the continuous and effective use of chlorine disinfection as a reinforcement to filtration, the Ohio River plants, considered as a group, apparently are fully able to deliver effluents of such bacteriological quality as is generally considered safe for a very large proportion of the time. Without the aid of chlorination, they undoubtedly would be unable to do so.

2. The type of plant represented by Group I, employing two stages of sedimentation, is more efficient in bacterial removal than the type represented by Group II, employing but a single stage of sedimentation. Of the Group I type, plants employing coagulation with both stages of sedimentation are more efficient than those using plain sedimentation as the primary stage.

3. Earlier observations as to the existence of a well-defined relation between the bacterial content of effluents and that of influents of water-purification processes have been confirmed by the results obtained from every individual Ohio River plant thus far studied. As far as the Ohio River plants included in this study are concerned, therefore, the possibility exists for forecasting the extent of deterioration in their effluents from a given increase in raw-water pollution, with plants of the highest efficiency here represented.

In considering the first of these three conclusions it may well be said that while the extremely high bacterial efficiency shown by the various Ohio River plants during the past year's survey has been an encouraging sign, their inability, as a group, to produce bacterially satisfactory effluents without the aid of chlorination virtually means that the last line of defense as at present established has been reached in the purification of Ohio River water. The next line of defense which suggests itself is long-time preliminary storage, but this measure would be costly in all cases and probably impracticable in some instances; hence the problem of meeting further encroachments of pollution in the Ohio River has definitely entered the phase when serious attention must be given to some plan for restricting further increase in the sewage pollution of the river.

VITAL STATISTICS FOR NEW YORK CITY, 1924

The following is taken from the Weekly Bulletin of the Department of Health of the city of New York for January 10, 1925:

The health of the city for the year 1924 was exceptionally good. The number of deaths reported during the year was 71,252, as com-

pared with the average for the immediately preceding five years of 73,432, a decrease of 2,180 deaths.

Those causes which showed a materially decreased mortality were influenza, a decrease of 1,696; tuberculosis of the lungs, 1,220; diarrheal diseases under five, 1,023; diphtheria and croup, 248; scarlet fever, 143; acute respiratory diseases, 538; and tuberculous meningitis, 100. Those causes showing materially increased mortalities were as follows: Chronic degenerative diseases, 1,906, which includes chronic organic heart diseases, chronic Bright's disease, diseases of the arteries, and cerebral apoplexy; cancer, an increase of 642 deaths; typhoid fever, 48 deaths; poliomyelitis, 26; appendicitis, 94; cirrhosis of the liver, 22; accidental deaths, 253; homicides, 63; and suicides, 34.

The great saving of life was under five years of age, there being 2,459 fewer deaths than in the five-year average. The great loss was at ages 65 years and over, there having been exactly 1,000 more deaths reported in 1924 than in the five-year average.

In all, 32,950 people died in institutions; 22,903 in tenements and apartment houses; 12,561 in private dwellings, and 634 in hotels.

Mortality from principal causes, 1924, and corrected average for preceding five years

	Corrected average preceding five years	Deaths reported year 1924	Increase	Decrease
Total deaths, all causes	73,432	71,252		2,180
Typhoid fever	136	184	48	
Measles	489	506	17	
Scarlet fever	223	80		143
Whooping cough	334	382	48	
Diphtheria and croup	962	714		248
Influenza	2,245	549		1,696
Pulmonary tuberculosis	6,000	4,780		1,220
Other tuberculous diseases	908	807		101
Cancer	5,915	6,557	642	
Diseases of arteries	3,014	3,667	653	
Organic heart disease	12,854	15,134	2,280	
Pneumonia (all forms)	9,315	9,152		163
Diarrheal diseases under 5 years	2,206	1,183		1,023
Bright's disease and nephritis	4,760	3,701		1,059
Puerperal diseases	715	679		36
Congenital debility and malformations	4,009	3,865		144
Violent deaths (excluding suicides)	4,255	4,571	316	
Suicides	799	833	34	
All other causes	14,293	13,908		385
Total births reported	131,264	130,426		838
Total marriages reported	62,069	62,254	185	

INFANTILE MORTALITY

The infantile mortality rate for the year was 68 per 1,000 live births, as compared with the five-year average rate of 76—a saving of 8 babies out of every 1,000 born alive.

In all, 130,426 births were reported during the year, a decrease of 838.

The Bulletin states:

"Formerly, the health of the baby was a local problem and emphasis was placed on family care. To-day the complex character of living conditions causes it to assume a much broader aspect, and community control can not be avoided. The factors that must be considered when dealing with this subject are: Housing, sanitation, overcrowding, social factors, pure water, pure milk, prevention of contagion, and out-of-door facilities.

"The best criterion of a people's health, perhaps of a people's civilization, is the rate of infant mortality. This is measurable. The rate is reckoned upon the basis of 1,000 births, e. g., a rate of 70 means 70 deaths under 1 year for each 1,000 babies born alive.

"The control of infant mortality spells 'well baby.' It is essential, therefore, to study its causation and the means employed to do away with these causes.

"The principal reasons for infant mortality may be set down as: Prenatal, those affecting the mother; postnatal, those affecting the child. Under the caption 'prenatal' one thinks of: Tuberculosis, syphilis, alcoholism, poverty, overcrowding, unhygienic surroundings, lack of proper food, manual labor on the part of the mother. One can not but be struck by the interrelation of these various causes and the bearing they must necessarily have upon one another."

MOSQUITO BREEDING IN WATER BARRELS[1]

INSTRUCTIVE INCIDENT IN CAMPAIGN AGAINST MOSQUITOES AT A NAVAL OPERATING BASE

The following information is taken from the sanitary report of the United States Naval Operating Base, Hampton Roads, Va., for the month of September, 1924:

"The sources of the mosquitoes noted in last month's report were located at Sewalls Point coal pier and the Virginian Railway coaling station in nine barrels of water used for controlling fires. Seven of these barrels were emptied, and the superintendents of the two places promised to keep the remaining barrels oiled. This was not accomplished, however, until thousands of *Culex* mosquitoes had been blown over the base by the then prevailing southerly wind. These mosquitoes immediately stocked every available body of water—of which the frequent rains, unfortunately, supplied many—in the made ground on the north side of the base. Although nearly 4 tons of niter cake and 150 gallons of crude oil were used during the month, reducing the breeding to a minimum, we still have thousands of *Culicidæ*. Thorough surveys were made at three units on the base for *Anopheles*, but none could be found. *Culex* larvæ were collected at three places and the containers either treated or destroyed. Several water holes were filled during the month."

[1] From the United States Naval Medical Bulletin for January, 1925.

DIGEST OF CURRENT PUBLIC HEALTH COURT DECISION

Ordinance authorizing acquisition of land for garbage disposal purposes upheld.—(Supreme Court of Illinois.) The city of Chicago has power to acquire land for use in the disposal of garbage and other waste matter, and the city ordinance passed June 13, 1923, providing for the acquisition of certain specified property to be used for the above-mentioned purposes, is valid. (Consumers' Co. *v.* City of Chicago et al., 145 N. E. 114.)

DEATHS DURING WEEK ENDED JANUARY 17, 1925

Summary of information received by telegraph from industrial insurance companies for week ended January 17, 1925, and corresponding week of 1924. (From the Weekly Health Index, January 20, 1925, issued by the Bureau of the Census, Department of Commerce)

	Week ending January 17, 1925	Corresponding week, 1924
Policies in force	58, 396, 301	54, 691, 101
Number of death claims	12, 125	11, 314
Death claims per 1,000 policies in force, annual rate	10. 8	10. 8

Deaths from all causes in certain large cities of the United States during the week ended January 17, 1925, infant mortality, annual death rate, and comparison with corresponding week of 1924. (From the Weekly Health Index, January 20, 1925, issued by the Bureau of the Census, Department of Commerce)

City	Week ended Jan. 17, 1925		Annual death rate per 1,000 corresponding week, 1924	Deaths under 1 year		Infant mortality rate, week ended Jan. 17, 1925 [2]
	Total deaths	Death rate [1]		Week ended Jan. 17, 1925	Corresponding week, 1924	
Total (62 cities)	7,405	14. 2	[3] 13. 3	907	[3] 888	
Akron	23			4	5	44
Albany [4]	34	14. 8	15. 4	1	5	22
Atlanta	99	22. 2	16. 5	19	11	
Baltimore [4]	275	18. 0	15. 3	34	32	99
Birmingham	66	16. 7	17. 1	7	12	
Boston	252	16. 8	14. 8	47	38	124
Bridgeport	50			8	3	127
Buffalo	130	12. 2	11. 6	15	15	61
Cambridge	33	15. 3	14. 0	2	10	34
Camden	33	13. 4	18. 2	3	8	49
Chicago [4]	677	11. 8	11. 5	106	94	94
Cincinnati	138	17. 6	16. 1	10	7	59
Cleveland	184	10. 2	11. 9	27	37	67
Columbus	73	13. 9	12. 6	10	6	94
Dallas	61	16. 4	11. 4	11	7	
Denver	73			8	13	
Des Moines	25	8. 7	10. 4	3	3	51
Detroit	253			61	49	103
Duluth	22	10. 4	10. 1	5	2	106
Erie	23			2	2	39
Fall River [4]	36	15. 5	19. 4	3	9	43
Flint	16			3	9	49
Fort Worth	46	15. 7	7. 0	9	3	

[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] Data for 61 cities.
[4] Deaths for week ended Friday, January 16, 1925.

Deaths from all causes in certain large cities of the United States during the week ended January 17, 1925, infant mortality, annual death rate, and comparison with corresponding week of 1924. (From the Weekly Health Index, January 20, 1925, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Jan. 17, 1925		Annual death rate per 1,000 corresponding week, 1924	Deaths under 1 year		Infant mortality rate, week ended Jan. 17, 1925
	Total deaths	Death rate		Week ended Jan. 17, 1925	Corresponding week, 1924	
Grand Rapids	36	12.5	8.4	5	3	78
Houston	60			7	5	
Indianapolis	92	13.4	12.9	7	14	48
Jacksonville, Fla	35	17.4	16.8	2	2	44
Jersey City	86	14.2	9.4	11	9	77
Kansas City, Kans	40	16.9	12.4	9	5	190
Kansas City, Mo	89	12.6	12.0	9	9	
Los Angeles	273			21	19	58
Louisville	87	17.5	12.3	9	6	79
Lowell	34	15.2	17.6	3	7	52
Lynn	18	9.0	8.5	0	3	0
Memphis	57	17.0	13.0	6	5	
Milwaukee	97	10.1	11.9	19	22	87
Minneapolis	108	13.2	12.9	15	12	80
Nashville [1]	41	17.2	19.4	9	8	
New Bedford	20	7.7	16.1	2	5	33
New Haven	49	14.3	6.8	9	3	116
New Orleans	181	22.8	20.5	23	16	
New York	1,610	13.8	12.7	172	193	69
Bronx Borough	157	9.1	11.1	17	29	59
Brooklyn Borough	524	12.2	11.2	63	53	66
Manhattan Borough	733	16.9	15.1	72	92	72
Queens Borough	134	12.2	10.6	14	12	69
Richmond Borough	62	24.2	18.8	6	7	108
Newark, N. J	120	13.8	11.2	17	18	78
Norfolk	31	9.6	11.4	4	6	71
Oakland	53	10.9	13.5	2	4	23
Omaha	42	10.3	10.3	3	4	29
Paterson	28	10.3	11.5	5	2	84
Philadelphia	608	16.0	15.0	67	74	84
Pittsburgh	223	18.4	16.2	32	27	112
Portland, Oreg	64	11.8	14.4	6	6	62
Providence	61	13.0	14.8	7	11	56
Richmond	73	20.4	15.3	10	6	121
Rochester	75	11.8		7		55
St. Louis	257	16.3	12.5	23	17	
St. Paul	58	12.3	13.0	7	7	60
Salt Lake City [1]	30	12.0	15.0	6	4	94
San Antonio	84	22.1	18.8	13	15	
San Francisco	180	16.8	17.8	12	14	69
Schenectady	25	12.8	9.9	2	4	56
Seattle	59			4	7	41
Somerville	27	13.8	13.0	4	4	107
Spokane	18			0	0	0
Springfield, Mass	32	10.9	11.6	5	3	74
Syracuse	48	13.1	11.9	2	8	25
Tacoma	30	15.0	13.2	2	2	48
Toledo	66	12.0	11.9	8	6	72
Trenton	49	19.4	15.7	4	3	65
Utica	26	12.6	10.9	2	1	41
Washington, D. C	133	13.9	15.2	17	8	95
Waterbury	22			4	5	88
Wilmington, Del	47	20.1	13.5	8	7	182
Yonkers	26	12.1	11.4	5	3	110
Youngstown	45	14.7	6.0	5	3	63

[1] Deaths for week ended Friday, January 16, 1925.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for Week Ended January 24, 1925

ALABAMA	Cases
Cerebrospinal meningitis	1
Chicken pox	68
Diphtheria	25
Dysentery	2
Influenza	467
Influenza reported as "Devil's grip"	3
Malaria	17
Measles	19
Mumps	52
Ophthalmia neonatorum	1
Pellagra	1
Pneumonia	137
Scarlet fever	18
Smallpox	292
Tetanus	1
Trachoma	8
Tuberculosis	25
Typhoid fever	9
Whooping cough	30

ARIZONA	
Chicken pox	14
Diphtheria	4
Measles	53
Mumps	16
Pneumonia	1
Scarlet fever	1
Smallpox	15
Tuberculosis	45
Whooping cough	7

ARKANSAS	
Chicken pox	86
Diphtheria	12
Hookworm disease	4
Influenza	201
Malaria	28
Measles	53

ARKANSAS—continued	Cases
Mumps	35
Ophthalmia neonatorum	1
Pellagra	5
Scarlet fever	12
Smallpox	12
Trachoma	3
Tuberculosis	6
Typhoid fever	6
Whooping cough	21

CALIFORNIA	
Cerebrospinal meningitis—Ukiah	1
Diphtheria	151
Influenza	53
Lethargic encephalitis:	
Healdsburg	1
Los Angeles	1
Measles	48
Poliomyelitis:	
Oakland	1
Sacramento	1
San Diego County	1
Santa Clara County	1
Scarlet fever	174
Smallpox:	
Los Angeles	58
Los Angeles County	26
Oakland	12
Orange County	12
Scattering	71
Typhoid fever	11

COLORADO [1] (Exclusive of Denver)	
Chicken pox	150
Diphtheria	18
Measles	5

[1] For two weeks ended Jan. 24, 1925.

COLORADO—continued

	Cases
Mumps	40
Pneumonia	11
Scarlet fever	58
Smallpox	1
Tuberculosis	43
Typhoid fever	3
Whooping cough	6

CONNECTICUT

Cerebrospinal meningitis	1
Chicken pox	99
Diphtheria	44
German measles	32
Influenza	4
Lethargic encephalitis	2
Measles	42
Mumps	31
Pneumonia (all forms)	101
Scarlet fever	183
Septic sore throat	2
Tuberculosis (all forms)	32
Typhoid fever	1
Whooping cough	67

DELAWARE

Chicken pox	1
Diphtheria	2
Measles	2
Mumps	6
Pneumonia	3
Scarlet fever	4
Tuberculosis	3
Whooping cough	6

FLORIDA

Diphtheria	7
Influenza	63
Malaria	4
Pneumonia	3
Scarlet fever	1
Smallpox	3
Typhoid fever	12

GEORGIA

Chicken pox	12
Diphtheria	3
German measles	1
Hookworm disease	1
Influenza	115
Malaria	1
Mumps	5
Pneumonia	28
Scarlet fever	3
Smallpox	1
Tuberculosis	15
Typhoid fever	1
Whooping cough	5

ILLINOIS

Cerebrospinal meningitis:	
Cook County	1
Knox County	1
Woodford County	1
Diphtheria:	
Cook County	89
Scattering	52

ILLINOIS—continued

	Cases
Influenza	37
Lethargic encephalitis—Cook County	5
Measles	421
Pneumonia	391
Scarlet fever:	
Cook County	281
Edgar County	8
McLean County	9
Madison County	14
St. Claire County	11
Scattering	132
Smallpox:	
Lake County	8
Madison County	8
Ogle County	8
St. Claire County	12
Scattering	25
Tuberculosis	242
Typhoid fever	32
Whooping cough	301

INDIANA

Cerebrospinal meningitis—Lake County	1
Chicken pox	142
Diphtheria	42
Influenza	62
Measles	100
Mumps	4
Pneumonia	24
Scarlet fever:	
Allen County	15
Elkhart County	19
Huntington County	18
Kosciusko County	25
Lake County	11
La Porte County	10
Parke County	8
St. Joseph County	16
Vigo County	12
Scattering	98
Smallpox:	
Jefferson County	10
Kosciusko County	12
Vigo County	13
Scattering	56
Tuberculosis	39
Typhoid fever	9
Whooping cough	39

IOWA

Diphtheria	21
Scarlet fever	64
Smallpox	33

KANSAS

Cerebrospinal meningitis	1
Chicken pox	177
Diphtheria	47
Influenza	4
Measles	8
Mumps	380
Pellagra	1
Pneumonia	40
Scarlet fever	151
Smallpox	23
Tuberculosis	56
Typhoid fever	5
Whooping cough	51

LOUISIANA

	Cases
Cerebrospinal meningitis	1
Diphtheria	17
Influenza	67
Malaria	3
Pneumonia	43
Scarlet fever	31
Smallpox	38
Tuberculosis	23
Typhoid fever	27

MAINE

Chicken pox	41
Diphtheria	27
German measles	1
Influenza	17
Measles	8
Mumps	116
Pneumonia	7
Scarlet fever	26
Tuberculosis	5
Typhoid fever	4
Vincent's angina	3
Whooping cough	3

MARYLAND [1]

Cerebrospinal meningitis	1
Chicken pox	67
Diphtheria	29
German measles	4
Influenza	128
Lethargic encephalitis	2
Measles	17
Mumps	63
Ophthalmia neonatorum	2
Pneumonia (all forms)	118
Scarlet fever	92
Septic sore throat	3
Tetanus	1
Tuberculosis	33
Typhoid fever	8
Typhus fever	1
Whooping cough	92

MASSACHUSETTS

Cerebrospinal meningitis	2
Chicken pox	283
Conjunctivitis (suppurative)	15
Diphtheria	107
German measles	161
Hookworm disease	1
Influenza	124
Lethargic encephalitis	8
Measles	380
Mumps	102
Ophthalmia neonatorum	35
Pneumonia (lobar)	158
Poliomyelitis	3
Scarlet fever	388
Septic sore throat	4
Trachoma	2
Trichinosis	4
Tuberculosis (all forms)	154
Typhoid fever	8
Whooping cough	140

[1] Week ended Friday.

MICHIGAN

	Cases
Diphtheria	98
Measles	149
Pneumonia	103
Scarlet fever	302
Smallpox	21
Tuberculosis	49
Typhoid fever	11
Whooping cough	120

MINNESOTA

Chicken pox	191
Diphtheria	52
Measles	8
Pneumonia	1
Scarlet fever	272
Smallpox	79
Tuberculosis	82
Typhoid fever	2
Whooping cough	23

MISSISSIPPI

Diphtheria	9
Scarlet fever	6
Smallpox	21
Typhoid fever	4

MISSOURI

Cerebrospinal meningitis	2
Chicken pox	97
Diphtheria	88
Influenza	24
Lethargic encephalitis	1
Measles	6
Mumps	39
Pneumonia	29
Scarlet fever	310
Smallpox	15
Trachoma	15
Tuberculosis	51
Typhoid fever	1
Whooping cough	11

MONTANA

Diphtheria	5
Scarlet fever	30
Smallpox	39
Typhoid fever	2

NEW JERSEY

Chicken pox	263
Diphtheria	88
Influenza	14
Measles	89
Pneumonia	177
Scarlet fever	245
Smallpox	14
Typhoid fever	9
Whooping cough	267

NEW YORK

(Exclusive of New York City)

Cerebrospinal meningitis	3
Diphtheria	83
Influenza	38

NEW YORK—continued	Cases
Lethargic encephalitis	6
Measles	195
Pneumonia	245
Poliomyelitis	1
Scarlet fever	359
Smallpox	18
Typhoid fever	25
Whooping cough	203

NORTH CAROLINA	
Cerebrospinal meningitis	1
Chicken pox	165
Diphtheria	49
German measles	1
Measles	21
Scarlet fever	45
Septic sore throat	3
Smallpox	84
Typhoid fever	1
Whooping cough	92

OKLAHOMA

(Exclusive of Oklahoma City and Tulsa)

Diphtheria	16
Smallpox	17
Typhoid fever	18

OREGON	
Chicken pox	60
Diphtheria:	
Portland	21
Scattering	9
Mumps	15
Pneumonia	[1] 9
Poliomyelitis	1
Scarlet fever:	
Portland	9
Scattering	20
Smallpox:	
Portland	10
Columbia County	17
Scattering	8
Tuberculosis	33
Typhoid fever	2
Whooping cough	8

SOUTH DAKOTA	
Chicken pox	17
Diphtheria	3
Mumps	3
Pneumonia	1
Scarlet fever	31
Smallpox	1
Tuberculosis	1
Typhoid fever	2
Whooping cough	2

TEXAS	
Anthrax	1
Chicken pox	141
Dengue	14
Diphtheria	84
Dysentery (epidemic)	13

[1] Deaths.

TEXAS—continued	Cases
Influenza	4,226
Leprosy	1
Lethargic encephalitis	3
Measles	66
Mumps	163
Ophthalmia neonatorum	4
Paratyphoid fever	1
Pellagra	25
Pneumonia	302
Rabies (human)	2
Scarlet fever	64
Smallpox	43
Tetanus	1
Trachoma	4
Tuberculosis	55
Typhoid fever	37
Whooping cough	58

VERMONT	
Chicken pox	42
Diphtheria	3
Measles	2
Mumps	55
Scarlet fever	31
Whooping cough	17

VIRGINIA	
Smallpox—Montgomery County	8

WASHINGTON	
Chicken pox	94
Diphtheria	32
Measles	69
Mumps	117
Pneumonia	2
Poliomyelitis	1
Scarlet fever	54
Smallpox	27
Tuberculosis	29
Typhoid fever	1
Whooping cough	8

WEST VIRGINIA	
Diphtheria	12
Scarlet fever	14
Smallpox	6
Typhoid fever	4

WISCONSIN	
Milwaukee:	
Chicken pox	59
Diphtheria	17
German measles	114
Influenza	2
Lethargic encephalitis	2
Measles	185
Mumps	63
Ophthalmia neonatorum	1
Pneumonia	7
Scarlet fever	13
Smallpox	1
Tuberculosis	19
Whooping cough	29

WISCONSIN—continued	
Scattering:	Cases
Chicken pox	226
Diphtheria	47
German measles	3
Influenza	33
Measles	102
Mumps	286
Ophthalmia neonatorum	1
Pneumonia	20
Poliomyelitis	1
Scarlet fever	159

WISCONSIN—continued	
Scattering—Continued.	Cases
Smallpox	48
Tuberculosis	23
Typhoid fever	3
Whooping cough	92
WYOMING	
Chicken pox	14
Measles	1
Mumps	1
Scarlet fever	16
Whooping cough	4

Reports for Week Ended January 17, 1925

NEBRASKA	Cases
Chicken pox	28
Diphtheria	17
Measles	3
Mumps	10
Pneumonia	2
Scarlet fever	15
Smallpox	24
Typhoid fever	5
Whooping cough	4

NORTH DAKOTA	Cases
Chicken pox	13
Diphtheria	1
Measles	6
Mumps	2
Pneumonia	7
Scarlet fever	58
Smallpox	7
Tuberculosis	2
Whooping cough	6

SUMMARY OF MONTHLY REPORTS FROM 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
October, 1924										
Nebraska	1	178					2	104		8
November, 1924										
Nebraska	1	94	9				1	120		2
December, 1924										
Delaware	1	13	6		2			6		1
Idaho	2	20	1					22		3
Illinois	2	664	82	6	815		9	1,516	166	231
Louisiana	3	101	98	24	11	1	2	60	53	157
Maryland	1	218	476	1	86	0	2	378		63
Nebraska		50	3				1	69		2
New York	11	1,520	330	6	925		44	2,263	51	784
North Carolina	0	314			82		1	215	152	27
North Dakota		29			64		10	167	69	
Oklahoma	5		535	59	9	6	1	174	27	217
Rhode Island	0	95	6	0		0	0	103		15

RECIPROCAL NOTIFICATION, DECEMBER, 1924

Notifications regarding communicable diseases sent during the month of December, 1924, to other State health departments by departments of health of certain States

Referred by—	Diphtheria	Scarlet fever	Smallpox	Tuberculosis	Typhoid fever
Connecticut	1	2			
Illinois		1	1	1	
Massachusetts					3
Minnesota			47	53	2
New York	1	7			13
New Jersey					1
Washington		1			

PLAGUE-ERADICATIVE MEASURES IN THE UNITED STATES

Los Angeles, Calif.—The following items are taken from the report of plague-eradicative measures in Los Angeles, Calif., for the week ended January 10, 1925:

Number of rats examined during week ended Jan. 10, 1925	3,903
Number of rats found to be plague infected	1
Number of squirrels examined during week ended Jan. 10, 1925	215
Number of squirrels found to be plague infected	0
Total number of rats examined to Jan. 10, 1925	31,612
Total number of rats found to be plague infected	71
Total number of squirrels examined to Jan. 10, 1925	1,093
Total number of squirrels found plague infected	0

Last case of human plague, Jan. 6, 1925.

Oakland, Calif.—From December 13, 1924, to January 10, 1925, 10 rats were found to be plague infected at Oakland, Calif.

New Orleans, La.—The following items are taken from the report of plague-eradicative measures in New Orleans, La., for the week ended January 10, 1925:

Number of vessels inspected	271
Number of inspections made	947
Number of vessels fumigated with cyanide gas	28
Number of rodents examined	4,133
Number of rodents found to be plague infected	0
Total number of rodents examined to Jan. 10, 1925	13,755
Total number of rodents found to be plague infected	5

SMALLPOX AT PORT ARTHUR, TEX.

Under date of January 19, 1925, 12 cases of smallpox were reported at Port Arthur, Tex.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

Diphtheria.—For the week ended January 10, 1925, 35 States reported 1,736 cases of diphtheria. For the week ended January 12, 1924, the same States reported 2,518 cases of this disease. One hundred and four cities, situated in all parts of the country and having an aggregate population of more than 28,800,000, reported 931 cases of diphtheria for the week ended January 10, 1925. Last year, for the corresponding week, they reported 1,373 cases. The estimated expectancy for these cities was 1,300 cases of diphtheria. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Measles.—Thirty States reported 2,233 cases of measles for the week ended January 10, 1925, and 13,096 cases of this disease for the week ended January 12, 1924. One hundred and four cities reported 1,191 cases of measles for the week this year and 4,994 cases last year.

Scarlet fever.—Scarlet fever was reported for the week as follows: 35 States—this year, 4,157 cases; last year, 3,889; 104 cities—this year, 2,038 cases; last year, 1,718; estimated expectancy, 1,031 cases.

Smallpox.—For the week ended January 10, 1925, 35 States reported 889 cases of smallpox. Last year, for the corresponding week, they reported 936 cases. One hundred and four cities reported smallpox for the week as follows: 1925, 316 cases; 1924, 345 cases; estimated expectancy, 78 cases. These cities reported 19 deaths from smallpox for the week this year, 13 of which occurred at Minneapolis.

Typhoid fever.—Three hundred and ninety-one cases of typhoid fever were reported for the week ended January 10, 1925, by 34 States. For the corresponding week of 1924 the same States reported 219 cases. One hundred and four cities reported 198 cases of typhoid fever for the week this year, and 81 cases for the week last year. The estimated expectancy for these cities was 49 cases.

Influenza and pneumonia.—Deaths from influenza and pneumonia (combined) were reported for the week by 104 cities as follows: 1925, 1,147 deaths; 1924, 1,177 deaths.

City reports for week ended January 10, 1925

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 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	Population July 1, 1923, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND									
Maine:									
Portland	73,129	17	2	3	0	0	0	45	1
New Hampshire:									
Concord	22,408	0	1	0	0	0	1	0	0
Vermont:									
Barre	[1] 10,068	0	0	1	0	0	0	5	0
Burlington	23,613	6	1	0	0	0	0	2	3
Massachusetts:									
Boston	770,400	70	68	47	3	2	80	7	23
Fall River	120,912	4	6	3	2	2	1	0	3
Springfield	144,227	8	4	5	1	2	50	7	3
Worcester	191,927	13	6	7	1	0	5	0	1
Rhode Island:									
Pawtucket	68,799	9	2	5	0	0	0	0	1
Providence	242,378	0	13	15	0	0	0	0	3
Connecticut:									
Bridgeport	[1] 143,555	1	9	7	2	1	0	1	3
Hartford	[1] 138,036	3	8	9	0	0	1	1	6
New Haven	172,967	55	5	1	0	0	21	0	5

[1] Population Jan. 1, 1920.

City reports for week ended January 10, 1925—Continued

Division, State, and city	Population July 1, 1923, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC									
New York:									
Buffalo	536,718	31	30	8	1	1	54	15	9
New York	5,927,625	231	227	202	24	19	40	26	287
Rochester	317,867	15	12	1	0	1	5	37	5
Syracuse	184,511	15	11	8	0	0	0	12	3
New Jersey:									
Camden	124,157	12	5	10	1	2	14	1	5
Newark	438,699	34	23	14	7	0	53	8	27
Trenton	127,390	4	8	5	2	2	9	0	2
Pennsylvania:									
Philadelphia	1,922,788	159	79	96	----	9	71	41	96
Pittsburgh	613,442	74	29	10	----	5	84	34	16
Reading	110,917	23	5	3	0	0	3	4	0
Scranton	140,636	3	6	3	0	0	0	0	8
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	406,312	20	16	5	----	5	1	2	14
Cleveland	888,519	141	39	27	7	5	1	6	21
Columbus	261,082	23	7	2	0	0	0	5	8
Toledo	268,338	25	9	13	0	0	2	2	6
Indiana:									
Fort Wayne	93,573	----	4	----	----	----	----	----	----
Indianapolis	342,718	80	20	5	0	1	2	7	20
South Bend	76,709	5	1	5	0	0	10	0	1
Terre Haute	68,939	6	2	0	0	0	0	0	1
Illinois:									
Chicago	2,886,121	159	150	67	15	4	273	18	82
Cicero	55,968	5	3	3	0	0	1	0	0
Peoria	79,675	13	1	0	0	0	0	1	1
Springfield	61,833	2	2	4	2	2	1	22	4
Michigan:									
Detroit	995,668	91	78	34	6	2	8	7	43
Flint	117,968	13	11	2	0	0	2	0	0
Grand Rapids	145,947	10	6	0	0	1	13	2	4
Wisconsin:									
Madison	42,519	22	1	0	0	0	1	182	0
Milwaukee	484,595	91	24	18	2	1	247	53	0
Racine	64,393	37	2	1	0	0	1	3	3
Superior	[1] 39,671	1	1	0	0	0	1	0	1
WEST NORTH CENTRAL									
Minnesota:									
Duluth	106,289	13	2	0	0	0	2	0	3
Minneapolis	409,125	59	22	0	0	0	0	8	6
St. Paul	241,891	38	18	16	0	0	0	21	7
Iowa:									
Davenport	61,262	4	1	0	0	----	0	0	----
Des Moines	140,923	1	4	5	0	----	0	0	----
Sioux City	79,662	6	2	1	0	----	0	1	----
Waterloo	39,667	4	0	0	0	----	0	----	----
Missouri:									
Kansas City	351,819	14	13	3	5	5	2	9	12
St. Joseph	78,232	3	4	0	0	0	1	1	3
St. Louis	803,853	47	66	36	1	1	4	4	----
North Dakota:									
Fargo	24,841	21	0	1	0	0	0	32	1
Grand Forks	14,547	1	1	1	0	----	0	0	----
South Dakota:									
Aberdeen	15,829	1	----	1	0	----	1	0	----
Sioux Falls	29,206	1	1	5	0	----	0	0	----
Nebraska:									
Lincoln	58,761	7	3	2	0	0	2	0	0
Omaha	204,382	26	6	1	0	0	0	0	6
Kansas:									
Topeka	52,555	21	2	2	0	0	0	159	2
Wichita	79,261	36	4	3	0	0	0	0	1

[1] Population Jan. 1, 1920.

City reports for week ended January 10, 1925—Continued

Division, State, and city	Population July 1, 1923, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC									
Delaware:									
Wilmington	117,728	7	2	4	0	0	0	1	5
Maryland:									
Baltimore	773,580	59	33	33	74	7	4	4	59
Cumberland	32,361	----	1	0	0	0	0	----	1
Frederick	11,301	----	1	0	0	0	0	----	1
District of Columbia:									
Washington	[1] 437,571	48	20	26	2	3	21	----	13
Virginia:									
Lynchburg	30,277	10	1	2	0	0	2	34	0
Norfolk	159,089	10	4	0	0	0	0	148	6
Richmond	181,044	4	8	2	0	1	1	0	7
Roanoke	55,502	11	2	5	0	0	0	0	0
West Virginia:									
Charleston	45,597	5	1	2	0	0	4	1	0
Huntington	57,918	0	2	1	0	----	0	0	----
Wheeling	[1] 56,208	14	2	1	0	1	8	0	3
North Carolina:									
Raleigh	29,171	16	1	0	0	2	0	0	2
Wilmington	35,719	2	1	0	0	0	0	6	5
Winston-Salem	56,230	8	1	1	0	0	0	1	6
South Carolina:									
Charleston	71,245	6	2	1	0	1	0	0	1
Columbia	39,688	2	1	0	0	0	0	4	0
Greenville	25,789	0	0	2	0	0	0	0	0
Georgia:									
Atlanta	222,963	9	4	2	2	1	0	0	10
Brunswick	15,937	1	0	1	0	0	0	0	0
Savannah	89,448	2	1	0	0	1	0	2	2
Florida:									
St. Petersburg	24,403	0	0	1	0	0	0	0	0
Tampa	56,050	3	1	2	0	0	1	4	0
EAST SOUTH CENTRAL									
Kentucky:									
Covington	57,877	5	1	0	0	0	0	0	2
Lexington	43,673	5	1	0	0	0	0	1	2
Louisville	257,671	11	9	3	3	1	1	0	13
Tennessee:									
Memphis	170,067	20	8	2	0	0	1	10	11
Nashville	121,128	1	3	1	0	2	3	0	7
Alabama:									
Birmingham	195,901	32	3	11	7	2	0	0	12
Mobile	63,858	0	1	0	0	3	0	0	6
Montgomery	45,383	1	1	4	1	0	0	2	0
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith	30,635	4	2	1	0	----	0	0	----
Little Rock	70,916	1	2	0	10	0	0	0	0
Louisiana:									
New Orleans	404,575	2	15	8	5	5	1	0	16
Shreveport	54,590	1	----	1	0	0	0	0	5
Oklahoma:									
Oklahoma	101,150	1	2	1	6	1	0	0	4
Tulsa	102,018	6	2	3	0	----	2	----	----
Texas:									
Dallas	177,274	32	8	9	1	1	0	0	6
Galveston	46,877	0	2	3	3	0	0	0	4
Houston	154,970	----	3	9	0	1	0	----	9
San Antonio	184,727	0	1	0	11	1	0	0	11
MOUNTAIN									
Montana:									
Billings	16,927	16	1	0	0	0	0	3	0
Great Falls	27,787	1	1	9	0	0	8	4	0
Helena	[1] 12,037	0	0	0	0	0	0	0	1
Missoula	[1] 12,668	----	0	4	0	0	1	----	1

[1] Population Jan. 1, 1920.

City reports for week ended January 10, 1925—Continued

Division, State, and city	Population July 1, 1923, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN—con.									
Idaho:									
Boise	22,806	0	0	0	0	0	0	0	0
Colorado:									
Denver	272,031	16	10	6	0	1	3	60	15
Pueblo	43,519	32	4	1	0	1	0	3	3
New Mexico:									
Albuquerque	16,648	13	1	0	0	0	0	0	2
Arizona:									
Phoenix	33,899	0	-------	0	0	2	0	1	1
Utah:									
Salt Lake City	126,241	75	3	5	0	0	2	35	4
Nevada:									
Reno	12,429	2	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	[1] 315,685	58	6	8	0	-------	6	15	-------
Spokane	104,573	23	3	0	0	-------	39	0	-------
Tacoma	101,731	4	3	1	0	0	0	0	3
Oregon:									
Portland	273,621	23	8	12	0	0	3	7	14
California:									
Los Angeles	666,853	74	37	38	8	2	20	24	23
Sacramento	69,950	3	2	1	0	0	1	0	1
San Francisco	539,038	35	27	19	8	3	1	6	18

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	7	0	0	0	0	0	2	0	0	14
New Hampshire:											
Concord	1	1	0	0	0	0	0	0	0	0	10
Vermont:											
Barre	1	0	0	0	0	0	0	0	0	0	4
Burlington	2	2	1	0	0	0	0	0	0	2	19
Massachusetts:											
Boston	48	117	0	0	0	16	1	1	0	20	255
Fall River	3	1	0	0	0	2	0	0	0	1	31
Springfield	7	42	0	0	0	2	0	0	0	8	43
Worcester	11	20	0	0	0	2	0	0	0	0	43
Rhode Island:											
Pawtucket	1	2	0	0	0	0	0	0	0	0	16
Providence	9	9	0	0	0	3	0	1	1	4	59
Connecticut:											
Bridgeport	5	18	0	0	0	2	0	1	0	1	36
Hartford	7	8	0	0	0	0	0	0	0	3	46
New Haven	7	41	0	0	0	1	0	1	0	16	43
MIDDLE ATLANTIC											
New York:											
Buffalo	22	24	0	0	0	14	1	5	1	6	155
New York	155	256	0	0	0	[1] 96	12	66	18	107	1,660
Rochester	12	42	0	0	0	5	0	3	0	8	70
Syracuse	14	2	0	0	0	1	0	0	0	3	44

[1] Population Jan. 1, 1920.

City reports for week ended January 10, 1925—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MIDDLE ATLANTIC—continued											
New Jersey:											
Camden	2	9	0	2	1	2	0	0	0	7	38
Newark	19	37	0	0	0	11	0	0	1	77	139
Trenton	2	4	0	0	0	3	0	0	0	3	59
Pennsylvania:											
Philadelphia	54	194	0	3	1	47	3	18	2	102	620
Pittsburgh	26	70	1	0	0	11	2	5	1	7	165
Reading	1	3	0	0	0	2	0	0	0	14	29
Scranton	4	2	0	0	0	1	0	1	1	11	----
EAST NORTH CENTRAL											
Ohio:											
Cincinnati											
Cleveland	11	25	1	3	0	1	0	6	1	3	134
Columbus	37	30	2	0	0	15	2	2	0	23	187
Toledo	8	12	1	5	0	3	0	2	0	3	83
Indiana:	16	19	3	1	0	2	0	0	0	39	74
Fort Wayne											
Indianapolis	3	----	0	----	----	----	0	----	----	----	----
South Bend	10	4	2	12	0	6	0	0	0	3	108
Terre Haute	4	4	0	0	0	1	0	0	0	0	12
Illinois:	2	1	0	6	0	0	0	0	0	0	16
Chicago											
Cicero	112	276	2	0	0	51	3	13	0	176	822
Peoria	1	10	0	0	0	0	0	0	0	3	7
Springfield	6	11	0	0	0	0	0	0	0	0	13
Michigan:	2	4	0	0	0	0	0	0	0	0	21
Detroit											
Flint	82	87	3	7	0	18	2	6	0	47	260
Grand Rapids	8	8	1	3	0	1	0	1	0	11	17
Wisconsin:	7	12	1	2	0	4	1	0	0	3	37
Madison											
Milwaukee	3	4	0	2	0	2	0	0	0	0	5
Racine	37	26	2	7	0	2	0	1	0	37	110
Superior	5	3	0	6	0	1	0	0	0	6	17
	2	4	2	0	0	1	0	0	0	0	12
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	17	1	0	0	0	0	0		2	25
Minneapolis	32	74	10	60	13	2	0	1	0	5	103
St. Paul	17	31	12	5	2	5	1	0	0	18	51
Iowa:									0		
Davenport	2	1	1	2	----	----	0	1	----	1	----
Des Moines	8	13	2	6	----	----	0	0	----	0	----
Sioux City	3	1	1	0	----	----	0	0	----	0	----
Waterloo	4	1	0	8	----	----	0	0	----	2	----
Missouri:											
Kansas City	13	75	2	0	0	9	1	0	0	0	93
St. Joseph	3	3	1	0	0	1	0	0	0	0	25
St. Louis	30	145	1	10	0	16	2	2	0	1	287
North Dakota:											
Fargo	1	3	1	0	0	0	0	0	0	0	5
Grand Forks	1	0	1	0	----	----	0	0	----	0	----
South Dakota:											
Aberdeen	----	0	----	0	----	----	----	0	----	1	----
Sioux Falls	2	3	1	0	0	0	0	0	0	0	10
Nebraska:											
Lincoln	2	2	1	0	0	0	0	0	0	2	15
Omaha	5	4	2	23	0	1	0	0	0	0	34
Kansas:											
Topeka	2	5	0	0	0	0	0	0	0	3	15
Wichita	3	3	0	0	0	1	0	0	0	9	31

City reports for week ended January 10, 1925—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	6	0	0	0	0	0	0	0	1	36
Maryland:											
Baltimore	30	37	0	0	0	20	2	3	2	47	305
Cumberland	1	0	0	0	0	0	0	0	0	------	8
Frederick	0	1	0	0	0	0	0	0	0	------	2
District of Columbia:											
Washington	19	14	0	1	0	6	2	15	3	17	127
Virginia:											
Lynchburg	1	0	0	0	0	0	0	0	0	0	12
Norfolk	1	0	0	0	0	2	0	0	0	12	------
Richmond	5	2	0	0	0	2	1	0	0	1	53
Roanoke	1	4	0	0	0	1	0	1	0	0	17
West Virginia:											
Charleston	1	4	0	7	0	0	0	0	0	0	17
Huntington	1	3	0	1	------	------	0	0	------	0	------
Wheeling	1	2	0	0	0	0	0	0	0	0	27
North Carolina:											
Raleigh	1	2	0	2	0	0	0	0	0	1	14
Wilmington	1	0	0	3	0	0	0	1	0	0	19
Winston-Salem	2	1	1	0	0	0	0	0	0	0	22
South Carolina:											
Charleston	0	1	0	0	0	1	1	1	0	0	23
Columbia	0	0	1	0	0	2	0	0	0	0	20
Greenville	0	0	0	0	0	1	0	1	0	0	6
Georgia:											
Atlanta	4	3	2	2	0	7	0	0	0	3	76
Brunswick	0	0	0	0	0	0	0	0	0	0	8
Savannah	1	0	0	0	0	2	0	1	0	0	37
Florida:											
St. Petersburg	0	2	0	0	0	0	0	0	0	0	11
Tampa	1	0	0	0	0	2	0	4	0	0	30
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	3	0	0	0	0	0	0	0	0	27
Lexington	1	1	0	1	0	0	0	0	0	0	14
Louisville	5	19	0	2	0	4	1	1	0	9	75
Tennessee:											
Memphis	3	6	1	4	0	4	1	6	1	0	68
Nashville	2	0	0	0	0	8	1	0	0	0	45
Alabama:											
Birmingham	4	10	1	58	0	6	1	1	0	0	82
Mobile	0	1	0	1	0	0	0	1	0	0	27
Montgomery	0	1	0	4	0	0	0	0	0	0	18
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	5	0	0	------	------	0	0	------	0	------
Little Rock	2	0	0	0	0	0	0	2	1	0	------
Louisiana:											
New Orleans	4	16	3	0	0	11	2	10	1	0	144
Shreveport	------	0	------	7	1	1	------	0	0	0	29
Oklahoma:											
Oklahoma	3	1	2	0	0	2	0	0	0	0	28
Tulsa	2	1	1	0	------	------	0	1	------	------	------
Texas:											
Dallas	3	6	1	5	0	2	0	1	0	2	41
Galveston	1	0	0	0	0	2	0	0	0	0	17
Houston	1	3	0	2	0	6	0	0	0	------	59
San Antonio	0	2	0	0	0	6	0	2	0	------	61

City reports for week ended January 10, 1925—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MOUNTAIN											
Montana:											
Billings	1	12	1	0	0	0	0	0	0	14	1
Great Falls	1	5	1	0	0	0	0	0	0	0	4
Helena	1	0	0	0	0	0	0	0	0	0	7
Missoula	1	0	0	0	0	0	0	0	0	0	9
Idaho:											
Boise	2	10	0	2	0	0	1	0	0	0	3
Colorado:											
Denver	9	7	3	0	0	12	0	0	0	2	81
Pueblo	3	2	0	0	0	0	0	1	0	0	15
New Mexico:											
Albuquerque	1	0	0	0	0	7	0	0	0	0	10
Arizona:											
Phoenix	------	0	------	0	0	7	------	0	0	0	23
Utah:											
Salt Lake City	4	3	2	0	0	3	0	0	0	1	34
Nevada:											
Reno	1	1	0	1	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	9	11	1	12	------	------	1	3	------	4	------
Spokane	4	3	5	2	------	------	1	0	------	6	------
Tacoma	3	2	1	1	0	0	0	0	0	0	40
Oregon:											
Portland	6	6	6	17	0	0	1	1	0	7	------
California:											
Los Angeles	15	39	2	29	0	26	1	2	0	34	263
Sacramento	1	1	0	2	0	4	1	0	0	0	18
San Francisco	15	9	1	5	1	15	1	4	0	16	184

Division, State, and city	Cerebro-spinal meningitis		Dengue		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)			Typhus fever	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, est. expectancy	Cases	Deaths	Cases	Deaths
NEW ENGLAND													
Massachusetts:													
Boston	2	2	0	0	4	3	0	0	0	0	0	0	0
Worcester	0	0	0	0	1	0	0	0	0	1	0	0	0
Connecticut:													
Bridgeport	1	1	0	0	0	0	0	0	0	0	0	0	0
Hartford	0	0	0	0	0	0	0	0	0	1	1	0	0
New Haven	1	0	0	0	0	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC													
New York:													
Buffalo	0	0	0	0	1	1	0	0	0	0	0	0	0
New York	3	1	0	0	7	5	0	0	0	0	0	1	0
Rochester	0	0	0	0	0	0	0	0	0	1	0	0	0
Pennsylvania:													
Philadelphia	1	1	0	0	3	3	0	0	0	1	0	0	0
Scranton	1	1	0	0	0	0	0	0	0	0	0	0	0

City reports for week ended January 10, 1925—Continued

Division, State, and city	Cerebro-spinal meningitis		Dengue		Lethargic encepha-litis		Pellagra		Poliomyelitis (infantile paralysis)			Typhus fever	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, est. expectancy	Cases	Deaths	Cases	Deaths
E. NORTH CENTRAL													
Ohio:													
Cincinnati	0	0	0	0	0	1	0	0	0	0	0	0	0
Cleveland	0	0	0	0	1	1	0	0	0	0	0	0	0
Illinois:													
Chicago	3	1	0	0	2	0	0	0	0	0	0	0	0
Michigan:													
Detroit	1	0	0	0	3	2	0	0	0	0	0	0	0
Wisconsin:													
Milwaukee	0	0	0	0	1	1	0	0	0	0	0	0	0
W. NORTH CENTRAL													
Missouri:													
St. Louis	1	1	2	0	2	0	0	0	0	0	0	0	0
Nebraska:													
Omaha	0	0	0	0	1	1	0	0	0	0	0	0	0
Kansas:													
Wichita	0	1	0	0	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC													
Maryland:													
Baltimore	0	0	0	0	1	1	0	0	0	0	2	0	0
South Carolina:													
Charleston	1	1	0	0	0	0	0	1	0	0	0	0	0
Columbia	0	0	0	0	0	0	0	2	0	0	0	0	0
Georgia:													
Atlanta	0	0	0	0	0	2	0	0	0	0	0	0	0
Savannah	0	0	0	0	0	0	1	1	0	0	0	0	0
E. SOUTH CENTRAL													
Tennessee:													
Memphis	0	0	0	0	0	0	0	1	0	0	0	0	0
W. SOUTH CENTRAL													
Louisiana:													
Shreveport	0	1	0	0	0	0	0	0	0	0	0	0	0
Oklahoma:													
Oklahoma	0	0	0	0	0	1	0	0	0	0	0	0	0
Texas:													
Houston	0	0	0	0	0	1	0	0	0	0	0	0	0
San Antonio	0	1	0	0	0	0	0	0	0	0	0	0	0
MOUNTAIN													
Montana:													
Missoula	0	0	0	0	0	0	0	0	0	0	0	1	0
Colorado:													
Denver	0	0	0	0	0	1	0	0	0	0	0	0	0
Utah:													
Salt Lake City	0	1	0	0	0	0	0	0	0	0	0	0	0
Nevada:													
Reno	0	0	0	0	0	0	0	0	0	2	1	0	0
PACIFIC													
Washington:													
Tacoma	0	0	0	0	0	0	0	0	0	1	1	0	0
Oregon:													
Portland	0	0	0	0	4	0	0	0	0	0	0	0	0
California:													
Los Angeles	2	1	0	0	1	0	1	0	0	2	0	0	0
Sacramento	0	0	0	0	0	0	0	0	0	1	0	0	0
San Francisco	0	1	0	0	0	0	0	0	0	0	0	0	0

The following table gives the rates per hundred thousand population for 105 cities for the 10-week period ended January 10, 1925. The population figures used in computing the rates were estimated as of July 1, 1923, as this is the latest date for which estimates are available. The 105 cities reporting cases had an estimated aggregate population of nearly 29,000,000 and the 97 cities reporting deaths had more than 28,000,000 population. The number of cities included in each group and the aggregate populations are shown in a separate table below.

Summary of weekly reports from cities, November 2, 1924, to January 10, 1925—Annual rates per 100,000 population [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Nov. 8	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3	Jan. 10
Total	204	201	201	175	[2] 190	[3] 193	[4] 197	150	[4] 155	[5] 169
New England	194	204	209	166	258	[3] 208	221	189	258	256
Middle Atlantic	154	158	159	144	170	175	187	149	140	181
East North Central	207	183	168	173	165	167	185	134	151	[5] 130
West North Central	265	305	332	307	309	265	299	168	176	143
South Atlantic	301	221	262	260	[6] 173	201	150	134	146	173
East South Central	200	149	183	120	[7] 98	97	149	51	91	120
West South Central	213	274	209	125	144	209	195	116	148	144
Mountain	363	344	258	162	172	315	248	209	191	239
Pacific	209	273	281	128	252	273	[4] 207	226	[4] 129	194

MEASLES CASE RATES

Total	56	58	72	66	[2] 112	[3] 128	[4] 143	105	[4] 158	[5] 216
New England	89	102	122	147	164	[3] 282	194	278	380	395
Middle Atlantic	73	68	78	79	105	120	115	235	121	169
East North Central	67	76	97	85	199	207	317	138	294	[5] 422
West North Central	15	21	29	10	25	35	19	10	10	19
South Atlantic	26	8	22	14	[6] 22	39	24	35	53	83
East South Central	11	11	11	0	[7] 0	6	11	0	17	29
West South Central	5	5	5	9	0	0	19	14	9	5
Mountain	19	38	38	29	19	48	57	19	115	134
Pacific	41	67	99	52	136	125	[4] 37	70	[4] 83	194

SCARLET FEVER CASE RATES

Total	208	198	223	232	[2] 270	[3] 312	[4] 314	244	[4] 297	[5] 369
New England	283	335	385	437	514	[3] 602	552	512	609	661
Middle Atlantic	179	167	185	197	197	260	268	225	286	324
East North Central	200	194	225	228	257	234	311	230	243	[5] 383
West North Central	466	456	473	508	616	626	601	468	527	757
South Atlantic	136	118	146	128	[6] 171	252	213	132	203	160
East South Central	166	80	97	57	[7] 162	109	240	126	172	229
West South Central	116	83	65	93	125	162	185	65	83	148
Mountain	181	191	229	143	296	162	239	191	162	382
Pacific	145	116	174	168	197	218	[4] 134	133	[4] 138	189

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1923.
[2] Norfolk, Va., and Memphis, Tenn., not included in calculating the rate. Reports not received at time of going to press.
[3] Worcester, Mass., not included.
[4] Los Angeles, Calif., not included.
[5] Fort Wayne, Ind., not included.
[6] Norfolk, Va., not included.
[7] Memphis, Tenn., not included.

Summary of weekly reports from cities November 2, 1924, to January 10, 1925—Annual rates per 100,000 population—Continued

SMALLPOX CASE RATES

	Week ended—									
	Nov. 8	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3	Jan 10.
Total	25	35	34	38	[2] 58	[3] 43	[4] 42	41	[4] 40	[5] 57
New England	0	0	0	0	0	[3] 0	0	0	0	0
Middle Atlantic	2	0	3	5	5	1	2	2	3	3
East North Central	4	8	10	14	10	13	14	20	27	[5] 40
West North Central	170	207	176	236	417	255	209	205	129	220
South Atlantic	6	14	12	6	[6] 48	39	22	28	39	30
East South Central	46	69	120	74	[7] 204	177	314	183	372	395
West South Central	9	37	28	32	19	14	51	19	32	65
Mountain	10	67	19	10	19	19	29	48	48	29
Pacific	93	136	142	136	113	113	[4] 106	122	[4] 69	148

TYPHOID FEVER CASE RATES

Total	22	19	24	29	[2] 45	[3] 43	[4] 56	35	[4] 37	[5] 36
New England	17	12	12	22	30	[3] 16	30	17	25	15
Middle Atlantic	12	17	23	46	71	68	101	57	58	49
East North Central	10	8	11	7	22	32	33	24	28	[5] 23
West North Central	19	6	17	4	8	17	15	19	4	6
South Atlantic	43	20	28	30	[6] 56	35	30	37	41	55
East South Central	80	114	80	109	[7] 63	57	51	34	40	51
West South Central	83	51	60	37	60	51	56	28	37	70
Mountain	86	76	19	19	10	19	10	0	0	10.
Pacific	26	17	46	17	29	17	[4] 14	15	[4] 5	26

INFLUENZA DEATH RATES

Total	7	8	8	10	[2] 12	[3] 17	[4] 16	15	19	[5] 21
New England	12	0	5	5	17	[3] 5	15	15	3	17
Middle Atlantic	12	9	9	8	11	22	17	14	21	20
East North Central	3	3	5	11	9	13	9	16	10	[5] 16
West North Central	0	0	0	7	4	4	9	7	9	13
South Atlantic	6	8	12	14	[6] 11	22	22	14	26	35
East South Central	6	23	11	29	[7] 28	23	23	51	63	46
West South Central	5	36	15	25	31	36	41	15	51	41
Mountain	0	10	38	19	29	29	48	10	38	19
Pacific	0	20	0	8	8	4	[4] 17	12	12	20

PNEUMONIA DEATH RATES

Total	118	125	120	130	[2] 153	[3] 159	[4] 172	157	203	[5] 192
New England	82	87	94	144	127	[3] 109	134	114	174	122
Middle Atlantic	154	149	152	152	188	201	191	178	226	228
East North Central	81	86	90	93	115	125	146	126	165	[5] 152
West North Central	63	70	79	74	63	88	68	92	101	90
South Atlantic	152	169	116	169	[6] 191	175	248	205	250	246
East South Central	137	263	206	246	[7] 211	217	297	206	303	292
West South Central	112	173	102	107	163	178	163	229	341	260
Mountain	76	95	143	124	210	200	276	219	229	229
Pacific	127	106	86	94	168	135	[4] 86	147	188	184

[2] Norfolk, Va., and Memphis, Tenn., not included in calculating the rate. Reports not received at time of going to press.
[3] Worcester, Mass., not included.
[4] Los Angeles, Calif., not included.
[5] Fort Wayne, Ind., not included.
[6] Norfolk, Va., not included.
[7] Memphis, Tenn., not included.

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 cases	Number of cities reporting deaths	Aggregate population of cities reporting cases	Aggregate population of cities reporting deaths
Total	105	97	28, 898, 350	28, 140, 934
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	11	2, 515, 330	2, 381, 454
South Atlantic	22	22	2, 566, 901	2, 566, 901
East South Central	7	7	911, 885	911, 885
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, 275, 841

FOREIGN AND INSULAR

AZORES

Plague.—Plague has been reported in the Azores as follows: Castelo Branco, a village 11½ kilometers from Horta, November 25, 1924, several cases; Feteira, 5 kilometers from Horta, November 25, one case; St. Michael, during the week ended November 22, 1924, three cases with one death. During the 10 days ended December 29, 1924, eight cases were reported on St. Michael Island.

BRAZIL

Hospital for lepers—Ceara.—On November 29, 1924, the president of the State of Ceara, Brazil, approved the bill passed in July, 1924, providing for the construction of a hospital for lepers at Ceara, Brazil.

CANARY ISLANDS

Plague—Vicinity of Santa Cruz de Teneriffe.—Information dated December 26, 1924, shows the occurrence, reported December 19, 1924, of three cases of plague at Realejo Alto, 45 kilometers from Santa Cruz de Teneriffe, Canary Islands. One case terminated fatally.

HAWAII

Plague—Honokaa.—A case of plague was notified, November 4, 1924, at Honokaa, Hawaii. The case occurred at Mill Camp, a location of the Honokaa Sugar Co.

MALTA

Lethargic encephalitis—Malta fever—Typhoid fever.—During the month of November, 1924, 5 cases of lethargic encephalitis, 56 cases of Malta (undulant) fever, and 26 cases of typhoid fever with 1 death were reported in the island of Malta.

SPAIN

Mortality from certain diseases—Barcelona Province.—During the months of September and October, 1924, mortality from certain diseases was reported in the Province of Barcelona, Spain, as follows: September, 1924—Bright's disease, 60 deaths; cancer and other malignant tumors, 113; organic diseases of the heart, 158; pneumonia,

26; tuberculosis, all forms, 172; typhoid fever, 101 deaths. October, 1924—Bright's disease, 71 deaths; cancer and other malignant tumors, 128; organic diseases of the heart, 198; pneumonia, 37; smallpox, 1; tuberculosis, all forms, 183; typhoid fever, 95 deaths.

UNION OF SOUTH AFRICA

Plague—Cape Province—Orange Free State—Transvaal.—During the week ended November 29, 1924, plague was reported in the Union of South Africa as follows: Cape Province—1 case, native, at De Aar; 2 cases, fatal, in native children, on farm, Maraisburg district. Orange Free State—1 case, native, from Hoopstad district, received at Kroonstad municipality. Transvaal—1 case, native, fatal, Wolmaransstad district, Vaal River.

VIRGIN ISLANDS

Communicable diseases—December, 1924.—Communicable diseases have been notified in the Virgin Islands as follows:

Island and disease	Cases	Remarks
St. Thomas and St. John:		
Dysentery	2	Unclassified.
Gonorrhea	2	
Malaria	1	St. John.
Measles	1	
St. Croix:		
Filariasis	7	
Gonorrhea	1	
Syphilis	1	Imported.
Trachoma	1	
Tuberculosis	2	Chronic pulmonary.

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER

Reports Received During Week Ended January 30, 1925 [1]

CHOLERA

Place	Date	Cases	Deaths	Remarks
India				Nov. 16-22, 1924: Cases, 1,938; deaths, 1,195.
Calcutta	Nov. 30-Dec. 13	14	12	
Madras	Dec. 7-13	2	2	
Siam:				
Bangkok	Nov. 23-29	1		

PLAGUE

Azores:				
Fayal Island—				
Castelo Branco	Nov. 25			Present with several cases.
Feteira	do	1	1	
St. Michael Island	Nov. 16-Dec. 29	11		
Canary Islands:				
Realejo Alto	Dec. 26	3	1	Vicinity of Santa Cruz de Teneriffe.
Ceylon:				
Colombo	Dec. 7-13		1	
Hawaii:				
Honokaa	Nov. 1	1		At Mill Camp, location of Honokaa Sugar Co.

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

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received During Week Ended January 30, 1925—Continued

PLAGUE—Continued

Place	Date	Cases	Deaths	Remarks
India				Nov. 16–22, 1924: Cases, 1,712; deaths, 1,237.
Rangoon	Nov. 30-Dec. 6	1	2	
Java:				
East Java—				
Blitar	Nov. 11-22			Province of Kediri; epidemic.
Pare	Nov. 29			Do.
Soerabaya	Nov. 16-22	6	4	
Union of South Africa:				
Cape Province—				
De Aar	Nov. 22-29	1		Native.
Maraisburg District	do	2	2	Bubonic. Native children, on Goedshoop Farm.
Orange Free State—				
Kroonstad	do	1		Bubonic; mild; from Grand. stable Farm, Hoopstad district.
Transvaal—				
Wolmaransstad District	do	1	1	On Farm Wolvespruit, Vaal River. Native.

SMALLPOX

Brazil:				
Pernambuco	Nov. 9-15	5	2	
Canada:				
British Columbia—				
Vancouver	Jan. 4-10	19		
Manitoba—				
Winnipeg	Jan. 4-17	11		
China:				
Amoy	Dec. 7-13			Present.
Hongkong	Nov. 30-Dec. 6	4	1	
Shanghai	Dec. 21-27		1	
Egypt:				
Alexandria	Dec. 17-23	3		
Great Britain:				
England and Wales	Dec. 7-Jan. 3	288		
India				Nov. 16–22, 1924; Cases, 969; deaths, 210.
Calcutta	Nov. 30-Dec. 13	78	36	
Karachi	Dec. 14-20	3		
Madras	Dec. 7-13	17	4	
Rangoon	Nov. 30-Dec. 6	9	3	
Java:				
East Java—				
Pasoerocan Residency	Nov. 12-19			Epidemic in two native villages.
Soerabaya	Nov. 16-29	123	51	
Mexico:				
Guadalajara	Jan. 6-12		1	
Mexico City	Dec. 14-20	2		
Vera Cruz	Jan. 5-11		3	
Villa Hermosa	Dec. 28-Jan. 10			Present. Locality, capital, State of Tabasco.
Spain:				
Barcelona	Oct. 1-31	1		Province.
Madrid	Year 1924		40	
Malaga	Nov. 23-Jan. 3		97	
Switzerland:				
Lucerne	Nov. 1-30	9		
Syria:				
Aleppo	Dec. 21-27	12		
Turkey:				
Constantinople	Dec. 13-19	5		
Union of South Africa:				
Cape Province	Nov. 22-29			Outbreaks.

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received During Week Ended January 30, 1925—Continued

TYPHUS FEVER

Place	Date	Cases	Deaths	Remarks
Mexico:				
Mexico City	Dec. 14-20	14		
Poland				Oct. 12-18, 1924: Cases, 30; deaths, 1.
Spain:				
Madrid	Year 1924		3	
Turkey:				
Constantinople	Dec. 13-19	3		
Union of South Africa:				
Cape Province	Nov. 23-29			Outbreaks.
Orange Free State	do			Do.

Reports Received from December 27, 1924, to January 23, 1925 [1]

CHOLERA

Place	Date	Cases	Deaths	Remarks
Ceylon:				
Colombo	Nov. 16-22	1		
India				Oct. 19-Nov. 15, 1924: Cases, 10,283; deaths, 6,122.
Bombay	Nov. 23-29	1	1	
Calcutta	Oct. 26-Nov. 29	35	29	
Madras	Nov. 16-Dec. 6	41	26	
Rangoon	Nov. 9-29	5	2	
Indo-China				Aug. 1-31, 1924: Cases, 7; deaths, 6. August, 1923: Cases, 13; deaths, 10 native and 1 fatal case European.
Province—				
Anam	Aug. 1-31	1	1	
Cambodia	do	2	2	
Cochin-China	do	4	3	
Siam:				
Bangkok	Nov. 9-22	3	2	

PLAGUE

Azores:				
Ponta Delgada	Dec. 6-12	9	5	
British East Africa:				
Kenya—				
Uganda	Aug. 1-31	79	62	
Canary Islands:				
Las Palmas				Stated to have been infected with plague Sept. 30, 1924.
Celebes:				
Macassar	Oct. 29			Epidemic.
Ceylon:				
Colombo	Nov. 9-Dec. 6	7	6	
China:				
Nanking	Nov. 23-Dec. 6			Present.
Ecuador:				
Guayaquil	Nov. 16-Dec. 15	8	3	Rats taken, 17,677; found infected, 33.
Egypt				Jan. 1-Dec. 9, 1924: Cases, 365. Corresponding period, year 1923—cases, 1,462.
City—				
Alexandria	Dec. 3-9	1	1	Bubonic.
Port Said	do	2	1	
Suez	do	1	1	
Hawaii				Dec. 9, 1924: Plague-infected rodent found in vicinity of Honokaa village.
India				Oct. 19-Nov. 15, 1924: Cases, 10,091; deaths, 7,463.
Bombay	Nov. 22-29	1	1	
Karachi	Nov. 30-Dec. 6	2	1	
Madras (Presidency)	Nov. 23-Dec 6	182	128	
Rangoon	Oct 26-Nov 29	12	11	

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

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received from December 27, 1924, to January 23, 1925—Continued

PLAGUE—Continued

Place	Date	Cases	Deaths	Remarks
Indo-China				Aug. 1-31, 1924: Cases, 13; deaths, 8. Corresponding period, 1923: Cases, 23; deaths, 21.
Province—				
Anam	Aug. 1-31	2	2	
Cambodia	do	9	6	
Cochin-China	do	2		
Java:				
Cheribon district	Oct. 14-Nov. 3		14	
Pekalongan district	do		29	
Soerabaya district—				
Soerabaya	Nov. 4			Epidemic. Seaport.
Tegal	Oct. 14-20		3	
Madagascar				Oct. 16-Nov. 15, 1924: Cases, 83; deaths, 75.
Tananarive Province—				
Tananarive Town	Oct. 16-Nov. 15	6	5	
Other localities	do	77	70	Bubonic, pneumonic, septicemic
Straits Settlements:				
Singapore	Nov. 9-15	1	1	
On vessel:				
S. S. Conde				At Marseille, France, Nov. 6, 1924. Plague rat found. Vessel left for Tamatave, Madagascar, Nov. 12, 1924.

SMALLPOX

Bolivia:				
La Paz	Nov. 1-30	12	7	
Brazil:				
Pernambuco	Nov. 16-22	21	4	
British South Africa:				
Northern Rhodesia	Oct. 28-Nov. 24	43	2	In natives.
Canada:				
British Columbia—				
Vancouver	Dec. 14-Jan. 3	32		
Manitoba—				
Winnipeg	Dec. 7-Jan. 3	14		
Ontario				Nov. 30-Dec. 27, 1924: Cases, 33.
China:				
Amoy	Nov. 9-29			Present.
Antung	Nov. 17-22	1		
Foochow	Nov. 2-Dec. 13			Do.
Hongkong	Nov. 9-15	1		
Shanghai	Dec. 7-13	1	1	Case, foreign; death, Chinese.
Czechoslovakia				April-June, 1924: Case, 1, occurring in Province of Moravia.
Ecuador:				
Guayaquil	Nov. 16-Dec. 15	4		
Egypt:				
Alexandria	Nov. 12-Dec. 16	6		
Gibraltar	Dec. 8-14	1		
Great Britain:				
England and Wales	Nov. 23-Dec. 6	184		
Newcastle-on-Tyne	Dec. 14-20	1		
India				Oct. 19-Nov. 15, 1924: Cases, 3,057; deaths, 673.
Bombay	Nov. 2-29	8	6	
Calcutta	Oct. 26-Nov. 29	72	46	
Karachi	Nov. 16-Dec. 13	9	1	
Madras	Nov. 16-Dec. 6	32	16	
Rangoon	Oct. 26-Nov. 29	32	9	
Indo-China				Aug. 1-31, 1924: Cases, 145; deaths, 54.
Province—				
Anam	Aug. 1-31	41	9	August, 1923: Cases, 177 (European, 20); deaths, 31 (European, 1).
Cambodia	do	24	8	
Cochin-China	do	72	30	
Saigon	Nov. 16-22	1	1	Including 100 sq. km. of surrounding country.
Tonkin	Aug. 1-31	8	7	
Iraq:				
Bagdad	Nov. 9-15	1	1	
Jamaica				Nov. 30-Dec. 27, 1924: Cases, 33. Reported as alastrim.
Kingston	Nov. 30-Dec. 27	4		Reported as alastrim.

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received from December 27, 1924, to January 23, 1925—Continued

SMALLPOX—Continued

Place	Date	Cases	Deaths	Remarks
Java:				
East Java—				
Soerabaya	Oct. 19–Nov. 15	361	108	
Province—				
Batam	Oct. 14–20	2		
Batavia	Oct. 21–Nov. 14	2		
Cheribon	Oct. 14–Nov. 3	14		
Pasoeroean	Oct. 26–Nov. 1	9	1	
Pekalongan	Oct. 14–Nov. 3	20		
Latvia				Oct. 1–31, 1924: Cases, 3.
Mexico:				
Durango	Dec. 1–31		5	
Guadalajara	Dec. 2–29		1	
Mexico City	Nov. 23–Dec. 13	2		
Tampico	Dec. 11–31	5	4	
Vera Cruz	Dec. 1–Jan. 3		10	
Portugal:				
Lisbon	Dec. 7–20	19		
Oporto	Nov. 30–Dec. 27	3	2	
Russia				Jan. 1–June 30, 1924: Cases, 9,683.
Spain:				
Barcelona	Nov. 27–Dec. 10		4	
Cadiz	Nov. 1–30		34	
Valencia	Nov. 30–Dec. 6	2	0	
Syria:				
Aleppo	Nov. 23–29	1	0	
Tunis:				
Tunis	Nov. 25–Dec. 29	42	35	
Union of South Africa:				
Cape Province	Nov. 9–15			Outbreaks.
Orange Free State	Nov. 2–8			Do.
Transvaal	Nov. 9–15			Do.

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Algeria:				
Algiers	Nov. 1–Dec. 10	2		
Bolivia:				
La Paz	do	2		
Chile:				
Concepcion	Nov. 25–Dec. 1		1	
Iquique	Nov. 30–Dec. 6		2	
Talcahuano	Nov. 16–Dec. 20		5	
Valparaiso	Nov. 25–Dec. 7		4	
Czechoslovakia				Apr.–June, 1924: Cases 3, occurring in Province of Russinia.
Egypt:				
Alexandria	Dec. 3–9	1	1	
Cairo	Oct. 1–Nov. 11	9	7	
Latvia				Oct. 1–31, 1924: Cases, 5.
Mexico:				
Durango	Dec. 1–31		1	
Guadalajara	Dec. 23–29		1	
Mexico City	Nov. 9–Dec. 13	51		
Palestine				Nov. 12–Dec. 8, 1924: Cases, 7.
Poland				Sept. 28–Oct. 11, 1924: Cases, 50, deaths, 3.
Rumania:				
Constanza	Dec. 1–10	1		
Russia				Jan. 1–June 30, 1924: Cases, 92,000.
Spain:				
Malaga	Dec. 21–27		1	
Turkey:				
Constantinople	Nov. 15–Dec. 5	3	1	
Union of South Africa:				
Cape Province	Nov. 9–15			Outbreaks.
East London	Nov. 16–22	1		
Orange Free State	Nov. 9–15			Do.
Transvaal	do			Do.
Yugoslavia:				
Belgrade	Nov. 24–Dec. 7	4		