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NATIONAL INVENTORY OF NEEDS FOR SANITATION FACILITIES

III. SEWERAGE AND WATER POLLUTION ABATEMENT [1]

GENERAL ASPECTS

Under the more primitive conditions of life, such as existed in the United States during the early days of the Republic, the disposal of household and other wastes was a comparatively simple problem, involving few if any intercommunity implications. In the rural sections of the country, substantially the same conditions are found today, except that the time-honored "privy" has been greatly improved in its functional design for good sanitation and the installation of running water supplies in many farm homes has made possible water-carriage systems of sewage disposal, utilizing individual cesspools, septic tanks, and subsurface tile grids for the final disposition of effluents.

With the development of urban communities, the disposal of wastes became a serious problem of public sanitation, which was not adequately solved until public water supplies were established and the construction of water-carriage sewer systems thus made possible. In modern cities, these sewer systems, constituting vast networks of interconnected underground conduits, are among the engineering marvels of the present age. Their phenomenal development within the past century has marked a new era in community sanitation, both in the United States and in other countries. The resulting improvement which they have wrought in the healthfulness and convenience of urban life has been reflected by the marked reduction in the prevalence of water-borne and fly-borne diseases which has been experienced in all communities served by public sewerage.

The widespread solution of this problem from the standpoint of local sanitation has resulted, however, in the creation of another problem of more far-reaching significance, namely, the increased pollution of the natural waterway systems of the country, in consequence of the concentration of large volumes of sewage and industrial wastes in streams, lakes, and coastal waters, which ordinarily

[1] Prepared by the Sanitary Engineering Division, United States Public Health Service.

afford the only means available for the ultimate disposal of these wastes. According to an estimate by the National Resources Committee (*1*), the total volume of sewage, both treated and untreated, which was being discharged through public sewer systems in 1938 amounted to some 5¾ billions of gallons daily. Approximately three-fifths of this total volume of sewage is treated to some degree, the remaining two-fifths being discharged without any treatment. The resulting increase in waterways pollution, in many cases far beyond the capacity of these watercourses for natural purification, has created a situation quite aptly termed by the National Resources Committee as one of "national concern."

In considering the needs which now or hereafter may exist for the further extension of public sewerage systems in the United States, it is imperative that full account be taken of the closely related needs, greater in the aggregate at present, for the abatement of water pollution, both resulting from the construction of sewer systems up to this time and also from that which may be expected to be added by any sewer extensions planned for the future. This need has been an important element in that part of the total needs for sanitation facilities with which the present paper deals.

Before considering in detail the results of this section of the inventory, it will be desirable to sketch very briefly the historical background of the particular needs with which it is concerned. In this connection, the three principal topics to be discussed are: (1) the development and present status of public sewerage systems in the United States, (2) the progress thus far made in the development of sewage and industrial wastes treatment, and (3) the history and present trend of water pollution and its abatement.

DEVELOPMENT OF PUBLIC SEWERAGE SYSTEMS IN THE UNITED STATES

The development of public sewerage systems in the United States dates from the year 1855, when the first comprehensive system in this country was designed for the city of Chicago. In 1860, according to Hyde (*2*), about 1,000,000 people of a total urban population of 6,000,000 were provided with some kind of sewerage, representing 17 percent of that total. In 1900 this number had increased to about 25,000,000, or roughly 35 percent of the total urban population. At the end of 1942, according to recent surveys of sewerage facilities in the United States conducted by the Public Health Service (*3*), with the cooperation of the State departments of health, the total population of some 8,434 communities, both incorporated and unincorporated, with 100 or more persons, had reached approximately 81,000,000, of which 70,900,000, or 87 percent, were estimated as being connected to sewers. Referring only to incorporated communities of more

than 200 population, a total of 7,484 such communities, having a combined population of 78,906,000, is now provided with sewerage facilities, either wholly or in part.

These figures indicate broadly that during the past 4 decades the total population connected to sewer systems has increased more than 3 times and its percentage of the total urban population by about 2.5 times. This situation is somewhat better than noted in 1926 by Fuller and McClintock (*4*) who remarked that over 4 times as much polluting matter was reaching American waterways then as 30 years previously.

SEWAGE TREATMENT

The general problem of sewage disposal is one of providing adequate and proper treatment facilities where necessary in order to supplement natural dilution. The development of sewage treatment in the United States has taken place largely within the past 50 years. In the year 1900, according to Hyde (*2*), roughly 60 municipal sewage treatment plants were serving a total population of about 1,000,000, or 4 percent of the population living in sewered communities. In 1935, there were approximately 3,700 municipal treatment plants serving a total population of 28,500,000, or 41 percent of the population resident in sewered communities. During the next 5 years, 1935–40, under the stimulus of Federal-aid projects, the number of treatment plants and population served increased phenomenally.

In 1942, according to the Public Health Service surveys, some 5,126 incorporated and unincorporated communities having 100 or more persons connected to sewers were wholly or partially served by 5,600 treatment plants. The estimated population connected to treatment plants was about 42,200,000, or 60 percent of the population connected to sewers. As the latter was about 70,900,000, the total population discharging untreated sewage through public sewer systems thus approximated 28,700,000 in that year. During the past 3 years community sewerage construction has been progressively curtailed except for construction in military and war industrial areas, resulting in a sizable backlog of deferred projects and suspended construction. Brief statistics on facilities under construction, or on which construction has been suspended, are given in a later paragraph.

Since the early years of sewage treatment, methods and processes have undergone a considerable degree of variation and elaboration, though some of the older processes, modified to some extent, have remained basically unaltered. In general, sewage treatment processes now are broadly classified as "primary" and "secondary," according to their degree of elaboration and purification effected. Primary treatment ordinarily includes screening and various methods of sedimentation.

Secondary treatment embraces the various additional processes, such as chemical treatment, activated sludge treatment, and the use of trickling or intermittent sand filters, which are designed to secure a higher degree of purification. Chlorination may be an adjunctive feature of either primary or secondary treatment, designed to reduce the content of sewage bacteria in watercourses receiving treated effluents. In general, it may be assumed that as an average, primary treatment effects about 35 percent of purification, and secondary treatment about 85 percent. These figures are approximate and subject to considerable variation in individual cases, according to local conditions and methods of treatment.

According to sewerage census data assembled up to the end of 1942 (*3*), treatment facilities serving the 5,100 communities previously mentioned were distributed as follows:

Treatment	Number of plants	Percent of total plants	Estimated population served	Percent of total population
Minor	50	0.9	3,300,000	7.8
Primary	2,848	50.8	15,900,000	37.7
Intermediate and secondary	2,712	48.3	23,000,000	54.5
Total	5,610	100.0	42,200,000	100.0
Plants with chlorination	1,168	20.8	14,980,000	35.5

In addition to the facilities in service reported above, community sewerage projects under construction, including those on which construction was suspended, based on data available for projects being constructed prior to 1943, included initial sewer systems and treatment plants for some 95 communities with 120,000 total population, initial sewer systems for 8 communities totaling about 12,000 population, initial treatment plants for 28 communities having existing sewer systems discharging sewage raw and serving connecting populations aggregating 470,000, and raising in 18 communities the existing degree of treatment variously from one to another of the general classifications indicated in the above table and involving some 1,200,000 connected population. In similar construction status prior to 1943 were treatment plant improvements and replacements which might be roughly classed as being within one or another of the general distribution groupings listed above. Later reports may reveal a number of new projects and improvements above-mentioned to have gone into operation during 1943, or some prior to that year.

WATER POLLUTION

According to the figures previously cited, about 29,000,000 people in 1942 were discharging raw sewage, and roughly 42,000,000, sewage treated to some degree, into the natural waterways of the United

States. Of the latter group, it has been noted that 3,300,000 were served by minor treatment, 15,900,000 by primary treatment, and 23,000,000 by intermediate and secondary treatment. Of this latter group, about 3,500,000 were served by intermediate treatment and 19,500,000 by secondary treatment. If it be assumed that minor treatment effects no purification, primary treatment 35 percent, intermediate treatment 50 percent, and secondary treatment 85 percent, it may be estimated roughly that the total residual polluting effect of this combined population would be equivalent to the raw sewage from approximately 18,400,000 population. When added to the 28,700,000 discharging raw sewage, this would make a total of about 47,000,000 whose raw sewage contribution would be approximately equivalent, in polluting effect, to that of the 71,000,000 discharging raw and treated sewage combined.

In addition to domestic sewage, large volumes of liquid wastes from industrial processes are discharged into natural watercourses, either directly or through sewer systems. Various estimates have been made as to the total pollution effect of these wastes in terms of equivalent populations contributing raw sewage. In the Ohio River Basin, the total industrial wastes pollution has been estimated as being equivalent to the raw sewage contributed by about 10,000,000 people. This is 116 percent of the actual sewered population, which approximates 8,620,000.

For the entire country, it may be estimated roughly that the total industrial wastes pollution is equivalent to the raw sewage discharged by a population of about 55,000,000 or 60,000,000. This estimate has been made by assuming that the total industrial wastes pollution in the 48 States would bear the same ratio to the corresponding total for the Ohio River Basin, both expressed in terms of sewage-contributing population, as is borne by the estimated financial values of products manufactured by the waste-producing industries in these two respective areas, as given by the National Resources Committee (*1*). This assumption is not valid for individual industries, but may be roughly correct for the various industries making up the group considered. On this basis, it may be estimated that the combined sewage and industrial wastes pollution for the country as a whole approximates the raw sewage contribution of not less than 100,000,000 people, including the 47,000,000 of equivalent sewage-contributing population.

These figures afford a very rough index of the present extent of water pollution in the United States and the magnitude of the problem of pollution abatement which is thus presented. This problem is a many-sided one, with widely divergent aspects, according to the various needs of industry, agriculture, commerce, and urban development affecting water use and waterways utilization in different parts

of the country. The problem also involves to a considerable extent certain broader interests of the entire population, such as the recreational use of natural watercourses and the propagation of fish life as an important element in the Nation's food supply.

In the report previously noted (*1*), the National Resources Committee has summarized its findings and recommendations with respect to the status of water pollution in the United States in 1939. In this connection, it was pointed out: (1) that water pollution is a problem of national concern, though most serious in the more populous and highly industrialized northeastern section of the country, (2) that it is inimical to the public interest in a variety of ways, and (3) that a reasonable program of pollution abatement would cost about $2,000,000,000 and require 10 to 20 years for its completion.

Nearly 25 years ago, F. H. Newell, former director of the United States Reclamation Service, described the various uses of water, listing them in decending order of importance as follows (*5*):

1. Human consumption (drinking).
2. Production of food (watering stock, irrigation, and fish propagation).
3. Disposal of wastes.
4. Industry (water power, steam power, and industrial processes).
5. Transportation (navigation).

To this list may be added:

6. Recreation (boating, bathing, camping, and sport fishing).

Under various local conditions affecting individual watercourses or geographical areas, the relative order of importance of these uses has been found by experience to be subject to some variation, though in general it probably remains today substantially as given by Newell. In Wisconsin and Minnesota, for example, as well as other vacation areas, recreational use of waters would stand very high in relative order of importance. In some industrial areas the use of water for industrial purposes would have a priority. It is to be noted that Newell was one of the early proponents of using waterways for the disposal of wastes, which has become generally recognized as a legitimate use, when not abused so as to interfere with other essential or desirable uses.

Damages resulting from water pollution may be classified as follows, roughly in the order of their relative importance, but subject to alteration in this respect in different areas and under various circumstances affecting water uses:

1. Damage to public water supplies used for domestic purposes (drinking and culinary use).
2. Damage to agriculture and food fish propagation (food production).
3. Damage to industrial uses of water.
4. Interference with navigation.
5. Damage to recreational uses.
6. Damage to land and property values not above included (resulting mostly from "nuisance" conditions).

In the Ohio River Basin, which presents both a large and typical industrial area in its northern section and an extensive rural area in its southern portion, the effects of pollution are fairly representative of those which have been experienced in other industrial areas throughout the country. Many water supplies, domestic and industrial, have suffered from the effects of sewage and industrial wastes, both from the standpoint of palatability and other physical and chemical qualities and from that of the public health. Although typhoid fever prevalence has been greatly reduced by effective municipal water purification, outbreaks of other intestinal diseases, apparently water-borne, have occurred from time to time, especially during or following periods of low stream flow. Recreational facilities have been materially damaged. Food fish and other aquatic life have been destroyed, or detrimentally affected. Property values along some streams have been reduced because of "nuisance" conditions caused by excessive pollution. Navigation has been seriously affected by corrosion of metal parts of river craft, and dams by acid waters. Agriculture has suffered from the deterioration in the quality of stream waters used for stock watering and irrigation.

ECONOMIC LOSSES FROM WATER POLLUTION

The economic losses resulting from water pollution over the entire country cannot be estimated with any degree of completeness or accuracy, because of the manifold types of damage resulting from pollution and the wide variety of local conditions which are concerned in such damage. Moreover, factual data bearing on the actual costs of pollution in terms of total damage to waterways, which not only are used for certain purposes but could be used for additional purposes if relatively unpolluted, are at best incomplete and in some instances almost wholly lacking. The element of intangible losses resulting from excessive water pollution and, conversely, of intangible benefits following its correction, is a very large one in many situations, particularly in those involving recreational uses of waterways and the various types of urban development which are affected by pollution in its different aspects. These intangible losses and benefits are difficult to evaluate in financial terms, which cannot, in fact, include all of the real liabilities and assets thereby involved.

Bearing on this phase of the subject, the experience of Wisconsin and Minnesota has been of particular interest, because these two States are well-known vacation areas in which the value of good streams and lakes is recognized as a definite public asset. In a special report on stream pollution in Wisconsin (*6*), issued in 1927, it was estimated, on the basis of a State-wide questionnaire to vacationists, that the income value of natural bodies of water in that

State for pleasure fishing alone approximated $10,000,000 annually, the total vacational expenditure being about $100,000,000 per year. Commercial fishing was valued at $750,000 annually. Substantially the same figures for Minnesota were derived from a similar estimate described in a report by the Metropolitan Drainage Commission of Minneapolis–St.Paul in 1928 (*7*). In this report it also was estimated that correction of pollution in the upper Mississippi River in the Twin Cities district would add a total of $1,500,000 to $2,500,000 to land values in that district alone, together with a river frontage value increase of $1,500,000. Commercial and sports fishing in the same district were valued at $110,000 annually. These combined benefits, both for Minnesota and Wisconsin and for the Twin Cities, would amount to somewhere between $4 and $5 per capita, on the basis of the respective populations of these areas.

The economic losses resulting from certain types of damage to water supplies, some of them due to pollution of their sources, have been discussed in the first paper of this series (*8*). In a note prepared for the National Resources Committee,[2] Jordan has estimated that a variation from low to high pollution load on water treatment plants would entail an increase in the cost of operation from $7.90 to $16 per million gallons. From statistics of construction and operating costs for 10 Ohio River water filtration plants handling raw waters of various average degrees of pollution, it has been shown by Streeter (*9*) that an increase in the yearly average raw water pollution load, expressed in terms of the coliform bacteria index, from 5,000 to 20,000 per 100 milliliter has added about $1 per capita annually to the total cost of water purification. Although this represents a definite tax on water consumers, due to pollution, it does not tell the whole story, as it fails to take account of the general depreciation in the palatability and other qualities of water supplies which has been experienced from excessive water pollution by sewage and industrial wastes. Although water-borne typhoid fever prevalence has been greatly reduced as the result of advances made in the technology of water purification, this disease still imposes a considerable annual economic loss on the country, and other water-borne diseases, mostly nonfatal, have continued to cause financial burdens such as those discussed in the first paper of this series (*8*).

The economic losses resulting from industrial wastes pollution are so variable according to the types and volumes of wastes involved that no reasonably complete evaluation of them is possible at the present time. In the Ohio River Basin, it has been estimated (*10*) that the total damage to streams caused by acid mine drainage water amounted to roughly $2,000,000 annually in 1940. At this time, sealing of mine openings had reduced the original mine-acid load by

[2] Appendix to reference 1.

about 25 percent. Certain industrial wastes, such as those from coke byproducts, producer gas, carbide, and oil refinery plants, have caused such objectionable tastes and odors in affected water supplies that many private bottled-water companies have done a thriving business among those able to afford such a luxury. In the first paper of this series, figures have been cited bearing on estimates of the per capita cost of bottled water in one typical case of this kind. Pollution of streams by sewage and industrial wastes rendering them unfit for stock watering and other agricultural uses has imposed heavy damage claims, upheld by the courts, on polluters in numerous instances.

These are but a few examples of the economic burden imposed on riparian dwellers and communities by water pollution in its various aspects. Although it would be extremely hazardous to estimate from the available data what the total burden may be in this respect, it is safe to say that it probably amounts to at least $1 per capita annually for 75 percent of the entire population of the United States, or roughly $100,000,000 annually for the entire country. Making due allowance for the intangible elements involved in such an estimate, such as general depreciation of land values, deterioration of water supplies, and damage to existing and potential recreational areas near centers of population, all of which are affected by pollution in ways which cannot be evaluated fully in financial terms, it seems likely that this estimate, admittedly a very rough approximation, probably errs materially on the side of conservatism.

THE PRESENT INVENTORY

The present inventory was undertaken in March 1943, in connection with a general survey of sanitation needs instituted by the States Relations Division of the Public Health Service through the Sanitation Section.

Basic data for the inventory have been obtained from 10 main sources as follows:

1. United States census data for 1940, listing incorporated communities and their populations.

2. A national census of sewerage systems and sewage treatment plants in the United States up to the end of the year 1940, as compiled by the United States Public Health Service, with cooperation by the State departments of health, together with unpublished supplements for 1941 and 1942.

3. Ohio River Pollution Survey, Final Report to the Ohio River Committee, United States Public Health Service and United States Corps of Engineers.

4. Reports of the National Resources Planning Board, dealing with sewage disposal and stream pollution abatement projects.

5. War Emergency Survey Reports, United States Public Health Service.
6. Reports of reconnaissance surveys by the Public Health Service.
7. Public Works Administration non-Federal projects. Publication No. 104, Public Works Administration (1940).
8. Engineering estimates for post-war construction from State and local agencies.
9. State health department reports and data.
10. Data from engineering publications.

POPULATIONS AFFECTED BY PRESENT NEEDS FOR SEWERAGE AND SEWAGE TREATMENT

In compiling the inventory it has been aimed to show the populations of all incorporated communities of more than 200 inhabitants in each State needing additional sewerage and sewage treatment facilities of various types, together with the estimated costs of such facilities, brought to the 1942 price level.[3] The provision of such facilities would provide every incorporated community of more than 200 population with a complete sewer system and adequate sewage treatment, to which all of the inhabitants of eaeh community would be connected, except those who could not be served with reasonable economy.

In estimating the needs for new sewer systems, or for extension of present systems, the additional populations to be served by these improvements have been based, in each case, on the difference between the total population of a community, as shown by the United States Census of 1940, and the number of people in that community who are now connected to the sewer system, according to the latest information available from the Public Health Service census of sewerage facilities (substantially up to the end of 1942). In estimating the populations needing intercepting sewers, it has been assumed that every incorporated community now sewered, but not provided with sewage treatment, will require this facility as an essential step toward the construction of a treatment plant.

With reference to sewage treatment, existing needs have been based on meeting requirements of three general categories, namely, (1) new sewage treatment plants for sewered communities now discharging raw sewage, (2) new treatment plants for communities not at present sewered, but needing such facilities, and (3) improvements and extensions to existing treatment plants. In estimating the populations needing new sewage treatment plants, as under categories 1 and 2, provision has been made for each incorporated community of more than 200 inhabitants falling under either one of these two categories. In this connection, the designed population to be served by each plant

[3] Some 1,550 small communities of less than 200 inhabitants were omitted from this inventory as presenting a special problem.

has been increased over that which is shown by the 1940 census by 10 percent for communities of less than 10,000 inhabitants and by 20 percent for all larger communities.

In some instances, where the self-purification capacities of natural watercourses are adequate to take care of the untreated wastes of particular communities without endangering the normal use of such watercourse for other essential or desirable purposes, the provision of sewage treatment facilities may be unnecessary, or at least deferable for an indefinite period of time. To this extent, the inclusion of every community in the three categories of needs above described doubtless would represent a certain degree of overstatement of such needs, insofar as the immediate future is concerned. On the other hand, the provision of at least primary treatment facilities for all sewered communities, regardless of their position in relation to natural watercourses, has been contemplated as an ultimate goal in the more recent trend of thought concerning these matters. Although this general policy may be unjustified in some cases, it provides for maximum needs in any event and, in the absence of detailed information as to local situations, probably is the most rational basis for preliminary estimates such as are involved in the present inventory.

Estimates of populations affected by improvements and extensions of existing sewage treatment plants have been obtained by taking the difference between the 1940 census population, increased by 10 or 20 percent if less or greater than 10,000, respectively, and the population for which the existing plant has been designed, based on its present capacity. This difference has been considered as representing the additional population of the community for which extensions of present treatment facilities will be needed.

Although these several estimates have been made for every community individually, it obviously would be impracticable to present within the compass of this paper such detailed information as thereby would be involved. For practical purposes, therefore, it will be sufficient to show here the total populations affected by needs of various types in each State and in the District of Columbia.

In table 1, for general reference, is given a summary of the number of incorporated communities in the United States classified according to population, together with the total populations of these incorporated places, grouped according to a somewhat broader classification. Reference to this table shows that a total number of 16,752 incorporated communities, with a combined population of 83,766,379, was listed in the 1940 United States Census and that 10,083 of these communities, with a combined population of 4,315,843, had less than 1,000 inhabitants individually. The bulk of the urban population, amounting to 74,423,702, was found in communities of over 2,500 population.

In order to show the present status in the provision of public

sewerage facilities table 2 has been compiled, giving for each State the number and total population of incorporated communities now provided with sewer systems. In this table the communities have been classified according to their individual populations, the lowest range being 1,000 and under and the highest 50,000 and over. In columns 9 and 10 the combined figures are given for all sewered communities in each State. These combined figures show a grand total of 7,484 incorporated communities, having a total population of 78,905,826, now provided with sewer systems.

TABLE 1.—*Number and population of incorporated communities in the continental United States, as given by the 1940 Census, classified according to population*

[Incorporated places]

Population range	Number of communities	Population
Total	16,752	
Under 1,000	10,083	
1,000 to 4,999	4,627	
5,000 to 24,999	1,630	
25,000 to 49,999	213	
50,000 to 99,999	107	
100,000 and over	92	
Under 1,000	10,083	4,315,843
1,000 to 2,500	3,205	5,026,834
Over 2,500	3,464	74,423,702
Total	16,752	83,766,379

A comprehensive estimate of these needs is shown, however, in table 3, which has been compiled from a detailed study of the requirements for each individual community of more than 200 population. In this table it is indicated that new sewer systems are needed for a total of 7,718 communities with a combined population of 4,835,847. It is of some interest to note that about 60 percent of the communities needing new sewer systems have less than 500 inhabitants and 87 percent less than 1,000, thus indicating that most of the existing needs in this respect are to be found in the very small communities.

The needs for extension of existing sewer systems are measurably greater than for the construction of new systems, as is revealed by the figures in table 4, which show a total additional population of 10,297,300 in communities now sewered for which sewer extensions are needed. The distribution of this population among the 48 States is roughly in accordance with the distribution of urban population, as is likewise true of the sewered population figures in table 2, though exceptions are to be noted in certain States which have undergone a rapid increase in urban population recently. An example is found in California, in which the largest unconnected population of sewered communities is noted. The total unsewered population in sewered

communities throughout the entire country is shown by comparison with the total population of these communities (table 2) to amount to 13 percent of the latter. Thus it may be said that approximately

TABLE 2.—*Number and population of incorporated communities provided with existing sewer systems*

[Classified according to population]

State	Population range								Combined total	
	1,000 and under		1,000–4,999		5,000–49,999		50,000 and over			
	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)
Alabama	26	19,848	73	176,481	23	275,973	4	451,880	126	924,182
Arizona	2	1,879	13	33,509	9	86,217	1	65,414	25	187,019
Arkansas	16	10,912	67	165,439	21	234,821	1	88,039	105	499,211
California	25	16,367	129	328,441	96	1,239,469	13	3,401,895	263	4,986,172
Colorado	39	23,933	47	106,537	15	165,422	2	374,574	103	670,466
Connecticut			2	6,042	20	472,514	5	641,992	27	1,120,548
Delaware	3	2,758	13	33,158	1	5,517	1	112,504	18	153,937
District of Columbia							1	663,091	1	663,091
Florida	14	9,771	62	153,905	28	386,061	4	514,440	108	1,064,177
Georgia	21	14,182	108	261,791	30	316,284	5	575,348	164	1,167,605
Idaho	0	0	5	16,291	10	122,499	0		15	138,790
Illinois	63	43,063	218	519,182	106	1,449,220	9	3,993,065	396	6,004,530
Indiana	79	55,401	116	250,644	59	689,154	8	1,003,062	262	1,998,261
Iowa	141	93,252	164	335,438	39	492,175	5	422,085	349	1,342,951
Kansas	74	48,227	104	226,996	29	336,128	3	304,257	210	915,608
Kentucky	23	17,075	86	195,780	28	370,517	2	381,095	139	964,467
Louisiana	2	1,474	38	108,365	25	396,100	2	592,704	67	1,098,643
Maine			6	18,857	19	253,040	1	73,643	26	345,540
Maryland	29	16,293	29	66,840	8	131,630	1	859,100	67	1,073,863
Massachusetts			9	34,920	96	1,574,501	16	2,219,593	121	3,829,014
Michigan	69	44,903	146	323,578	67	927,567	9	2,335,951	291	3,632,179
Minnesota	128	81,005	143	282,055	40	388,057	3	881,171	314	1,632,288
Mississippi	33	21,403	55	127,890	21	279,854	1	62,107	110	491,259
Missouri	32	21,241	118	258,564	43	474,752	4	1,352,175	197	2,106,732
Montana	23	14,539	32	66,286	12	177,945	0	0	67	258,770
Nebraska	91	61,700	88	167,409	15	146,908	2	305,828	196	681,845
Nevada	3	2,626	6	16,402	3	35,057	0	0	12	54,085
New Hampshire			2	8,498	15	197,042	1	77,685	18	283,225
New Jersey	27	14,802	63	185,876	106	1,521,825	13	1,657,981	209	3,380,487
New Mexico	12	8,812	17	42,550	13	142,372	0	0	42	193,752
New York	38	27,424	147	380,411	100	1,429,786	13	9,375,492	298	11,213,113
North Carolina	90	56,503	110	231,476	40	511,669	5	351,538	245	1,151,186
North Dakota	38	26,418	35	53,006	9	118,247	0	0	82	197,671
Ohio	146	89,868	218	479,469	102	1,858,127	12	2,899,418	478	5,326,882
Oklahoma	55	35,809	111	232,998	40	427,110	2	346,581	208	1,042,498
Oregon	34	18,971	41	102,002	15	162,593	1	305,394	91	589,960
Pennsylvania	64	46,485	242	611,565	172	2,008,110	16	3,720,377	494	6,386,537
Rhode Island			1	3,842	10	245,193	2	329,301	13	578,336
South Carolina	12	7,382	62	148,919	21	239,537	2	133,671	97	529,509
South Dakota	49	51,252	44	81,500	10	128,466	0	0	103	241,218
Tennessee	10	7,936	57	142,084	23	218,382	4	700,087	94	1,068,489
Texas	72	53,545	258	605,063	91	988,007	11	1,580,396	432	3,227,011
Utah	6	4,427	23	55,905	7	950,990	1	149,934	37	161,256
Vermont	14	7,187	21	43,184	10	107,625	0	0	45	157,996
Virginia	28	17,190	59	140,080	24	348,065	5	514,446	116	1,019,781
Washington	40	26,582	54	590,725	17	249,010	3	599,711	114	1,466,028
West Virginia	66	39,300	82	166,985	22	259,298	3	207,849	173	673,432
Wisconsin	100	68,828	125	270,349	50	825,081	3	732,114	278	1,896,372
Wyoming	11	5,455	21	45,262	6	76,952	0	0	38	127,669
Total	1,848	1,216,010	3,670	8,901,959	1,766	27,034,869	200	41,752,988	7,484	78,905,826

TABLE 3.—*Number and population of incorporated communities with over 200 inhabitants for which new sewer systems with treatment are needed*

[Classified according to population]

State	Population range								Combined total	
	201–500		501–1,000		1,001–5,000		Over 5,000			
	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)
Alabama	72	23,498	46	30,377	19	24,595	3	25,933	140	104,403
Arizona			6	4,899	3	4,142			9	9,041
Arkansas	152	47,120	65	46,171	22	33,368			239	126,659
California	3	1,066	7	5,702	8	17,851	1	9,122	19	33,741
Colorado	77	22,595	25	17,164	9	12,599			111	52,358
Connecticut			3	1,915	9	22,189	3	27,347	15	51,451
Delaware	16	4,794	8	5,360	3	4,248			27	14,402
District of Columbia										
Florida	64	21,397	44	30,660	32	60,090	2	15,702	142	127,849
Georgia	187	59,174	96	63,440	25	29,280	1	12,155	309	164,049
Idaho	56	19,802	32	21,272	36	74,859			124	115,933
Illinois	407	124,529	226	155,940	87	130,121			720	410,590
Indiana	139	46,454	78	48,871	18	26,007			230	121,422
Iowa	309	99,178	99	66,174	8	9,590			416	174,942
Kansas	211	68,565	65	41,645	6	8,691			282	118,901
Kentucky	84	28,258	53	37,043	22	32,452			159	97,753
Louisiana	52	19,556	41	30,926	43	70,188	1	5,384	137	126,054
Maine										
Maryland	31	10,103	23	18,208	13	23,183			67	51,494
Massachusetts										
Michigan	94	32,117	57	37,578	19	26,967	2	16,225	172	112,887
Minnesota	271	78,287	59	37,017	11	20,689			341	135,993
Mississippi	79	27,516	47	31,969	27	48,365			154	107,850
Missouri	273	89,274	100	68,661	33	51,039			405	208,974
Montana	26	8,504	17	11,090	3	4,389			46	23,983
Nebraska	190	60,756	31	19,515					221	80,271
Nevada										
New Hampshire										
New Jersey	17	6,342	27	19,505	77	186,569	2	10,682	123	223,118
New Mexico	9	2,717	5	3,941	4	5,184	1	6,421	19	18,263
New York	94	32,980	113	78,286	85	16,560	6	52,807	298	180,633
North Carolina	143	45,824	40	26,700	16	24,168			199	96,692
North Dakota	171	50,755	24	15,731	3	4,672			198	71,158
Ohio	207	70,719	98	66,143	24	39,203			329	176,065
Oklahoma	201	59,513	65	42,635	9	10,406			275	112,554
Oregon	63	19,167	22	15,178	9	11,678			94	46,023
Pennsylvania	175	57,748	140	98,978	125	263,096	20	145,183	460	565,005
Rhode Island							6	75,047	6	75,047
South Carolina	68	22,157	29	18,930	18	26,997			115	68,084
South Dakota	126	36,496	25	15,657	2	2,063			153	54,216
Tennessee	63	20,234	39	27,784	21	31,723			123	79,741
Texas	92	33,777	84	58,581	32	51,269			208	143,627
Utah	67	22,276	45	30,240	31	56,780			143	109,296
Vermont	14	3,943	8	5,498	3	5,266			25	14,707
Virginia	54	17,911	32	21,564	6	7,569			92	47,044
Washington	58	18,961	30	21,188	10	13,272			98	53,421
West Virginia	27	7,554	6	4,987	3	3,770			36	16,302
Wisconsin	138	44,718	60	40,452	10	15,325			208	100,495
Wyoming	24	6,977	4	2,966	3	3,413			31	13,356
Total	4,604	1,473,312	2,119	1,446,532	947	1,513,995	48	402,008	7,718	4,835,847

1 out of every 7 persons residing in such communities remains unconnected to an existing sewer system.

In the introductory section of this paper it has been noted that

the existing needs of the urban population for the treatment of raw sewage now being discharged through existing sewer systems present a considerably larger problem, as a whole, than the needs for additional sewerage facilities. In table 5, this greater need is reflected by the estimated total population, numbering 25,788,663, of some 2,804 incorporated communities which are not provided at present with any form of sewage treatment. This represents about 33 percent of the total population of the country inhabiting incorporated sewered communities and 31 percent of the total urban population, or nearly 1 out of every 3 persons living in incorporated communities. These figures serve to reemphasize the importance and magnitude of the task which remains to be met in the abatement of water pollution throughout the country.

In order to summarize the total figures given in tables 2 to 5, inclusive, for more ready comparison, table 6 has been prepared. In this table it is indicated that 10,522 communities in the country as a whole, with a combined population of some 30,000,000, are lacking in public sewer systems, or in sewage treatment plants, or in both combined. The needs in this respect are by far the greater in communities under 5,000, insofar as the number of new systems needed is concerned, though the need in terms of population to be served is about 2.7 times as great in communities of more than 5,000. With the total number and population of communities needing extensions

TABLE 4—*Number of communities and total populations for which extensions to existing sewer systems are needed*

State	Number of communities	Population	State	Number of communities	Population
Alabama	114	291,600	New Hampshire	16	78,100
Arizona	12	27,900	New Jersey	69	110,800
Arkansas	91	122,500	New Mexico	37	47,800
California	183	1,209,400	New York	155	788,200
Colorado	79	80,400	North Carolina	220	269,700
Connecticut	18	113,900	North Dakota	73	45,900
Delaware	14	27,900	Ohio	381	506,000
Florida	82	376,000	Oklahoma	189	112,100
Georgia	160	395,800	Oregon	69	46,500
Idaho	11	23,700	Pennsylvania	291	460,100
Illinois	341	538,800	Rhode Island	13	82,800
Indiana	259	376,600	South Carolina	72	103,100
Iowa	248	184,600	South Dakota	49	21,400
Kansas	128	153,500	Tennessee	91	267,700
Kentucky	113	145,400	Texas	324	688,000
Louisiana	61	160,700	Utah	35	109,000
Maine	24	89,600	Vermont	12	12,000
Maryland	53	114,300	Virginia	75	110,000
Massachusetts	96	392,300	Washington	101	233,600
Michigan	159	116,500	West Virginia	129	93,300
Minnesota	272	333,100	Wisconsin	165	156,900
Mississippi	92	139,100	Wyoming	24	16,600
Missouri	186	379,900	District of Columbia	1	7,500
Montana	51	35,700			
Nebraska	108	92,300	Total	5,553	10,297,300
Nevada	7	8,700			

TABLE 5.—*Number and population of incorporated communities with over 200 inhabitants for which new sewage treatment plants are needed in connection with existing sewer systems*

[Classified according to population]

State	Population range								Combined total	
	1,000 and under		1,001 to 5,000		5,001 to 50,000		Over 50,000			
	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)	Number of communities	Population (1940)
Alabama	5	3,417	43	107,142	15	213,945	2	156,084	65	480,588
Arizona			2	7,150	4	23,482			6	30,632
Arkansas	4	2,545	13	31,029	7	108,709	1	88,039	25	230,322
California	6	3,820	26	68,202	21	218,882	4	679,919	57	970,823
Colorado	26	15,169	25	56,810	5	37,449			56	109,428
Connecticut			2	6,042	5	75,481	1	99,314	8	180,837
Delaware			6	16,103			1	112,504	7	128,607
District of Columbia										
Florida	2	1,066	15	40,773	6	63,702	1	173,065	24	278,606
Georgia	5	3,436	44	121,342	15	149,672	4	273,060	68	547,510
Idaho			3	10,063	8	106,436			11	116,499
Illinois	9	4,480	45	109,036	18	227,448	1	75,608	73	416,572
Indiana	68	49,126	77	153,800	28	324,028	2	164,078	175	691,032
Iowa	24	15,993	36	80,506	11	234,390	1	82,364	72	413,253
Kansas	20	12,985	22	52,868	8	81,576	1	121,458	51	268,887
Kentucky	15	10,726	48	101,329	13	183,903	2	381,185	78	677,143
Louisiana			11	32,862	10	148,753	2	592,704	23	774,319
Maine			6	18,857	17	239,057	1	73,643	24	331,557
Maryland	17	10,905	9	24,051	3	60,455			29	95,411
Massachusetts			4	16,600	56	1,074,984	13	1,814,002	73	2,905,586
Michigan	56	36,628	84	193,973	27	390,252			167	620.853
Minnesota	46	27,492	38	78,577	12	116,488			96	222,557
Mississippi	10	6,484	30	77,365	16	232,804	1	62,107	57	378,760
Missouri	4	3,024	28	57,625	16	151,016	3	1,290,937	51	1,502,602
Montana	1	876	17	39,006	8	147,848			26	187,730
Nebraska	28	20,176	52	99,276	10	94,785	1	223,844	91	438,081
Nevada	1	830	1	4,140					2	4,970
New Hampshire			2	8,498	12	157,582	1	77,685	15	243,765
New Jersey	1	906	3	7,563	13	180,240	4	486,659	21	675,368
New Mexico	3	2,154	1	1,446	3	20,222			7	23,822
New York	13	9,877	43	116,125	27	402,252	3	249,131	86	777,385
North Carolina	20	11,043	46	105,165	15	215,443	1	51,310	82	382,961
North Dakota	5	3,560	5	7,399	3	27,971			13	38,930
Ohio	78	55,703	96	203,643	37	584,552	2	218,312	213	1,062,210
Oklahoma	6	2,716	16	38,234	9	114,328			31	155,278
Oregon	14	9,333	26	93,939	6	57,663	1	305,394	47	466,329
Pennsylvania	48	34,305	168	436,053	117	1,331,225	7	2,707,803	340	4,509,386
Rhode Island					7	105,579			7	105,579
South Carolina	2	1,513	13	41,882	6	51,925	2	133,671	23	228,091
South Dakota	18	11,480	11	26,472	1	6,798			30	44,750
Tennessee	5	3,480	20	44,302	13	148,106	4	700,084	42	895,972
Texas	3	2,153	3	1,919	4	84,700	2	119,923	12	208,695
Utah	4	3,234	9	18,572	5	84,482	1	149,934	19	256,222
Vermont	12	6,224	21	43,184	9	99,588			42	148,996
Virginia	10	6,419	38	92,538	18	258,657	4	457,406	70	815,020
Washington	21	11,948	27	67,860	14	197,736	3	599,711	65	877,255
West Virginia	63	36,032	70	142,394	20	226,205	3	207,849	156	612,480
Wisconsin	9	6,905	31	71,105	7	101,762			47	179,772
Wyoming	4	1,860	14	29,403	3	45,969			21	77,232
Total	686	450,023	1,350	3,202,223	688	9,207,630	80	12,928,787	2,804	25,788,663

TABLE 6.—*Total number and population of communities for all States combined, as given in tables 2, 3, 4, and 5*

	Population range					
	Under 5,000		Over 5,000		Combined	
	Number of communities	Population	Number of communities	Population	Number of communities	Population
(1) With existing sewer systems	5,518	10,117,959	1,966	68,787,857	7,484	78,905,826
(2) New sewer systems needed, with treatment	7,670	4,433,839	48	402,008	7,718	4,835,847
(3) New sewage treatment plants needed (for existing systems)	2,036	3,652,246	768	22,136,417	2,804	25,788,663
(4) Sewer extensions needed					5,553	10,297,300
Total communities requiring new treatment [Sum of (2) and (3)]	9,706	8,086,085	816	22,538,425	10,522	30,624,510
Total communities requiring some type of sewerage need					13,915	[1] 40,500,000

[1] Estimated from totals in tables 2, 3, and 4, corrected for number of communities having adequate facilities and number omitted because of having less than 200 inhabitants.

to existing sewer systems added to those needing new installations, 13,915 out of 16,752 communities in the United States are shown to present some type of need involving additional sewerage or sewage treatment. The difference between these two figures is represented by the sum of 1,537 communities with under 200 inhabitants, not included in this inventory, and 1,300 communities now having systems which are adequate.

COSTS OF FULFILLING NEEDS

In estimating the costs of fulfilling the several needs enumerated in the previous tabulations, the general method followed has been to apply to the population of each separate community needing a particular type of facility a per capita cost figure based on the most authentic construction cost data available, thus deriving an estimated total cost figure for this facility in that community. As the per capita cost data thus used have been based on construction figures covering the years 1933–39, inclusive, these figures have been averaged for that period and finally increased by 32 percent in order to bring them up to the 1942 cost level in accordance with the relation shown by general construction cost indices of the Engineering News-Record.

In making these estimates, three different sources of cost data for the period 1933–39 have been available, namely, (1) an analysis of construction costs for sewage treatment works carried out in connection with the preparation of a recent report on the Ohio River Pollution Survey, (2) detailed cost data on 289 Public Works Administration sewerage and sewage treatment projects as given in Bulletin No. 104, Federal Works Agency, entitled "Public Works Administration Non-Federal Sewage Disposal Projects," and (3) detailed

engineering estimates for post-war construction from State and local agencies. In all cases where actual engineering cost data have been made available from individual cities, these data have been used for those communities in preference to information derived from other sources.

As a basis of estimating the costs of sewer extensions and new sewer systems, an analysis has been made of the 289 Public Works Administration projects above noted under item 2. This study has indicated that the per capita cost of new sewer systems with treatment included and also that of new treatment plants alone tend to diminish with increasing numbers of population served, but at a decreasing rate. The two curves approach their respective minimum asymptotes with populations ranging over 10,000. The difference between these two curves, which is a measure of the cost of sewer systems without treatment plants, tends to remain fairly constant, however, at all ranges of population. This difference, which averages $31 per capita, has been taken as representing the per capita cost of sewer systems at the 1933–39 price level. When increased by 32 percent to bring it up to the 1942 level, this figure becomes $41 per capita, which has been used for both sewer extensions and new systems as above indicated.

For intercepting sewers, the unit cost assumed has been $5 per capita for communities with 1940 United States Census populations under 10,000 and $10 per capita for communities of over 10,000. These unit costs were developed in connection with the Ohio River Pollution Survey as a basis of estimates for the construction of intercepting sewers leading to treatment plants in communities of the Ohio River Basin. As applied to the present inventory, they have been increased by 32 percent in order to bring them up to the 1942 price level.

Estimation of per capita costs of sewage treatment has been based on two relationship curves developed from the Ohio River Survey, one showing the population served as related to the per capita cost of primary sewage treatment, and the other the population served as related to the per capita cost of secondary treatment. As the type of treatment, i. e., primary or secondary, has not been capable of definite predetermination in the present inventory a mean curve representing the averages of the ordinates of the two curves has been used for these estimates.

The mean curve thus derived has been applied in estimating for three types of sewage treatment needs: (1) new sewage treatment plants for sewered communities, (2) new treatment plants for communities not at present sewered, but to be provided with new sewer systems, and (3) improvements and extensions to existing treatment plants. In applying this cost population curve, advantage has been

taken of the fact that the costs on which it is based include an item for excess of design population over census population (from 10 to 20 percent) and an item for engineering, land, and other miscellaneous costs (15 percent). As in the estimates for sewer construction, the costs obtained by this method have been increased by 32 percent to bring them up to the 1942 price index level.

INDUSTRIAL WASTES

Industrial wastes may be handled by treatment at the municipal plant with domestic sewage, or by independent industrial waste corrective measures. Although no estimates for costs of industrial wastes treatment have been practicable for individual communities in connection with the present inventory, it has been possible to make an approximate estimate on a State basis by applying experience gained in the Ohio River Survey. This has involved (1) increasing the total sewage treatment costs as estimated for each State by 21 percent, in order to allow for the added cost of treating industrial wastes with sewage, and (2) adding an item of 22 percent of net sewage treatment costs (before applying the 21 percent increase as above) for the cost of independent industrial wastes treatment. The Ohio River Survey figures for independent industrial waste treatment included only practical and proven treatment or other corrective measures. Costs for development and installation of corrective processes are not now known and not included. For this reason total costs of correcting industrial waste pollution as shown in this inventory represent amounts which can be spent without extensive study and are not ultimate costs. Furthermore, costs of rearranging sewers cannot be estimated and are not included.

RESULTS OF COST ESTIMATES

The results of the estimates of cost involved in fulfilling each need for sewers and sewage treatment (the latter representing cost of pollution abatement) are presented in table 7, in thousands of dollars for each State and the District of Columbia. The estimated total cost of the entire program amounts to $2,255,150,000, of which $656,190,000, or 29 percent, represents the cost of new sewer systems and extensions, $559,160,000 (25 percent) the cost of intercepting sewers incidental to the addition of treatment works to existing sewer systems, and the remaining $1,039,800,000 (46 percent) the cost of sewage and industrial wastes treatment.

On referring to table 7, it will be noted that the total cost of sewage treatment, when added to that of new intercepting sewers, amounts to 57 percent of the total cost of the entire program. Industrial wastes treatment, both separately and in combination with sewage treatment, accounts for an additional 14 percent of this total cost.

As each one of these items, including intercepting sewers, is a major element in the total cost of water pollution abatement, it may be said that the total cost of such an abatement program would amount to $1,598,960,000, or roughly 70 percent of the total cost of the entire program.

TABLE 7.—*Total estimated costs, in thousands of dollars, of fulfilling needs for sewers, sewage treatment, and industrial wastes treatment in each State*

States	Sewers		Municipal treatment			Independent industrial waste correction	Combined total
	New systems and extensions	Interceptors	Domestic sewage	Industrial wastes	Total		
Alabama	$16,240	$5,490	$11,280	$2,370	$13,650	$2,480	$37,860
Arizona	1,510	210	950	200	1,150	210	3,080
Arkansas	10,220	2,610	9,650	2,030	11,680	2,120	26,630
California	50,970	33,470	32,610	6,850	39,460	7,170	131,070
Colorado	5,440	810	5,610	1,180	6,790	1,230	14,270
Connecticut	6,780	2,660	5,310	1,110	6,420	1,170	17,030
Delaware	1,730	1,520	2,110	440	2,550	460	6,260
District of Columbia	8,580	8,580	6,600	[1] 1,390	7,990	[1] 1,450	26,600
Florida	20,660	7,440	12,540	2,630	15,170	2,760	46,030
Georgia	22,950	6,460	16,950	3,560	20,510	3,730	53,650
Idaho	5,720	1,400	5,030	1,060	6,090	1,110	14,320
Illinois	43,920	12,280	51,360	10,790	62,150	11,300	129,650
Indiana	20,420	13,040	20,890	4,390	25,280	4,600	63,340
Iowa	14,740	4,580	16,690	3,510	20,200	3,670	43,190
Kansas	11,170	2,850	10,040	2,110	12,150	2,210	28,380
Kentucky	9,970	12,780	11,930	2,500	14,430	2,620	39,800
Louisiana	11,760	9,760	11,200	2,350	13,550	2,460	37,530
Maine	3,670	4,310	4,260	890	5,150	940	14,070
Maryland	12,170	13,520	5,790	1,220	7,010	1,270	33,970
Massachusetts	16,080	48,090	37,220	7,820	45,040	8,190	117,400
Michigan	9,400	15,510	14,100	2,960	17,060	3,100	45,070
Minnesota	19,240	1,950	12,540	2,630	15,170	2,760	39,120
Mississippi	10,120	4,030	9,970	2,090	12,060	2,190	28,400
Missouri	24,140	18,770	27,250	5,720	32,970	6,000	81,880
Montana	2,450	2,130	4,180	880	5,060	920	10,560
Nebraska	7,080	3,980	10,300	2,160	12,460	2,270	25,790
Nevada	360	30	230	50	280	50	720
New Hampshire	3,200	3,060	3,200	670	3,870	700	10,830
New Jersey	13,690	9,750	13,830	2,900	16,730	3,040	43,210
New Mexico	2,710	100	1,240	260	1,500	270	4,580
New York	39,720	74,620	96,430	20,250	116,680	21,210	252,230
North Carolina	15,020	6,160	15,290	3,210	18,500	3,360	43,040
North Dakota	4,800	360	5,460	1,150	6,610	1,200	12,970
Oklahoma	8,610	1,800	12,150	2,550	14,700	2,670	27,780
Ohio	33,860	37,520	37,810	7,940	45,750	8,320	125,450
Oregon	3,790	8,980	7,470	1,570	9,040	1,640	23,450
Pennsylvania	53,840	102,510	80,870	16,980	97,850	17,790	271,990
Rhode Island	6,470	2,040	2,410	510	2,920	530	11,960
South Carolina	7,020	2,650	6,960	1,440	8,300	1,510	19,480
South Dakota	3,100	300	4,230	890	5,120	930	9,450
Tennessee	14,250	25,340	13,690	2,870	16,560	3,010	59,160
Texas	34,100	2,860	11,210	2,350	13,560	2,470	52,990
Utah	8,950	3,200	7,200	1,510	8,710	1,580	22,440
Vermont	1,090	1,310	3,070	640	3,710	670	6,780
Virginia	6,440	15,130	15,750	3,310	19,060	3,460	44,090
Washington	11,770	10,960	11,720	2,460	14,180	2,580	39,490
West Virginia	4,490	9,850	11,390	2,390	13,780	2,510	30,630
Wisconsin	10,550	1,680	7,290	1,530	8,820	1,600	22,650
Wyoming	1,230	720	2,020	420	2,440	440	4,830
Total	656,190	559,160	727,180	152,690	879,870	159,930	2,255,150

[1] An estimate, based on the same percentage of total sewage treatment cost as applied to similar estimates for individual States. Probably somewhat in excess of the true figure, because of the lower degree of industrial development in the District of Columbia.

With reference to sewage and industrial wastes treatment, the results of the estimates indicate that sewage treatment alone would account for about 70 percent of the total cost, with the remaining 30 percent chargeable to industrial wastes treatment. It is quite probable that this proportion of cost for industrial wastes treatment may be unduly low, as experience with this phase of the problem has not been thus far sufficiently extensive over the entire country to reveal all of the elements of cost which may be involved in any far-reaching program of eliminating industrial wastes pollution. Possible compensating elements may be the recovery of valuable by-products from the diversion and treatment of industrial wastes, together with the fact that industrial wastes treatment plants usually are of relatively inexpensive construction and seldom need to be built with capacities materially in excess of present requirements. Economies of this type would tend to reduce the net cost of any general program directed toward correction of industrial pollution, though they cannot be considered with any degree of assurance, for the reason above noted.

As these estimates have been based to a large extent on a consideration of the needs of individual communities for the several facilities included in the inventory, some degree of variation would be expected in the relative needs for particular facilities among the different States, in which a wide diversity is to be found in such matters as amount and trend of urbanization, industrial development, and the proportion of small towns and large cities, respectively, in the individual States. An examination of table 7 does reveal such a tendency, though perhaps not as great as might be expected. In Massachusetts, for example, which is an old State with a long history of urban and industrial development, only 14 percent of the combined needs for sewage facilities are indicated as being for new sewer systems or extensions, in contrast to 29 percent for the country as a whole and to 39 percent in California, a young State undergoing rapid expansion in urban growth and industrialization. In some of the States which have been largely rural, but have undergone recent industrialization, relative needs for sewage and industrial wastes treatment are shown to be somewhat greater than for the country as a whole. Despite these tendencies, a large majority of the States appear to follow quite closely the general pattern of distribution for all of the States combined. It may be said, therefore, that in general the needs for each and every facility enumerated in this inventory are to a very large extent national in scope and not confined to any particular areas or groups of States.

METHODS OF FULFILLING NEEDS

In the first paper (*8*) of this series, it has been shown that the fulfillment of needs for the improvement and extension of public water

supplies can be accomplished, in general, on a completely self-liquidating basis by the local communities, with technical aid from the States, where needed, and financial assistance from the State and Federal governments in the form of low interest-bearing loans amortized over a suitable period of years. In many instances, such improvements are financed through bond issues, similar to those of other revenue-producing public utilities. As water is an essential commodity, sold to individual consumers, the cost of developing and improving a water supply is borne directly by the consumers alone and tends to be distributed automatically among them in proportion to the benefits received. In this connection, it should be noted that the sole, or at least the chief, beneficiaries of water-supply improvements are the local consumers who pay for the water as delivered to them.

Improvements and extensions of public sewerage systems are in much the same general category as are public water-supply betterments, in that the chief beneficiaries are local users of the systems and thus may justly share in the expense of such improvements. In States having sewer rental and other similar laws, citizens connected to sewer systems may be charged for this particular service on substantially the same basis as users of a public water system. In 1939, according to Sweeney (*11*), 600 municipalities in 35 States had adopted sewer rental laws.

In a recent book (*12*), Keefer has reviewed briefly the methods followed in charging for sewerage service under the sewer rental plan. One widely used method is to base the charge on the quantity of water used, sometimes on a graduated scale with decreasing rates as water consumption increases. Sewerage charges are also based on the number and type of plumbing fixtures in a house, the foot frontage or the type of property, the strength and character of the sewage, and a flat rate for each house, with corresponding rates for apartment houses, industries, and other kinds of property. Bills, prepared separately or with the water bill, are rendered annually or more frequently. Childs and Schroepfer (*13*) have summarized the rates in 58 municipalities. These rates are given by Keefer (*12*), who notes that the practical advantage of direct charges for sewerage service are (1) that sufficient funds are provided for operating and maintaining the sewerage system, and (2) that each property owner pays more nearly in proportion to the service received.

The aforesaid remarks have particular reference to local methods of financing sewerage improvements. The larger problem of water pollution abatement on a Nation-wide scale involves legal and technical, as well as financial, implications and problems which in many instances extend far beyond local boundaries. For this reason, the general problem of providing adequate treatment of sewage and industrial wastes in order to restore and maintain the normal uses of

the Nation's waterways for health and food conservation, recreation, navigation, industry, and other essential purposes, is one which involves consideration of many elements other than local financing.

It is beyond the scope of this paper to discuss these matters except very briefly. Some of their more important legal and governmental aspects have been covered very fully and ably by recent commentators, notably by Baity (*14*), who has pointed out that "the use of a natural watercourse for the reception of liquid wastes is as necessary and legitimate as its use for any other purpose, subject to definite limitations." After reviewing efforts toward Federal legislation and recent progress in water pollution abatement, Baity notes the Federal-State pattern of cooperation which has been developed within the past 50 years in all matters pertaining to public health, whereby the United States Public Health Service has provided (a) research services to develop scientific facts and procedures, (b) safe and uniform standards, (c) guidance in methods and procedures, and (d) financial assistance, the responsibility for legislation and administration of the programs being left to the States. The author concludes his discussion with a statement of principles relating to the administration of a national plan of water pollution abatement which includes, among others, the following points:

1. Natural waterways supply various important needs within their drainage basins and those uses must be considered and balanced.
2. One of the natural and inescapable uses of streams is for the reception and ultimate disposal of wastes, after such treatment as may be required.
3. The self-purification capacities of natural watercourses must be utilized to a greater or less degree in all cases, alone or as an adjunct to treatment processes.
4. The most important factors in pollution abatement are related to public health.
5. A national pollution abatement program should be carried out in cooperation with State health agencies along the lines of the Federal-State pattern, which has been found so effective in other similar undertakings.
6. With a national campaign conducted under such a plan, and with reasonable availability of Federal funds for loans and grants-in-aid, the future progress in pollution abatement should be comparable to that of the years 1933–38, when, under the stimulus of Federal aid, more progress was made than during the preceding 25 years.

In a recent paper Velz (*15*) has stressed the great importance of intelligent advance planning for pollution abatement, in order to avoid the adoption of hastily conceived and poorly balanced projects. In this connection, he draws a parallel between a watercourse in which pollution control has been poorly planned and a highway consisting of "alternate sections of beautiful hard pavement, old dirt road, one-lane pavement, and good road, ending in a mud hole." He points out also the importance of approaching the problem of industrial wastes, not as a separate one to be solved after all municipal sewage pollution has

been abated, but as a combined problem of industry and the municipality to be worked out jointly with a view to combining the treatment of sewage and industrial wastes wherever possible. As examples of successful joint cooperation of this type he cites the Elizabeth and Rahway Valley joint meeting projects and the Passaic Valley Sewerage Commission plan, both in New Jersey.

The two papers by Baity and Velz supplement each other in affording an admirable composite view of the Federal-State and the State-local approaches toward a solution of the problem. Their conclusions may be summarized very briefly as advocating (1) Federal aid through financial assistance where needed, the development of sound technical methods and standards, and active cooperation with the States in working out well-balanced programs of pollution abatement, (2) State regulation of local pollution, with assistance to local communities, and (3) local responsibility for carrying out detailed projects for sewage treatment, sometimes jointly with industries and neighboring communities.

On the basis of the figures given in table 7, construction work in the amount of $225,500,000 would need to be accomplished annually if the entire program of sewerage improvements and extensions, including sewage treatment, were to be completed in a 10-year period. Spreading the work over a longer period would reduce correspondingly the annual volume of construction required.

An approximation as to the annual payments which would be required to finance a total capital expenditure of $2,255,000,000 may be made by the application of the usual formula for liquidating a given capital sum by equal annual payments over any given period of time at any assumed rate of interest. According to this formula, the annual payment (Y) required to liquidate a capital sum (C) in (n) years at an interest rate of (r), as a decimal, is $Y=\frac{Cr}{(1+r)^n-1}$.

If it be assumed, for purposes of illustration, that construction costs are to be financed by the issuance of 20-year bonds, bearing 3 percent interest, the annual payment required to liquidate an initial capital expenditure of $2,255,000,000 would amount to 6.7222 percent of the original capital sum, or $151,600,000, over the 20-year period.

The true annual financing cost of a capital expenditure, however, is not determined by the term of bond or other indebtedness payment but rather by spreading the capital cost over the useful life of the structure or improvement for which the capital expenditure was incurred. Thus, if in the formula noted above, (n) be taken as the estimated annual life of the structure or improvement, the annual payment (Y) for (n) years would result in the liquidation of the original capital investment at the end of the useful life of the physical improvement. Presumably, the physical improvement would then

require replacement and the annual payment (Y) would be continued on the renewed capital expenditure.

On this basis, estimate may be made of the true annual financing cost of the proposed sewerage improvement program. The useful life of various parts of a sewerage system will vary widely; for intercepting sewers an assumed useful life of 40 to 50 years probably would not be excessive, whereas the useful life of certain mechanical and equipment items may be less than 20 years. It is believed that the assumption of an average useful life of 30 years would be conservative; utilization of this figure and an interest rate of 3 percent would result in an estimated annual financing cost of 5.102 percent of the total required capital expenditure, or $115,000,000 per year for the entire $2,255,150,000 program herein outlined. Similarly, an annual financing cost of $81,500,000 would be involved in that portion of the entire program which is involved directly in pollution abatement. If to this latter figure there is added the estimated annual operating and maintenance costs, approximating $35,000,000, of the works which would be involved in the abatement of the existing pollution, a total estimated cost of $116,500,000 is obtained. The annual cost of present water pollution may be conservatively estimated at $100,000,000 per year, on the basis of its total economic damage, and the saving of this amount would very nearly pay the entire cost of the abatement program. From this standpoint, pollution abatement as a national project would be practically self-liquidating from a financial viewpoint and its intangible benefits probably would greatly exceed any economic benefits which might be conceived.

From the standpoint of providing a backlog of employment for public works, sewerage and water pollution abatement projects are fully as important in the public interest as public water supply improvements. Projects of this type, being designed for community sanitation, are in many States exempt from the usual bond-limit restrictions of municipalities. They can be carried out either as combined undertakings for groups of communities or as single projects forming part of a combined plan. In this respect they are entirely flexible. Because of the very large measure of public interest involved in water pollution abatement, Federal and State aid in financing such projects is justifiable to fully the same extent as is true of other forms of public works improvements affecting large areas of the country. The importance of detailed planning in advance cannot be too greatly stressed, however, as a large amount of careful engineering surveys and estimates must be completed before any construction work can be started. In such planning, the Federal and State governments have a definite responsibility, but the detailed projects must finally be carried out by the local communities. Close

cooperation between all three of these authorities will be essential to any well-coordinated action, which otherwise could be wasteful and ineffective. To this task should be dedicated some of the best technical and legal resources of the Federal and State health agencies in the near future, as the main burden of responsibility will rest on these agencies for taking the lead toward effeotive action.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

May 21–June 17, 1944

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State for each week are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended June 17, 1944, the number reported for the corresponding period in 1943, and the median number for the years 1939–43.

DISEASES ABOVE MEDIAN PREVALENCE

Meningococcus meningitis.—The number of cases of meningococcus meningitis dropped from 1,636 during the preceding 4-week period to 1,167 for the 4 weeks ended June 17. The incidence was about 25 percent below that for the corresponding period in 1943, but it was almost 8 times the 1939–43 median. Only the East North Central and South Central regions reported a higher incidence than in 1943, but all regions continued to report excesses over the medians. Since the epidemic peaks occur at intervals of 7 to 10 years, the 5-year medians at this time usually represent the lower interepidemic years. The current epidemic of this disease has been the greatest during the nearly 40 years covered by reports to the United States Public Health Service. This epidemic has been in progress since 1941 and has appeared in all sections of the country. It is probable that the peak for the country as a whole was reached in 1943, since the three preceding epidemics with peaks in 1917–18, 1929–30, and 1936–37 were accompanied by relatively high rates for one or two years on either side of the peak year. In some sections of the country, however, the peak was not reached until 1944. Since the beginning of the year 1944 there have been 11,446 cases reported, as compared with 11,431 for the same weeks in 1943. A decline in the number of cases was reported from each section during the current 4-week period, with the present level somewhat below that of the corresponding period in 1943.

Poliomyelitis.—For the 4 weeks ended June 17 there were 198 cases of poliomyelitis reported. The 1939–43 median for the corresponding weeks was 179 cases. Of the total cases, California reported 27, Louisiana 26, North Carolina and New York 20 each, Wisconsin 14, Kentucky 11, Mississippi 8, and Alabama and Ohio 7 cases each. No more than 5 cases were reported from any other State. Under date of June 20 there were 39 delayed cases reported from North Carolina, chiefly in Catawba, Caldwell, and Gaston Counties. An increase in this disease is normally expected at this season of the year.

The rate of increase during the current period was somewhat higher than the rate of increase during nonepidemic years.

Scarlet fever.—The number of cases of scarlet fever dropped from 25,698 during the 4 weeks ended May 20 to 14,210 during the current 4-week period. The incidence was, however, about 40 percent above the normal seasonal incidence (approximately 10,000 cases) and for the country as a whole was the highest incidence recorded since 1937, when about 17,000 cases were reported for these 4 weeks. Each section of the country contributed to the relatively high incidence of this disease, but the greatest excesses over the preceding 5-year median were reported from the Mountain and Pacific regions; the smallest excess (10 percent) was reported from the East South Central region.

Rocky Mountain spotted fever.—For the 4 weeks ended June 17 there were 81 cases of Rocky Mountain spotted fever reported, as compared with 63, 88, and 97 for the corresponding period in the years 1943, 1942, and 1941, respectively. Of the 81 cases reported for the current period, 44 occurred in the South Atlantic region, as compared with 26 in 1943, 22 in 1942, and 34 in 1939. During the current period, Maryland reported 15 cases, Virginia and Wyoming 9 each, North Carolina 8, New York and Colorado 5 each, New Jersey and West Virginia 4 each, and 12 other States reported from 1 to 3 cases each. The other 29 States reported no cases, including none in the whole of the New England, East North Central, and Pacific regions, and only 1 case in the West North Central section. Since the beginning of the year there have been 112 cases reported in the country as a whole, as compared with 133, 165, and 208 for the same period in the 3 preceding years.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended June 17 there were 676 cases of diphtheria reported, as compared with 703 in the corresponding period of 1943 and a preceding 5-year median of 767 cases. Significant increases in the number of cases occurring were reported from the West South Central, Mountain, and Pacific regions; in the New England and West North Central sections the incidence was about normal, but in all other sections the number of cases dropped considerably below the seasonal expectancy.

Influenza.—For the country as a whole the incidence of influenza was also below the normal seasonal level during the current 4-week period; 2,854 cases being reported, as compared with a 1939–43 median of 3,236 cases. A comparison of geographic regions shows a relatively high incidence in the New England and East and West South Central sections, but in all other sections the numbers of cases were considerably below the medians.

Measles.—The number of cases (59,394) of measles reported for the 4 weeks ended June 17 was about 70 percent of the number reported for the corresponding period in 1943, but it was only about 5 percent below the median seasonal level. The East North Central, South Atlantic, West South Central, and Pacific sections reported considerable increases over the 1939–43 medians, but in the other 5 regions the incidence was comparatively low.

Smallpox.—The incidence of smallpox reached a new low level for this season of the year. For the current 4-week period there were 25 cases reported, slightly more than one-half of the number of cases reported for the corresponding period in 1943, and less than 20 percent of the preceding 5-year median. The situation was favorable in all sections of the country.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period May 21–June 17, 1944, the number for the corresponding period in 1943, and the median number of cases reported for the corresponding period, 1939–43

Division	Current period	1943	5-year median	Current period	1943	5-year median	Current period	1943	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	676	703	767	2,854	3,636	3,236	59,394	88,677	62,904
New England	14	12	13	55	11	10	6,170	8,822	7,291
Middle Atlantic	90	94	140	15	45	36	8,342	26,995	10,115
East North Central	85	165	153	82	180	226	11,186	31,697	8,748
West North Central	45	46	51	14	74	43	3,114	5,904	4,496
South Atlantic	104	108	119	760	958	972	6,547	4,621	4,621
East South Central	33	42	47	198	153	167	919	1,382	1,265
West South Central	143	109	106	1,386	1,532	884	7,200	1,427	2,637
Mountain	54	43	43	229	467	329	1,839	2,789	2,789
Pacific	108	84	81	115	216	216	14,077	5,040	5,040
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	1,167	1,582	152	198	239	179	14,210	10,123	10,056
New England	70	161	14	5	7	3	1,415	2,061	905
Middle Atlantic	282	494	58	24	10	11	3,213	2,480	2,816
East North Central	286	237	19	13	6	9	4,376	2,588	3,041
West North Central	90	95	7	5	5	5	1,258	669	700
South Atlantic	120	257	25	[3] 44	10	15	1,065	504	504
East South Central	93	67	15	29	4	9	278	170	244
West South Central	87	58	19	43	62	10	362	175	171
Mountain	16	68	5	6	13	6	639	745	197
Pacific	123	145	12	29	122	38	1,604	731	589
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	25	43	144	411	374	513	7,443	16,483	15,027
New England	0	0	0	23	24	24	488	938	1,359
Middle Atlantic	0	1	0	36	56	74	978	2,484	3,011
East North Central	5	17	51	35	35	47	1,061	3,115	3,288
West North Central	4	5	43	23	22	31	418	1,009	655
South Atlantic	0	2	4	86	106	125	1,676	3,420	2,160
East South Central	7	3	20	53	32	47	518	622	632
West South Central	3	10	25	86	72	116	1,110	2,493	1,581
Mountain	5	2	7	23	11	15	717	576	643
Pacific	1	3	4	46	16	32	477	1,826	1,826

[1] Mississippi and New York excluded; New York City included.
[2] Mississippi excluded.
[3] 39 additional delayed cases were reported under date of June 21 in North Carolina.

Typhoid and paratyphoid fever.—The number of cases (411) of this disease reported during the current 4-week period was about 10 percent above the number reported during the same weeks in 1943, but it was about 20 percent below the 5-year median level. Slight increases over the normal incidence were reported from the West South Central, Mountain, and Pacific sections, but in other sections the incidence either closely approximated the median or fell considerably below it.

Whooping cough.—For this disease the number of cases (7,443) was the lowest reported for this period in the 7 years for which these data are available. The situation was favorable in all sections of the country except the Mountain; there the incidence was slightly above the seasonal expectancy.

MORTALITY, ALL CAUSES

For the 4 weeks ended June 17 there were 33,724 deaths from all causes reported by 93 large cities to the Bureau of the Census. The average for the corresponding period in the 3 preceding years was 33,358 deaths. A comparison of geographic regions shows that the deaths were higher than the 3-year average in the New England, North Central, East South Central, and Pacific regions, about the same as the average in the Middle Atlantic, West South Central, and Mountain regions, and low in the South Atlantic region. For the country as a whole the number of deaths was about 3 percent higher than the 3-year average during the first and fourth weeks of the current period and slightly lower than the average in the second and third weeks; the average increase for the 4 weeks was 1.1 percent.

INCIDENCE OF HOSPITALIZATION, MAY 1944

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 10,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	May	
	1943	1944
1. Number of plans supplying data	68	71
2. Number of persons eligible for hospital care	9,935,638	13,430,075
3. Number of persons admitted for hospital care	82,446	120,375
4. Incidence per 1,000 persons, annual rate, during current month (daily rate × 365)	100.8	100.6
5. Incidence per 1,000 persons, annual rate for the 12 months ending May 31	106.4	104.7

PREVALENCE OF DISEASE

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

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 1, 1944

Summary

Of a total of 222 cases of poliomyelitis reported for the current week, as compared with 126 last week and 79 for the 5-year median, 138 cases, or 62 percent, occurred in 3 States, as follows (last week's figures in parentheses): North Carolina 84 (42), Kentucky 29 (17), and New York 25 (9). California reported 13 cases, Pennsylvania, Ohio, Virginia, and Florida 6 each, and Minnesota, Texas, and Oregon 5 each. For the corresponding week last year a total of 190 cases was reported, 80 of which were in Texas, 57 in California, and 23 in Oklahoma. The cumulative total to date this year is 1,044, as compared with 1,084 for the same period last year and a 5-year median of 776.

The decline in the incidence of meningococcus meningitis continued. A total of 180 cases was reported, as compared with 219 last week and 246 for the next earlier week. The corresponding 5-year median is 36. States reporting the largest numbers are New York (27), California (22), Michigan (12), and Texas (11). For the year to date 11,842 cases have been reported, as compared with 12,011 for the same period last year.

A total of 111 cases of typhoid fever was reported, as compared with 104 last week, 141 for the corresponding week last year, and a 5-year median of 195. Of the current total, 21 cases were reported in Texas, 9 in Georgia, 7 in Arkansas, and 6 in California. The cumulative total to date is 2,115, as compared with 1,807 for the period last year and a 5-year median of 2,498.

Of a total of 26 cases of Rocky Mountain spotted fever, 17 occurred in the South Atlantic area. A total of 170 cases has been reported to date this year, as compared with 186 for the corresponding period last year.

Of 118 cases of typhus fever reported for the week, 49 were in Texas, 26 in Georgia, and 19 in Alabama. For the corresponding week last year 82 cases were reported. The cumulative total to date is 1,413, as compared with 1,286 last year.

Deaths recorded for the week in 93 large cities of the United States totaled 8,473, as compared with 8,557 last week and a 3-year (1941-43) average of 8,353. The cumulative total is 247,443, as compared with 253,902 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended July 1, 1944, and comparison with corresponding week of 1943 and 5-year median

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

Division and State	Diphtheria			Influenza			Measles			Meningitis, Meningococcus		
	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43
	July 1, 1944	July 3, 1943		July 1, 1944	July 3, 1943		July 1, 1944	July 3, 1943		July 1, 1944	July 3, 1943	
NEW ENGLAND												
Maine	0	0	0	------	------	------	111	111	95	1	3	0
New Hampshire	0	0	0	------	2	------	9	6	6	0	0	0
Vermont	0	0	0	------	------	------	1	148	80	0	1	0
Massachusetts	1	0	1	------	------	------	457	738	738	4	14	1
Rhode Island	0	0	0	------	------	------	20	140	60	0	3	0
Connecticut	0	1	0	------	------	------	141	190	190	7	5	1
MIDDLE ATLANTIC												
New York	7	7	13	[1]3	[1]3	[1]3	609	1,912	869	27	51	5
New Jersey	2	3	3	4	1	3	344	1,310	714	5	16	2
Pennsylvania	4	20	7	------	3	------	182	390	260	6	14	3
EAST NORTH CENTRAL												
Ohio	4	10	7	3	2	4	35	327	90	6	4	1
Indiana	1	1	4	3	9	6	25	109	37	2	1	0
Illinois	3	11	15	2	11	11	81	602	185	6	10	0
Michigan [2]	7	6	5	------	1	------	259	1,158	692	12	17	1
Wisconsin	1	1	1	3	9	9	644	1,245	793	4	1	1
WEST NORTH CENTRAL												
Minnesota	11	1	4	------	2	1	67	266	66	5	3	0
Iowa	1	0	1	------	------	2	45	125	64	2	0	0
Missouri	1	0	1	1	1	------	23	71	31	5	6	1
North Dakota	0	0	0	------	------	------	0	52	9	0	0	0
South Dakota	0	1	0	------	------	------	1	47	6	0	0	0
Nebraska	1	0	1	------	------	------	20	22	13	1	1	1
Kansas	3	2	2	------	2	------	63	69	69	6	3	1
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	0	6	4	1	1	0
Maryland [2]	4	2	1	------	5	1	42	120	65	8	5	3
District of Columbia	0	0	0	------	------	------	30	55	55	0	2	0
Virginia	5	4	5	56	70	42	134	61	115	5	15	3
West Virginia	2	0	2	2	------	4	50	31	31	2	4	0
North Carolina	4	4	4	------	37	1	122	147	147	3	4	2
South Carolina	6	6	6	106	90	80	144	26	26	2	5	0
Georgia	3	4	4	3	2	3	11	63	25	1	4	0
Florida	3	2	2	1	8	------	46	11	22	4	3	0
EAST SOUTH CENTRAL												
Kentucky	0	0	3	5	1	2	31	20	20	6	0	1
Tennessee	1	2	2	4	1	5	11	35	35	1	4	0
Alabama	2	1	6	16	6	3	16	124	62	3	1	0
Mississippi [2]	3	1	2	------	------	------	------	------	------	1	0	0
WEST SOUTH CENTRAL												
Arkansas	1	0	2	27	------	1	33	23	23	0	0	0
Louisiana	7	4	4	4	2	2	8	29	15	1	7	0
Oklahoma	0	1	1	12	6	9	45	9	35	2	1	0
Texas	30	15	11	249	314	135	442	156	156	11	3	1
MOUNTAIN												
Montana	5	0	0	------	6	------	15	96	35	1	0	0
Idaho	0	0	0	------	3	------	4	27	17	1	0	0
Wyoming	0	0	0	------	4	------	14	25	22	0	0	0
Colorado	2	5	9	45	8	8	69	30	41	1	3	0
New Mexico	3	2	2	1	------	------	12	7	15	0	1	0
Arizona	0	0	1	28	43	30	14	18	25	0	0	0
Utah [2]	1	0	0	------	3	1	41	50	50	1	3	0
Nevada	0	1	0	------	------	------	2	15	1	0	4	0
PACIFIC												
Washington	2	7	4	1	------	------	137	133	133	4	2	1
Oregon	1	2	2	1	4	4	53	48	48	0	4	0
California	27	16	11	12	36	36	1,371	362	362	22	16	3
Total	159	143	143	592	695	407	6,034	10,765	6,619	180	245	36
26 weeks	5,555	6,126	6,580	335,523	77,581	149,475	576,549	509,829	450,664	11,841	12,011	1,211

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 1, 1944, and comparison with corresponding week of 1943 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [2]		
	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43
	July 1, 1944	July 3, 1943		July 1, 1944	July 3, 1943		July 1, 1944	July 3, 1943		July 1, 1944	July 3, 1943	
NEW ENGLAND												
Maine	0	0	0	5	14	7	0	0	0	1	2	1
New Hampshire	1	0	0	0	2	1	0	0	0	0	0	0
Vermont	0	0	0	3	3	3	0	0	0	0	0	0
Massachusetts	0	0	0	153	169	124	0	0	0	5	1	2
Rhode Island	0	0	0	1	5	5	0	0	0	1	1	0
Connecticut	0	0	0	23	22	22	0	0	0	0	1	1
MIDDLE ATLANTIC												
New York	25	4	3	176	148	154	0	0	0	3	8	8
New Jersey	2	1	0	60	26	58	0	0	0	1	1	3
Pennsylvania	6	0	0	113	63	85	0	0	0	4	11	10
EAST NORTH CENTRAL												
Ohio	6	0	1	95	66	82	0	0	0	2	4	8
Indiana	0	0	0	20	9	21	0	3	0	1	4	3
Illinois	2	0	2	59	48	93	0	1	3	3	1	6
Michigan [3]	0	1	1	64	50	104	0	0	0	4	7	3
Wisconsin	2	0	0	68	82	60	0	0	1	1	0	0
WEST NORTH CENTRAL												
Minnesota	5	1	1	38	9	22	0	0	0	0	1	1
Iowa	0	0	0	17	4	13	0	0	0	1	2	2
Missouri	1	1	0	12	10	20	0	0	1	2	2	5
North Dakota	0	0	0	8	0	2	3	0	0	0	0	0
South Dakota	0	0	0	8	6	4	0	0	1	0	0	0
Nebraska	0	0	0	9	3	4	0	1	1	0	0	0
Kansas	1	3	0	17	17	18	0	1	0	3	3	3
SOUTH ATLANTIC												
Delaware	0	0	0	1	1	3	0	0	0	0	2	1
Maryland [3]	2	0	0	24	20	12	0	0	0	1	1	1
District of Columbia	0	0	0	17	7	3	0	0	0	0	0	0
Virginia	6	0	1	16	13	10	0	0	0	3	7	5
West Virginia	1	0	0	21	6	12	0	0	0	0	6	3
North Carolina	84	1	1	12	2	11	0	0	0	0	6	6
South Carolina	2	0	2	2	0	2	0	0	0	5	3	6
Georgia	2	1	1	7	1	7	0	0	0	9	5	16
Florida	6	0	0	4	4	2	0	0	0	4	0	2
EAST SOUTH CENTRAL												
Kentucky	29	0	0	10	9	19	0	0	0	5	8	9
Tennessee	1	0	1	8	9	18	0	0	0	2	6	11
Alabama	1	0	1	5	4	7	0	1	0	1	4	4
Mississippi [3]	3	0	1	7	3	2	0	0	0	2	6	7
WEST SOUTH CENTRAL												
Arkansas	4	3	1	3	1	2	0	0	0	7	7	10
Louisiana	4	1	1	4	6	5	0	0	0	2	6	15
Oklahoma	2	23	1	3	4	9	0	0	0	2	1	3
Texas	5	80	4	34	28	18	0	0	1	21	17	17
MOUNTAIN												
Montana	0	0	0	17	6	6	0	1	0	1	0	0
Idaho	0	0	0	4	1	2	0	0	0	1	0	1
Wyoming	0	0	0	3	17	6	0	0	0	0	0	0
Colorado	1	5	1	23	42	15	0	0	0	3	0	0
New Mexico	0	0	1	2	3	3	0	0	0	2	1	4
Arizona	0	3	1	8	18	4	0	0	0	0	0	1
Utah [3]	0	2	1	19	17	5	0	0	0	0	1	0
Nevada	0	0	0	0	11	0	0	0	0	0	1	0
PACIFIC												
Washington	0	3	0	45	23	10	0	0	0	1	1	1
Oregon	5	0	0	23	4	4	1	0	0	1	0	1
California	13	57	16	202	110	75	0	0	0	6	3	4
Total	222	190	79	1,473	1,126	1,277	4	8	30	111	141	195
26 weeks	1,044	1,084	776	141,393	92,168	92,168	267	576	1,111	2,115	1,807	2,498

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 1, 1944, and comparison with corresponding week of 1943 and 5-year median—Con.

Division and State	Whooping cough			Week ended July 1, 1944								
	Week ended—		Median 1939–43	Dysentery				Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	July 1, 1944	July 3, 1943		Anthrax	Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	11	19	21	0	0	0	0	0	0	0	0	0
New Hampshire	0	5	0	0	0	0	0	0	0	0	0	0
Vermont	20	0	23	0	0	0	0	0	0	0	0	0
Massachusetts	52	76	144	0	0	0	0	0	0	0	0	0
Rhode Island	10	46	18	0	0	0	0	0	0	0	0	0
Connecticut	33	23	47	0	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	142	319	319	1	2	10	0	0	0	0	0	1
New Jersey	70	204	204	0	1	0	0	0	0	1	0	0
Pennsylvania	66	287	307	0	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	227	252	252	0	0	0	0	0	0	0	0	0
Indiana	30	55	38	0	0	0	0	0	0	0	0	0
Illinois	62	165	165	0	0	6	0	3	0	2	0	0
Michigan [2]	66	179	197	0	1	2	0	2	0	0	0	0
Wisconsin	71	288	171	0	0	0	0	2	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	9	74	35	0	3	0	0	0	0	0	1	0
Iowa	12	62	35	0	0	0	0	0	0	1	0	0
Missouri	29	42	42	0	0	0	1	0	0	1	2	0
North Dakota	5	6	7	0	0	0	0	0	0	0	0	0
South Dakota	0	7	7	0	0	0	0	0	0	0	0	0
Nebraska	13	7	7	0	0	0	0	0	0	0	0	0
Kansas	52	83	54	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	1	4	4	0	0	0	0	0	0	0	0	0
Maryland [2]	83	163	79	0	0	0	2	0	0	6	0	0
District of Columbia	3	36	22	0	0	0	0	0	0	0	0	0
Virginia	50	67	67	0	0	0	413	0	0	4	0	0
West Virginia	14	67	57	0	0	0	0	0	0	2	0	0
North Carolina	190	275	253	0	0	0	0	0	0	4	0	3
South Carolina	123	50	46	0	0	6	0	0	0	0	0	3
Georgia	18	17	17	0	9	9	0	0	0	1	0	26
Florida	33	38	7	0	16	1	0	0	0	0	0	11
EAST SOUTH CENTRAL												
Kentucky	93	69	61	0	0	18	0	0	0	0	0	0
Tennessee	25	58	71	0	0	0	6	0	0	0	0	0
Alabama	30	58	31	0	0	0	0	0	0	0	2	19
Mississippi [3]	---	---	---	0	0	0	0	0	0	0	0	5
WEST SOUTH CENTRAL												
Arkansas	23	28	19	0	2	57	0	0	0	0	4	0
Louisiana	0	10	10	0	2	16	0	0	0	0	0	1
Oklahoma	7	16	16	0	0	0	0	0	0	0	0	0
Texas	254	410	274	0	37	687	0	0	0	0	6	49
MOUNTAIN												
Montana	8	18	13	0	0	0	0	0	0	0	0	0
Idaho	4	4	6	0	0	0	0	0	0	1	0	0
Wyoming	2	4	5	0	0	0	0	0	0	1	2	0
Colorado	31	21	24	0	0	0	0	0	0	0	0	0
New Mexico	2	0	18	0	0	2	0	0	0	0	0	0
Arizona	12	19	23	0	0	0	52	1	0	0	0	0
Utah [3]	63	108	70	0	0	0	0	0	0	1	2	0
Nevada	0	6	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	19	50	61	0	0	0	0	0	0	0	0	0
Oregon	9	48	25	0	0	0	0	0	0	1	0	0
California	93	203	203	0	5	9	0	2	0	0	1	0
Total	2,170	4,046	3,749	1	79	823	474	10	0	26	20	118
26 weeks	47,504	106,015	101,777	23	755	8,856	2,967	284	15	170	300	1,413
26 weeks, 1943	---	---	---	35	961	6,344	1,726	288	14	184	478	1,286

[1] New York City only. [2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts 3, New York 2, Ohio 1, Michigan 1, Virginia 1, Georgia 3, Tennessee 1, Arkansas 3, Idaho 1, California 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 17, 1944

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

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	0	0	0	0	6	0	1	0
New Hampshire:												
Concord	0	0	------	0	1	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0	------	0	90	6	6	0	61	0	1	8
Fall River	0	0	------	0	11	0	0	0	0	0	0	1
Springfield	0	0	------	0	13	1	0	0	15	0	0	7
Worcester	0	0	------	0	4	0	6	0	15	0	1	4
Rhode Island:												
Providence	0	0	------	0	10	0	0	0	4	0	0	13
Connecticut:												
Bridgeport	0	0	------	0	0	1	0	0	1	0	0	0
Hartford	0	0	------	0	7	0	1	0	12	0	0	1
New Haven	0	0	------	0	16	0	3	0	1	0	0	2
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	7	2	2	1	5	0	0	0
New York	7	1	3	0	389	15	40	0	143	0	1	29
Rochester	0	0	------	0	113	0	2	1	3	0	0	2
Syracuse	0	0	------	0	2	1	0	0	1	0	0	13
New Jersey:												
Camden	0	0	------	0	2	0	2	0	1	0	0	0
Newark	0	0	------	0	81	7	3	0	13	0	0	3
Trenton	0	0	------	0	0	1	4	0	3	0	0	6
Pennsylvania:												
Philadelphia	3	0	1	0	36	9	14	0	64	0	1	3
Pittsburgh	0	0	------	0	1	4	5	0	19	0	0	6
Reading	0	0	------	0	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	9	4	2	1	19	0	0	7
Cleveland	0	0	1	1	4	3	0	0	33	0	1	3
Columbus	0	0	------	0	3	0	5	0	3	0	0	24
Indiana:												
Fort Wayne	0	0	------	0	0	0	3	0	0	0	0	0
Indianapolis	0	0	------	0	19	3	1	0	14	0	0	8
South Bend	0	0	------	0	0	0	0	0	0	0	0	5
Terre Haute	0	0	------	0	2	0	0	0	1	0	0	0
Illinois:												
Chicago	2	0	------	0	83	9	18	2	59	0	0	20
Springfield	0	0	------	0	2	1	1	0	1	0	0	0
Michigan:												
Detroit	7	0	------	1	122	3	6	0	64	0	0	17
Flint	0	0	------	0	4	0	3	0	4	0	0	2
Grand Rapids	0	0	------	0	0	0	0	0	4	0	0	1
Wisconsin:												
Kenosha	0	0	------	0	77	0	0	0	0	0	0	6
Milwaukee	0	0	------	0	141	2	5	0	19	0	0	23
Racine	0	0	------	0	123	0	0	0	1	0	0	7
Superior	0	0	------	0	2	1	0	0	4	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	1	0	------	0	71	0	1	0	8	0	0	0
Minneapolis	2	0	------	0	33	2	2	1	21	0	0	7
St. Paul	0	0	------	0	19	1	3	0	2	0	0	2

See footnotes at end of table.

City reports for week ended June 17, 1944—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Missouri:												
Kansas City	0	0	------	0	13	2	2	0	4	0	1	1
St. Joseph	0	0	------	0	0	0	0	0	1	0	0	0
St. Louis	1	0	1	0	8	5	6	0	9	0	0	14
North Dakota:												
Fargo	0	0	------	0	1	0	0	0	3	0	0	0
Nebraska:												
Omaha	0	0	------	0	6	0	2	0	4	0	0	0
Kansas:												
Topeka	0	0	------	0	22	0	0	0	1	0	0	2
Wichita	0	0	------	0	3	0	3	1	1	0	1	2
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	0	1	0	0	0	0	0
Maryland:												
Baltimore	2	0	1	0	38	4	9	0	37	0	0	55
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	1	0	149	1	7	0	24	0	0	2
Virginia:												
Lynchburg	0	0	------	0	0	0	0	2	1	0	0	1
Richmond	0	0	------	0	9	0	2	0	1	0	1	0
Roanoke	0	0	------	0	1	0	0	0	0	0	0	11
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	2	0	0	0
Wheeling	0	0	------	0	0	0	1	0	0	0	0	0
North Carolina:												
Raleigh	0	0	------	0	22	0	0	0	1	0	0	9
Wilmington	0	0	------	0	2	0	0	0	0	0	0	5
Winston-Salem	0	0	------	0	3	0	0	0	1	0	0	0
South Carolina:												
Charleston	0	0	------	0	1	0	0	0	0	0	0	0
Georgia:												
Atlanta	0	0	1	0	1	0	2	0	2	0	0	0
Brunswick	0	0	------	0	0	0	0	0	2	0	0	0
Savannah	0	0	------	0	0	0	2	0	0	0	0	0
Florida:												
Tampa	0	0	3	0	0	2	0	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	9	2	1	1	0	0	1	5
Nashville	0	0	------	0	12	1	4	0	2	0	0	1
Alabama:												
Birmingham	0	0	1	0	2	0	1	1	0	0	0	4
Mobile	0	0	------	0	0	1	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Louisiana:												
New Orleans	2	0	3	1	3	2	1	5	1	0	0	0
Shreveport	0	0	------	0	4	0	4	0	1	0	2	1
Texas:												
Dallas	3	0	------	0	16	0	1	0	1	0	0	6
Galveston	0	0	------	0	0	0	1	1	0	0	0	0
Houston	2	0	------	0	1	0	5	0	2	0	0	0
San Antonio	1	0	------	0	0	0	5	0	1	0	0	0
MOUNTAIN												
Montana:												
Billings	1	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	1	0	2	0	2	0	0	0
Helena	0	0	------	0	3	0	0	0	1	0	0	0
Missoula	0	0	------	0	10	0	1	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	1	0	0	0	0	0	0

See footnotes at end of table.

City reports for week ended June 17, 1944—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
MOUNTAIN—continued												
Colorado:												
Denver	1	0	1	0	15	1	4	0	3	0	0	5
Pueblo	0	0	.....	0	0	0	0	0	3	0	0	3
Utah:												
Salt Lake City	1	0	.....	1	30	0	1	0	16	0	0	7
PACIFIC												
Washington:												
Seattle	0	0	.....	0	47	1	5	0	12	0	0	2
Spokane	0	0	.....	0	14	1	0	0	8	0	0	0
Tacoma	0	0	.....	0	0	1	1	0	9	0	0	2
California:												
Los Angeles	13	0	4	0	245	4	4	2	29	0	0	6
Sacramento	0	0	.....	0	42	0	2	0	15	0	1	3
San Francisco	0	0	1	0	197	3	2	1	27	0	1	4
Total	49	1	22	4	2,409	108	221	20	851	0	14	381
Corresponding week, 1943	48	.....	40	10	5,145	.....	305	.....	712	0	13	1,224
Average, 1939–43	61	.....	38	[1] 13	[2] 3,775	.....	[1] 251	.....	789	3	25	1,184

[1] 3-year average.
[2] 5-year median.

Dysentery, amebic.—Cases: New York, 3; Cleveland,1; Dallas, 1; San Francisco, 1.
Dysentery, bacillary.—Cases: New York, 1; Detroit, 4; Richmond, 1; Charleston, S. C., 53; Houston, 5, Los Angeles, 4.
Dysentery, unspecified.—Cases: Baltimore, 1; Shreveport, 7; San Antonio, 22.
Leprosy.—Cases: New York, 1.
Rocky Mountain spotted fever.—Cases: Winston-Salem, 4.
Tularemia.—Cases: Chicago, 1.
Typhus fever.—Cases: Winston-Salem, 1; Birmingham, 1; New Orleans, 4; Houston, 1, San Antonio, 3.

Rates (annual basis) per 100,000 population, by geographic groups, for the 88 cities in the preceding table (estimated population, 1943, 34,292,500)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	0.0	0.0	0.0	0.0	399	21.0	42.0	0.0	302	0.0	7.9	95
Middle Atlantic	4.6	0.5	1.9	0.0	283	18.1	33.3	0.9	117	0.0	0.9	29
East North Central	5.5	0.0	0.6	1.2	359	15.8	26.8	1.8	137	0.0	0.6	75
West North Central	8.0	0.0	2.0	0.0	350	19.9	37.8	4.0	107	0.0	4.0	56
South Atlantic	3.3	0.0	9.8	0.0	371	11.4	39.2	3.3	116	0.0	1.6	136
East South Central	0.0	0.0	5.9	0.0	136	23.6	41.3	11.8	12	0.0	5.9	59
West South Central	24.2	0.0	9.1	3.0	73	6.0	51.4	18.1	18	0.0	6.0	21
Mountain	23.8	0.0	7.9	7.9	469	15.9	63.5	0.0	199	0.0	0.0	119
Pacific	20.6	0.0	7.9	0.0	862	15.8	22.1	4.7	158	0.0	3.2	27
Total	7.5	0.2	3.4	0.6	367	16.5	33.7	3.0	130	0.0	2.1	58

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—A rat found on May 31, 1944, in Honokaa, Hamakua District, Island of Hawaii, T. H., was proved positive for plague on June 7, 1944.

Puerto Rico

Notifiable diseases—4 weeks ended June 17, 1944.—During the 4 weeks ended June 17, 1944, cases of certain notifiable diseases were reported in Puerto Rico as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	3
Chickenpox	95	Ophthalmia neonatorum	2
Diphtheria	37	Puerperal fever	2
Dysentery	16	Syphilis	895
Filariasis	13	Tetanus	24
German measles	5	Tetanus, infantile	3
Gonorrhea	416	Tuberculosis (all forms)	691
Influenza	34	Typhoid fever	24
Leprosy	1	Typhus fever (endemic)	15
Lymphogranuloma inguinale	1	Weil's disease	1
Malaria	578	Whooping cough	13
Measles	25		

* * *

DEATHS DURING WEEK ENDED JUNE 24, 1944

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

	Week ended June 24, 1944	Corresponding week, 1943
Data for 93 large cities of the United States:		
Total deaths	8,556	9,101
Average for 3 prior years	8,601	
Total deaths, first 25 weeks of year	238,969	244,474
Deaths under 1 year of age	617	707
Average for 3 prior years	573	
Deaths under 1 year of age, first 25 weeks of year	15,649	17,001
Data from industrial insurance companies:		
Policies in force	66,635,780	65,572,219
Number of death claims	12,227	12,341
Death claims per 1,000 policies in force, annual rate	9.6	9.8
Death claims per 1,000 policies, first 25 weeks of year, annual rate	10.6	10.4

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 3, 1944.—During the week ended June 3, 1944, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		20		168	485	36	41	75	165	990
Diphtheria		4	1	28	2	4		6		45
Dysentery (bacillary)				7						7
Encephalitis, infectious				1						1
German measles		1		183	120	6	63	7	74	454
Influenza			1		13	1			4	19
Measles		16	1	592	755	226	67	76	52	1,785
Meningitis, meningococcus		1		2	2	1		2		8
Mumps		10		199	190	20	18	75	43	555
Poliomyelitis								1		1
Scarlet fever		13	4	71	161	41	8	51	75	424
Tuberculosis (all forms)		15	2	86	62	22		6	84	277
Typhoid and paratyphoid fever		1		9	2				1	13
Undulant fever				14	1					15
Whooping cough		38		48	41	1	5	1	14	148

SWEDEN

Notifiable diseases—April 1944.—During the month of April 1944, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	9	Paratyphoid fever	21
Diphtheria	242	Poliomyelitis	38
Carriers	133	Scarlet fever	2,702
Dysentery	41	Syphilis	80
Encephalitis, epidemic	1	Typhoid fever	2
Gonorrhea	1,532	Undulant fever	7
Hepatitis, epidemic	517	Weil's disease	12

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

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

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

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

Cholera

India—Calcutta.—For the week ended June 10, 1944, 151 cases of cholera with 82 deaths were reported in Calcutta, India.

Plague

Bolivia—Tarija Department—Alisos.—According to information received June 19, 1944, 6 cases of plague with 2 deaths were reported in Alisos, Tarija Department, Bolivia.

Egypt.—Plague has been reported in Egypt as follows: Ismailiya—week ended June 17, 1944, 21 cases with 3 deaths including 17 cases in the southern area; Port Said—week ended June 10, 1944, 4 cases.

Indochina.—Plague has been reported in Indochina as follows: May 11–20, 1944, Annam, 2 cases; Cochinchina, 3 cases.

Madagascar.—For the period April 11–20, 1944, 6 cases of plague were reported in Madagascar.

Smallpox

Egypt.—For the week ended May 27, 1944, 428 cases of smallpox with 24 deaths were reported in Egypt.

India—Calcutta.—For the week ended June 10, 1944, 132 cases of smallpox with 122 deaths were reported in Calcutta, India.

Nigeria.—For the week ended May 27, 1944, 165 cases of smallpox with 20 deaths were reported in Nigeria.

Peru.—For the month of March 1944, 14 cases of smallpox were reported in Peru.

Turkey.—For the month of April 1944, 295 cases of smallpox were reported in Turkey.

Venezuela.—For the month of May 1944, 66 cases of smallpox were reported in Venezuela.

Typhus Fever

Irish Free State—Roscommon County—Castlerea.—Typhus fever has been reported in Castlerea, Roscommon County, Irish Free State, as follows: Week ended June 3, 1944, 1 case; week ended June 10, 1944, 1 case.

Peru.—For the month of March 1944, 70 cases of typhus fever were reported in Peru, including 24 cases reported in Cuzco Department and 22 cases in Junin Department.

Slovakia.—For the week ended May 20, 1944, 19 cases of typhus fever were reported in Slovakia.

Turkey.—For the month of April 1944, 490 cases of typhus fever were reported in Turkey, and for the month of May 1944, 391 cases were reported.

Yugoslavia.—For the period April 1–14, 1944, 815 cases of typhus fever were reported in Yugoslavia.

Yellow Fever

Gold Coast—Kintampo.—On June 1, 1944, 1 suspected case of yellow fever was reported in Kintampo, Gold Coast.