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Average Poliomyelitis Incidence Reported in the Counties of the United States, 1932–1946

By ALEXANDER G. GILLIAM, FAY M. HEMPHILL and JEAN H. GERENDE*

The tendency in the United States for epidemics of poliomyelitis to be distributed irregularly both geographically and in time was noted by Frost in 1913 (*1*). Lavinder, Freeman and Frost (*2*) also observed that up to 1916 both endemic and epidemic poliomyelitis had been more frequently reported in northern than in southern portions of this country. Predilection of the disease for irregular distribution in time and in place has been documented further by Dauer's studies of the county distribution of reported cases for the individual years 1933 through 1948 (*3*). In examination of his annual maps he has noted that areas of high incidence vary in extent and location and that there is generally an interval of several years between periods of high incidence in any one locality. The latter fact had been observed in this country by Lavinder, Freeman and Frost (*2*) on the basis of a more limited experience and prior to that time by Wernstedt (*4*) in Sweden as well as others (*5*).[1]

It is not possible from Dauer's published data to determine whether the observed annual regional differences in incidence persist or whether they tend to disappear over a period of years. Nor from these, or other published data, can one subject to any quantitative test the impression that an interval of several years elapses between periods of high incidence in any one locality. It is therefore proposed to examine

*Senior Surgeon, Public Health Service (now at National Cancer Institute, Bethesda, Md.); Sanitarian (R), Communicable Disease Center, Public Health Service, Atlanta, Ga.; and Statistical Assistant, Department of Epidemiology, University of Michigan School of Public Health (now Analytical Statistician, Armed Forces Institute of Pathology, Washington, D. C.), respectively.

Collection of basic data was instituted while the senior author was on detail to the Office of Malaria Control in War Areas (now the Communicable Disease Center). Their analysis was initiated while he was on detail to the Department of Epidemiology, the University of Michigan School of Public Health. Work undertaken at the latter institution was aided by a grant from the National Foundation for Infantile Paralysis.

[1] This phenomenon had been noted earlier by Lovett and Richardson (*6*) on the basis of experience in Massachusetts, but these authors postulated a 2-year periodicity which subsequent experience has not confirmed. The most adequate early documentation of the "sparing effect" of an epidemic of poliomyelitis—in the present-day sense—appears to be that of Wernstedt (*4*).

the distribution by county of poliomyelitis reported to the Public Health Service during the years 1932 to 1946, inclusive, with these general questions in mind. This report deals with average reported incidence for the entire 15-year period and a subsequent report will examine the same data from the standpoint of annual incidence and epidemic recurrence.

Sources of Data

Since 1932 the various State Departments of Health have submitted to the Division of Public Health Methods, Public Health Service, the number of cases reported monthly from the counties of their jurisdiction.[2] At the end of the year such records are corrected for duplication, changed diagnoses, etc., and annual totals for the State (not the individual counties) are published in The Notifiable Diseases, a supplement to PUBLIC HEALTH REPORTS. The available information does not allow some cases to be allocated to county of report, hence the monthly totals do not in all instances exactly equal the final total credited to the State in The Notifiable Diseases.

Data in this study are drawn from summation of these monthly reports by counties. Where annual totals so derived for all counties differed materially from State totals as published, additional data were provided by the State Health Department concerned. Where the difference was slight, monthly reports as originally received were used. Thus, during the 15-year period in question the distribution of 142,744 reported cases by county and year of occurrence is available. This differs little from the 143,565 cases recorded for the same period in The Notifiable Diseases. It means, essentially, that 821 cases, or 0.58 percent of the total in this study, were not susceptible to allocation to county of report.

It appears necessary to emphasize that in most States in this country no distinction is made between paralytic and nonparalytic poliomyelitis in cases officially reported. There is thus no relatively objective criterion for comparing reported incidence in two localities at one time or even in the same locality at different times. Although personal experience (Gilliam) suggests that the true ratio of paralytic to nonparalytic disease varies with epidemics, the situation is not infrequently encountered where suspected abortive and nonparalytic disease is reported officially in one county and only paralytic disease registered in an adjoining political jurisdiction patently involved in the same epidemic. In addition, though poliomyelitis is probably better recorded in this country than many other communicable diseases, completeness of reporting varies considerably from time to

[2] In some States certain incorporated cities are politically independent of the counties to which they are geographically contiguous. For purposes of State morbidity reports, and in this study, they are regarded as counties.

time and from place to place (*7*, *8*). These limitations must be recognized in any analysis of reported poliomyelitis. It must be emphasized, therefore, that this study deals with poliomyelitis *reported* in the counties of the United States for a 15-year period, 1932–46.

Results

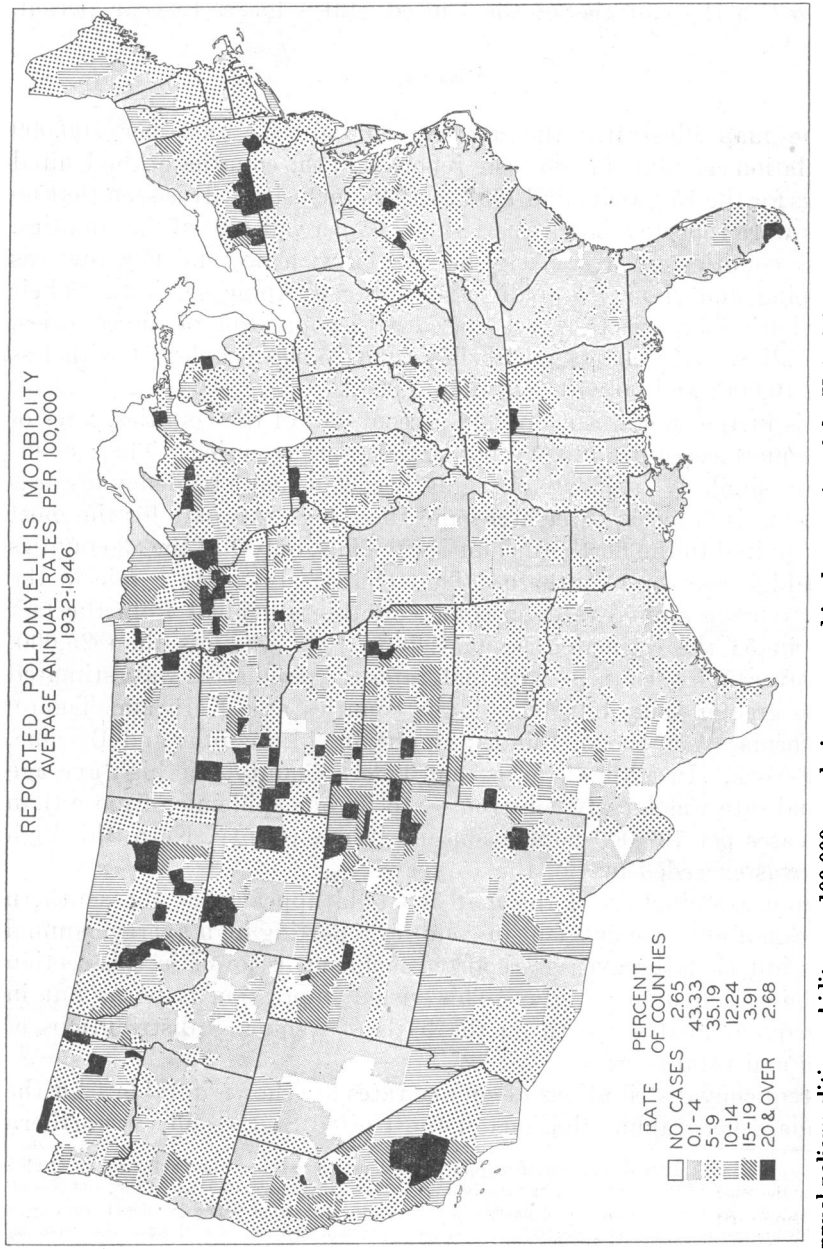
The map illustrates the average annual case rate per 100,000 population calculated from cases reported in the counties of the United States for the 15-year period 1932 to 1946, inclusive. It is seen that no cases were reported in this period in 2.65 percent (82) of the counties. These counties are irregularly distributed with no tendency towards grouping and show no predilection for geographic sections. Their distribution appears to be associated with population of the counties, since all 82 were counties with less than 25,000 people; 71 with less than 10,000; and 50 with less than 5,000.

It is further noted that in 2.68 percent (83) of the counties, rates of 20 or more cases per 100,000 population were recorded. These counties are similarly distributed irregularly except that a tendency towards grouping is noted in three areas and these high rates are for the most part limited to the northern counties.[3] Thus, only 7 of the 83 counties with high rates are southern. That chance also plays a role in the high average annual rates in some counties is evident from the fact that in 54 the estimated population in 1939 was less than 25,000. However, in five counties with high rates the population was estimated to be greater than 100,000. These counties are: Kern and Tulare, California; Winnebago, Illinois; Hennepin, Minnesota; and Broome, New York. In all of them, except Tulare County, the high average annual rate was largely contributed to by one epidemic of more than 100 cases per 100,000 population and in one county, Kern, this high rate was exceeded in 3 of the 15 years.

From examination of the map it would appear that the southern States not only are deficient in counties reporting high average annual rates but that the average reported incidence is lower in this section in the period under study. This visual impression is borne out in subsequent analyses both on the basis of frequency distributions of rates and total rates.

Frequency distributions of county rates are shown in table 1 for the standard geographic divisions of the United States and for northern

[3] Here and elsewhere in this report northern counties are considered as those counties lying north of a line forming the southern boundaries of Virginia, Kentucky, Missouri, Kansas, Colorado, Utah, and Nevada and continued westward through the counties of California, the majority of whose area lies above or below it. This line has been selected largely for convenience but certain analyses, in addition to those recorded here, suggest that with some exceptions it represents a fairly good dividing point insofar as reported poliomyelitis is concerned. As is readily evident from the map, an important exception is in the State of California.



Average annual poliomyelitis morbidity, per 100,000 population, reported in the counties of the United States during the 15-year period, 1932–46, inclusive.

Table 1. *Percentage distribution of counties in each geographic division by average annual poliomyelitis morbidity rates, 1932–46, inclusive*

Geographic division	Percentage of counties in each rate group						
	Average annual rate per 100,000 population						
	0	0.1–4	5–9	10–14	15–19	20 and over	Total
New England	1.49	13.43	68.66	16.42	0	0	100
Middle Atlantic	0	36.30	38.36	14.38	2.74	8.22	100
East North Central	0	33.72	50.00	11.93	1.60	2.75	100
West North Central	1.45	33.01	31.88	21.42	8.37	3.87	100
South Atlantic	5.18	60.28	28.32	4.49	1.04	.69	100
East South Central	0	56.87	34.34	5.77	1.92	1.10	100
West South Central	3.83	55.32	33.19	5.75	1.70	.21	100
Mountain	7.89	30.47	28.67	20.07	6.81	6.09	100
Pacific	1.50	19.55	34.59	24.06	13.53	6.77	100
Northern counties	2.52	33.57	38.71	16.17	5.13	3.90	100
Southern counties	2.88	59.89	29.21	5.58	1.83	.61	100
United States	2.65	43.33	35.19	12.24	3.91	2.68	100

and southern counties as previously defined. More than 60 percent of the southern counties recorded rates of less than 5 per 100,000 while about 35 percent of the northern counties fell into this rate class. Further, in only 8 percent of southern counties were rates of 10 or more reported, while about 25 percent of northern counties recorded average rates of this magnitude.

Individual geographic divisions lying largely or wholly in the northern or southern sections differ little from the larger sections of which they are a part in distribution of county rates. The Mountain and Pacific divisions, however, contain a substantial number of counties classed as southern, and both divisions follow a northern type of rate distribution. It is worthy of note that in the Pacific division the counties of southern California contribute materially to the northern type of rate distribution.

In table 2 the northern and southern counties are distributed in several population groups and total cases and average annual rates are recorded. The estimated mid-year (1939) population was less than 10,000 in 25 percent of the 1,948 counties classed as northern and in 20 percent of the 1,147 counties classed as southern. These northern counties comprised about 3 percent of the total northern population and reported about the same percentage of cases. In the southern section they comprised about 4 percent of the population and accounted for slightly less than 3 percent of the southern cases.

The heavily populated northern counties of 100,000 or more people comprised only 7 percent of the county units but included about 57 percent of the northern population and accounted for a like percentage of the cases. On the other hand counties of this size made

Table 2. *Distribution of northern and southern counties in several population groups, by total number of cases reported 1932–46 and average annual rates per 100,000 population*

Population group [1]	Counties		1939 population		Cases 1932–46		Average Annual rate
	Number	Percent	Number	Percent	Number	Percent	
Northern counties							
0–9,000	492	25.26	2,940,102	3.11	3,415	3.17	7.74
10,000–24,000	769	39.47	12,598,249	13.33	14,228	13.20	7.53
25,000–49,000	382	19.61	13,062,656	13.82	15,625	14.50	7.97
50,000–99,000	170	8.73	12,088,694	12.79	13,629	12.65	7.52
100,000–499,000	112	5.75	24,127,892	25.53	27,784	25.78	7.68
500,000 and over	23	1.18	29,696,379	31.42	33,088	30.70	7.43
Total	1,948	100.00	94,513,972	100.00	107,769	100.00	7.60
Southern counties							
0–9,000	225	19.62	1,407,014	3.86	954	2.73	4.52
10,000–24,000	494	43.07	8,288,218	22.72	5,913	16.90	4.76
25,000–49,000	300	26.15	10,072,031	27.60	7,219	20.64	4.78
50,000–99,000	83	7.24	5,360,472	14.69	4,329	12.38	5.38
100,000–499,000	43	3.75	8,101,825	22.20	9,356	26.75	[2] 7.70
500,000 and over	2	.17	3,258,596	8.93	7,204	20.60	[2] 14.74
Total	1,147	100.00	36,488,156	100.00	34,975	100.00	[2] 6.39
United States							
0–9,000	717	23.17	4,347,116	3.32	4,369	3.06	6.70
10,000–24,000	1,263	40.81	20,886,467	15.94	20,141	14.11	6.43
25,000–49,000	682	22.04	23,134,687	17.66	22,844	16.00	6.58
50,000–99,000	253	8.17	17,449,166	13.32	17,958	12.58	6.86
100,000–499,000	155	5.01	32,229,717	24.60	37,140	26.02	7.68
500,000 and over	25	.80	32,954,975	25.16	40,292	28.23	8.15
Total	3,095	100.00	131,002,128	100.00	142,744	100.00	7.26

[1] Counties are grouped according to their mid-year (1939) estimated population. Because of increases or decreases in population all counties did not actually remain in the same population group throughout the 15-year period.

[2] Southern counties, excluding southern California: 100,000–499,000—6.1; 500,000 and over—8.3; total—5.2.

up only 4 percent of the southern reporting units with 31 percent of its population and 47 percent of its cases.

Thus, the southern counties are slightly deficient in units of less than 10,000 population and more greatly deficient in heavily populated counties. These relative deficiencies are compensated for by a relative excess in reporting units of 25,000 to 49,000 population. In addition, the more populous southern units recorded a disproportionately high percentage of southern cases.

For the country as a whole more than two-thirds of the cases in this 15-year period were reported from counties of 50,000 or more population, which made up only 14 percent of the total counties. Although this might be expected, it seems deserving of emphasis in any consideration of a visual representation of geographic distribution of disease, such as is illustrated in the map.

Average annual rates for northern and southern counties are shown in table 2 for counties divided into six population groups. In the northern counties there is no discernible difference in rates among the six population groups shown. Among southern counties, however, there is a fairly definite increase in rates in the three classes with 50,000 or more population. These differences remain even when the populous

counties of southern California are excluded. For the country as a whole, the same tendency is noticed for the counties with populations of 50,000 or more.

Studies in this country and elsewhere have stated that in general the risk of clinical attack decreases as population density increases. Both northern and southern experience noted here would appear to be at variance with this thesis, since in the northern counties average risk appeared uniform in all population groups and in the southern counties average risk increased with population. It should be pointed out, however, that most studies in this country dealing with risk of attack as related to density of population were made during the period when official reports included few nonparalytic cases, that is, when the incidence in one area could be more fairly compared with reported incidence in another than is possible now. Further, data recorded here probably reflect population density too inadequately to comprise a fair test of this particular point. One would expect, a priori, that the proportion of nonparalytic cases reported would increase with size of population in the reporting unit. Any effort to explain why this might occur more frequently in the south than in the north would be pure speculation. It will be recalled, however, that the initial impetus in this country towards recording nonparalytic disease was first manifest in the New England, and some of the Middle Atlantic States in the late 1920's.

The total rate recorded for all northern counties is significantly greater than the rate for all southern counties. Whether or not this represents a difference in actual incidence or a difference in reporting is again a matter of speculation. The data of Collins (*8*), comprising a canvass for past history of paralytic disease in samples of northern and southern populations, support the impression that the northern section may have actually experienced a greater incidence than the southern. During this period, however, the States classed here as southern reported a numerically, but not significantly, higher crude death rate from poliomyelitis than the northern States. (0.82 per 100,000 versus 0.73 per 100,000).

In table 3 the percentages of counties of different population groups falling into several average annual rate classes are shown for northern and southern counties. Units in both sections reporting no cases in 15 years are limited to the less populous counties. Among the northern counties about 43 percent of those with less than 10,000 population reported rates of less than 5 while only 13 percent of the most populous counties recorded such rates. There is thus, with increase in population, a decrease in percentage of counties in the under 5 rate group, while an opposite tendency is apparent in the 5–9 group. For the whole northern experience, the largest proportion of counties fell in the 5–9 rate group.

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Table 3. *Percentage distribution of northern and southern counties in several population and average annual rate groups*

Population group [1]	Average annual case rates per 100,000 population						Total percent
	0	0.1–4	5–9	10–14	15–19	20 and over	
Northern counties							
0–9,000	8.94	34.55	29.07	16.67	5.69	5.08	100
10,000–24,000	.65	35.89	38.10	16.65	5.46	3.25	100
25,000–49,000	-------	30.37	44.50	15.97	4.97	4.19	100
50,000–99,000	-------	35.29	44.12	12.35	4.12	4.12	100
100,000–499,000	-------	25.89	50.89	18.75	2.68	1.79	100
500,000 and over	-------	13.04	69.56	8.70	4.35	4.35	100
Total	2.52	33.57	38.71	16.17	5.13	3.90	100
Southern counties							
0–9,000	12.00	53.78	22.22	8.00	3.11	.89	100
10,000–24,000	1.21	62.55	28.95	5.67	1.21	.41	100
25,000–49,000	-------	65.34	29.67	3.33	1.33	.33	100
50,000–99,000	-------	55.42	38.55	4.82	1.21	-------	100
100,000–499,000	-------	34.89	46.51	9.30	4.65	4.65	100
500,000 and over	-------	-------	50.00	-------	50.00	-------	100
Total	2.88	59.89	29.21	5.58	1.83	.61	100
United States							
0–9,000	9.90	40.58	26.92	13.95	4.88	3.77	100
10,000–24,000	.87	46.32	34.52	12.35	3.80	2.14	100
25,000–49,000	-------	45.75	37.98	10.41	3.37	2.49	100
50,000–99,000	-------	41.90	42.29	9.88	3.16	2.77	100
100,000–499,000	-------	28.39	49.68	16.13	3.22	2.58	100
500,000 and over	-------	12.00	68.00	8.00	8.00	4.00	100
Total	2.65	43.33	35.19	12.24	3.91	2.68	100

[1] See footnote 1, table 2.

Among southern counties the same relationships are noted except that in the total experience the greatest proportion of counties fell into the under 5 rate group instead of the 5–9 class.

The tendency in both sections for the percentage of counties in the rate group 10–14 to decrease with increase in population is not regular, since in the north the highest percentage is found in the 100,000 to 499,000 population class and in the south the percentages increase in the counties with 50,000 or more population. In the two classes representing rates of 15 or more per 100,000 no regular relationship to population of county is apparent. In addition, the number of counties falling in these rate classes is small.

For the country as a whole it may be said that units reporting no cases are limited to the counties with small populations. On the other hand, higher rates were reported in about the same proportion of these counties as in counties with greater population. Among the rate groups considered, the mode appears in the under 5 rate class for counties under 50,000 population and in the 5–9 rate class for counties with more than 50,000.

Summary

The average annual rates calculated from cases of poliomyelitis reported in the counties of the United States during 15 years, 1932–46,

have been grouped in 6 rate classes and mapped. When this map is divided into northern and southern sections by the parallel representing a general westerly continuation of the southern border of Virginia, it is observed that:

1. Of the small proportion (2.68 percent) of counties reporting the highest rates, most lie in the northern section with little other tendency towards geographic concentration evident.

2. No tendency towards grouping nor sectional predilection is manifest by the counties (2.65 percent) in which no cases were recorded.

3. Higher average annual rates appeared to prevail in the northern section.

Further analysis of these rates confirmed the impression, gained from review of the map, that the rates reported from the northern counties were higher in the period under review. It cannot be determined from these data, however, whether the reported differences between northern and southern sections are due to differences in actual incidence of manifest disease, to differences in reporting, or to other factors, such as variation in age and racial distribution of populations.

Analysis of counties in several population groups showed that the southern section was slightly deficient in lightly populated and more greatly deficient in heavily populated counties. For the whole United States counties of 50,000 population or more comprised only about 14 percent of all counties, included about 63 percent of the population and accounted for over two-thirds of all cases. Among the northern counties little difference was observed between rates for the different population groups. In southern counties, however, while the average rates were about the same among the groups under 50,000 population, a striking rate increase was observed with population increase in the 3 classes comprising those of 50,000 and over.

For the country as a whole the units reporting no cases were limited to the lightly populated counties. Among the rate groups examined, the mode appears in the under 5 per 100,000 class for counties under 50,000 population and in the 5–9 class for more populous counties.

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Poliomyelitis Epidemic Recurrence in the Counties of the United States, 1932–1946

By Alexander G. Gilliam, Fay M. Hemphill and Jean H. Gerende*

In the preceding report (*1*) certain analyses were made of the cases of poliomyelitis reported in the counties of the United States for the 15-year period 1932 through 1946. That study was largely concerned with average annual rates recorded. This report deals with the same basic data from the point of view of testing the observation made by Wernstedt (*2*), that areas passing through epidemics of poliomyelitis experience several years of relative freedom before epidemic recurrence. It was noted that others have called attention to this phenomenon but that no quantitative test of the impression was possible from published literature.

Sources of Data

The data discussed represent the cases reported, by county of origin, by the various State Health Departments to the Public Health Service. The detailed sources of these data, together with some comment on their limitations, have been described previously (*1*). In this

*Senior Surgeon, Public Health Service (now at National Cancer Institute, Bethesda, Md.); Sanitarian (R), Communicable Disease Center, Public Health Service, Atlanta, Ga.; and Statistical Assistant, Department of Epidemiology, University of Michigan School of Public Health (now, Analytical Statistician, Armed Forces Institute of Pathology, Washington, D. C.), respectively.

Collection of basic data was instituted while the senior author was on detail to the Office of Malaria Control in War Areas, (now the Communicable Disease Center). Their analysis was initiated while he was on detail to the Department of Epidemiology, the University of Michigan School of Public Health. Work undertaken at the latter institution was aided by a grant from the National Foundation for Infantile Paralysis.

study, annual rates for the years 1932 through 1939 are based on annual county population estimates as of July 1, obtained by arithmetic interpolation of the 1930 and 1940 censuses. Population estimates for the remaining years were made by arithmetic extrapolation of the same census figures.

Because of the large population dislocations which occurred just preceding and during the war years, some objection may be made to this method of population estimates. In areas such as southern California, for example, calculated rates are too high since the population estimates are undeniably low. Such objections are valid but are outweighed by the necessity, in the analyses to follow, for annual estimates made on a consistent basis. It is believed that while the rates here reported are badly distorted for some areas and in some years, this distortion is insufficient to seriously disturb the general observations made.

Frequency Distribution of Annual Rates

In the preceding report (*1*) it was noted that in counties classed as southern [1] the average annual incidence of reported poliomyelitis was less than in northern counties during the period under study. In addition, the frequency distributions of these rates were different in the two sections.

To test these differences further, annual rates have been calculated for each of the 3,095 counties, or a total of 46,425 county rates in the 15-year period. The distribution of these rates for northern and southern counties is shown in table 1. It is readily evident that the differences noted in average annual rates in the two sections are also apparent when annual rates are assembled. Thus, each of 1,948 northern counties was at risk of reporting no cases as well as 1 or more cases annually 15 times during this period; or for all northern counties there were 29,220 epidemic opportunities. In 16,250 of such instances (55.61 percent) no cases were reported. This is in contrast to southern experience where no cases were recorded in 62.43 percent of instances. On the other end of the rate scale, incidence of 100 or more per 100,000 was reported in 0.92 percent in northern experience and in only 0.28 percent among southern counties.

Viewed in terms of epidemic opportunities table 1 represents county rates actually reported during a 15-year period. The entire distribution of these rates expresses the average annual risk northern and southern counties experienced. It may therefore be said that each percentage listed in table 1 represents the average annual risk each county experienced of reporting each rate noted. For example, based

[1] Counties classed as southern are those lying south of the parallel representing a general westerly continuation of the southern border of Virginia.

on cases reported from 1932 to 1946, a northern county annually had about 56 chances in 100 of reporting no cases at all and less than 1 chance in 100 of recording a severe epidemic of 100 or more cases per 100,000.

Table 1. *Frequency distribution of annual rates for reported poliomyelitis in northern and southern counties during the 15-year period, 1932–46*

Annual rate per 100,000 population	Number and percent of counties experiencing each annual rate			
	Northern counties		Southern counties	
	Number	Percent	Number	Percent
No cases	16,250	55.61	10,741	62.43
0.1–4	4,051	13.86	2,260	13.14
5–9	3,331	11.40	1,795	10.43
10–14	1,705	5.84	856	4.98
15–19	997	3.41	465	2.70
20–24	590	2.02	288	1.67
25–29	476	1.63	171	.99
30–34	319	1.09	172	1.00
35–39	238	.82	88	.51
40–49	343	1.17	131	.76
50–74	456	1.56	135	.78
75–99	195	.67	56	.33
100–149	156	.53	37	.22
150–199	62	.21	4	.02
200 and over	51	.18	6	.04
Total	29,220	100.00	17,205	100.00

Definition of an Epidemic

Table 1 also provides a basis for defining an epidemic in terms of recorded experience. An epidemic is generally regarded as an unusual and temporary increase in the prevalence of a particular disease in a specified population. Unusual increase implies a rate that is uncommonly noted. With poliomyelitis it is not satisfactory to consider as epidemic a rate exceeding average incidence since the average rate frequently is composed largely of a few unusual episodes. Thus, in over half of the epidemic opportunities of this experience no cases at all were recorded.

What may be regarded in a statistical sense as unusual is a matter of opinion; there are degrees of "unusualness." It is general practice, however, to consider as uncommon an event occurring not oftener than about 5 times in 100 opportunities. Accumulation of percentages in table 1 shows that rates of less than 35 per 100,000 population were reported in about 95 percent (94.86) of northern experience and rates of less than 25 per 100,000 were recorded in a similar (95.35) proportion of southern epidemic opportunities. Thus, in northern counties a rate of 35 or more, and in southern counties a rate of 25 or more per 100,000, was registered in about 5 out of 100 epidemic opportunities.

On the basis, therefore, of rates noted in poliomyelitis reported for the counties of the United States during a 15-year period, an epidemic

will be considered as an annual rate of 35 or more per 100,000 among northern counties and 25 or more per 100,000 for southern counties. It is not intended to imply that this definition satisfies all requirements needed in a general definition of an epidemic of poliomyelitis but it does reflect actual reported experience.

It is further not intended to imply that the definitions of an epidemic derived from these data are necessarily of general application in the United States. Differences in reported poliomyelitis in the 15 years, 1932 to 1946, between the counties classed as northern and southern required the adoption of different epidemic standards in the two sections for that period. These standards are based on observed experience and are subject to revision as further experience accumulates.

Attention has been focused on the increasing tendency since the late 1930's toward the occurrence of epidemics of poliomyelitis in the southern States. If this tendency towards increase, either in actual incidence or in reporting, has been generally greater in the southern than in the northern States then a different epidemic standard in the two sections has already lost any general significance. Therefore, it must be reiterated that the definitions here presented apply to poliomyelitis reported in the 15 years, 1932 to 1946, and are applicable only to counties and not to reporting units as large as States.

In focusing attention on the increase reported in the southern States, a similar increase in northern States has been generally overlooked. A comparison of the two sections on the basis of changes in average annual rates, in two 11-year periods, is given in the table below and shows that the increase in reported poliomyelitis has been similar in both sections. This is also observed in table 6 where the 15 years, 1932–46, are divided in five 3-year periods.

Ratio $\frac{\text{Average annual rate 1938–48}}{\text{Average annual rate 1927–37}}$	*Southern States*	*Northern States**
Less than 1.0	0	5
1.0–1.9	6	15
2.0–2.9	3	8
3.0–3.9	3	4
4.0–4.9	0	1
5.0–5.9	1	1
6.0–6.9	0	1
Total	13	35

California=1.23 (omitted above)

*Including the District of Columbia.

The five northern States reporting decreases experienced epidemics in 1931 or 1935, or in both years.

In table 2 rate groups are further divided in "degree of epidemicity" and average annual risk for each class is given for northern and southern counties in several population groups. Rates of 100 or more per 100,000 are arbitrarily regarded as "severely epidemic" in both

Table 2. *Average annual risk, of poliomyelitis epidemics of different severity, experienced during the 15-year period, 1932–46, by northern and southern counties in several population groups*

Epidemic severity	Annual rate per 100,000	Probability of epidemic						
		Population of county						All counties
		Under 10,000	10–24,000	25–49,000	50–99,000	100–499,000	500,000 and over	
Northern counties								
Severely epidemic	100 and over	0.0143	0.0085	0.0073	0.0060	0.0035	0.0060	0.0092
Epidemic	35 and over	.0646	.0496	.0472	.0408	.0412	.0243	.0514
Mildly epidemic	20 to 34	.0460	.0457	.0481	.0460	.0592	.0763	.0474
Endemic	0.1 to 19	.0882	.2846	.4923	.6590	.8079	.8872	.3451
No cases	0	.8012	.6201	.4124	.2542	.0917	.0122	.5561
Total county epidemic opportunities, 1932–46.		7,416	11,531	5,720	2,502	1,723	328	29,220
Average annual epidemic opportunities.[1]		492	769	382	170	112	23	1,948
Southern counties								
Severely epidemic	100 and over	.0050	.0023	.0013	.0016	.0081	.0000	.0028
Epidemic	25 and over	.0587	.0429	.0396	.0395	.0808	.1428	.0465
Mildly epidemic	15 to 24	.0437	.0441	.0406	.0437	.0599	.1071	.0437
Endemic	0.1 to 14	.0554	.2390	.4057	.5791	.7557	.7501	.2855
No cases	0	.8420	.6840	.5141	.3377	.1036	.0000	.6243
Total county epidemic opportunities, 1932–46.		3,430	7,377	4,538	1,214	618	28	17,205
Average annual epidemic opportunities.[1]		225	494	300	83	43	2	1,147

[1] These figures equal the number of counties in each population group in the mid-year, 1939. If some counties did not lose or gain population sufficiently to change from group to group, then the "total epidemic opportunities" in each class would be 15 times each average annual figure.

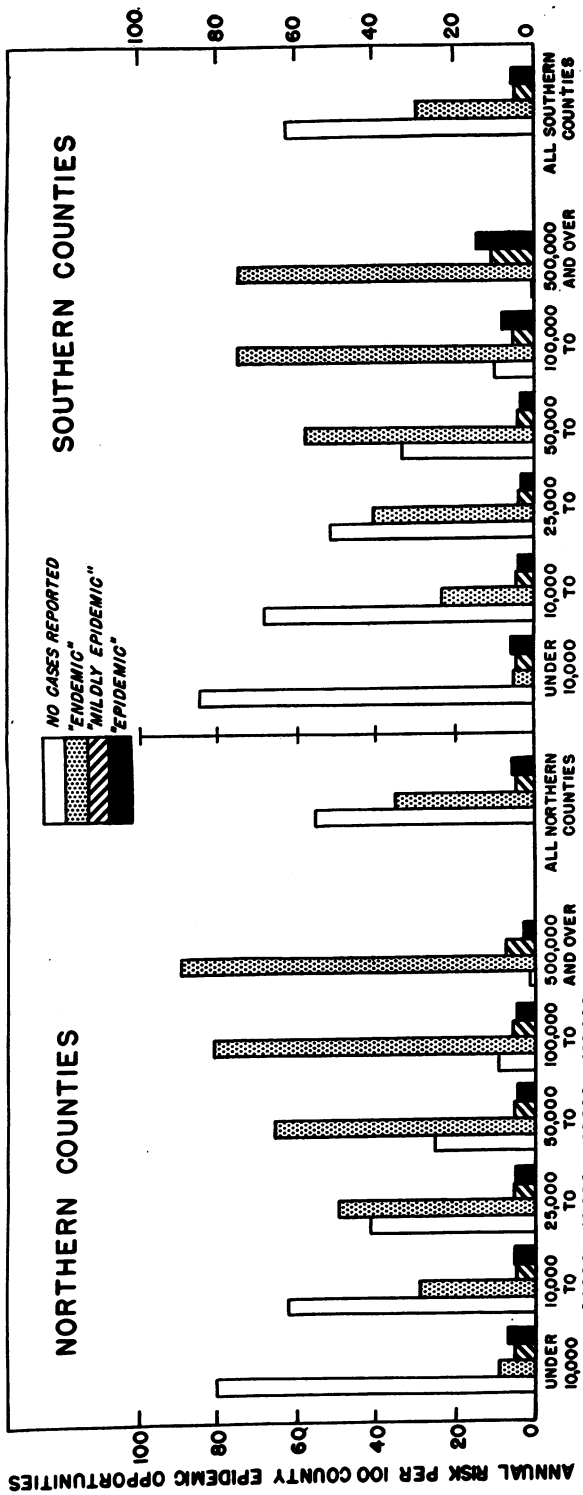
sections. The rate group next lower than that classed as "epidemic," and experienced about 5 times in 100 "epidemic opportunities," is called "mildly epidemic". For northern counties this comprises rates of 20 to 34 per 100,000 and for southern counties rates of 15 to 24 per 100,000. All rates below these groups are arbitrarily called "endemic".

It is noted in table 2 that in each population group probabilities recorded are based on a substantial sample of epidemic opportunities except in the instance of counties with populations of 500,000 or more. There were 328 such opportunities among northern counties and only 28 among southern counties. Probabilities for southern counties in this population class therefore have little stability. It should be pointed out also that chance may, and undoubtedly does, play a large role in rates experienced in lightly populated counties. Thus, in a southern county of 10,000 people, 3 cases make an epidemic and in both sections 10 cases, in a population of that size, constitute a severe epidemic. The standard error of a rate of 30 per 100,000 in a population of 10,000 is ± 17.3. Thus, one might expect from 0 to about 6 cases by chance alone, although by definition the latter is an epidemic.

In spite of these facts table 2 demonstrates a number of points of

Table 3. *Percentage distribution of counties, by annual poliomyelitis rates per 100,000 population, for each year, 1932 to 1946, inclusive*

Rate per 100,000	Percent of counties experiencing each rate, each year															
	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1932–46
Northern counties																
0	66.79	64.07	59.19	60.78	65.04	47.38	76.08	63.40	40.09	55.60	62.78	53.03	43.28	49.44	27.26	55.61
0.1–4	15.55	14.43	16.12	13.86	15.66	13.04	14.37	15.50	12.52	14.68	17.76	14.06	8.88	11.96	9.55	13.86
5–9	9.80	10.16	10.32	10.27	10.06	16.12	5.44	9.91	11.40	15.09	10.01	11.24	15.66	14.68	10.83	11.40
10–14	4.16	4.72	4.31	5.19	3.39	9.75	2.41	3.70	7.70	6.57	3.95	5.85	9.70	8.01	8.11	5.84
15–19	1.39	2.62	2.77	3.18	2.00	5.24	.67	2.36	5.29	2.93	2.05	4.06	6.47	4.42	5.75	3.41
20–24	.67	1.18	1.85	1.44	.92	2.46	.26	1.18	4.52	1.80	.67	2.21	3.39	2.36	5.39	2.02
25–29	.62	1.08	1.03	.92	1.13	1.44	.10	.92	4.06	1.28	.72	1.74	2.77	2.11	4.52	1.63
30–34	.31	.36	.62	.92	.46	1.39	.21	.46	2.72	.46	.26	1.74	1.90	1.18	3.39	1.09
35–39	.10	.20	.56	.51	.36	.87	0	.72	1.90	.36	.31	.98	1.23	1.23	2.87	.82
40–99	.51	1.08	2.36	2.47	.82	2.05	.46	1.49	8.26	1.18	1.28	3.80	5.39	3.95	15.91	3.40
100–199	.10	.10	.67	.36	.16	.21	0	.26	1.28	0	.16	1.03	1.02	.56	5.29	.74
200 and over	0	0	.20	.10	0	.05	0	.10	.26	.05	.05	.26	.31	.10	1.13	.18
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
35 and over	.71	1.38	3.79	3.44	1.34	3.18	.46	2.57	11.70	1.59	1.80	6.07	7.95	5.84	25.20	5.14
100 and over	.10	.10	.87	.46	.16	.26	0	.36	1.54	.05	.21	1.29	1.33	.66	6.42	.92
Southern counties																
0	80.11	81.78	76.63	70.53	61.55	49.08	72.54	63.13	68.27	47.69	62.52	59.97	55.10	49.62	37.93	62.43
0.1–4	10.81	9.68	10.29	11.07	14.65	13.43	14.82	13.16	14.38	14.73	16.65	11.60	15.78	14.21	11.77	13.14
5–9	5.58	5.14	6.54	8.81	10.46	13.08	8.02	9.24	10.81	13.34	11.94	7.93	15.34	16.30	13.95	10.43
10–14	1.92	1.74	2.09	3.40	4.88	6.62	2.79	4.45	3.49	7.24	4.36	5.06	6.02	8.37	12.21	4.98
15–19	.87	.70	1.05	2.27	2.79	5.67	1.22	3.14	1.48	4.18	1.83	2.88	2.88	4.18	5.40	2.70
20–24	.44	.35	.87	1.05	1.31	2.88	.26	1.83	.35	3.23	.70	2.27	1.39	2.44	5.75	1.67
25–29	0	.17	.17	.52	1.05	2.00	.09	1.13	.17	1.66	.44	2.27	.78	1.23	3.23	.99
30–34	.09	.26	.44	.44	.78	1.57	.17	1.31	.35	1.83	.52	2.35	.87	1.13	2.88	1.00
35–39	.09	.09	0	.17	.35	1.39	.09	.52	.35	.96	.26	.96	.44	.17	1.83	.51
40–99	.09	.09	1.57	1.57	1.74	3.75	0	1.65	.35	4.53	.78	4.18	.96	2.09	4.71	1.87
100–199	0	0	.35	.17	.44	.44	0	.44	0	.52	0	.44	.44	.17	.17	.24
200 and over	0	0	0	0	0	.09	0	0	0	.09	0	.09	0	.09	.17	.04
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100 00	100.00	100.00	100.00	100.00	100.00	100.00
25 and over	.27	.61	2.53	2.87	4.36	9.24	.35	5.05	1.22	9.59	2.00	10.29	3.49	4.88	12.99	4.65
100 and over	0	0	.35	.17	.44	.53	0	.44	0	.61	0	.53	.44	.26	.34	.28



Average annual risk of reported poliomyelitis in northern and southern counties of several population groups during the 15-year period, 1932 to 1946, inclusive.

interest. When counties are considered without regard to population, it is observed that in the period 1932 to 1946 a severe epidemic was about 3 times as likely to be reported in a northern county as in a southern county. Since by arbitrary definition "epidemic" and "mildly epidemic" were chosen to comprise about 10 percent of total risk, the remaining probabilities are distributed in the "endemic" and "no cases" classes. In these, northern experience shows a higher risk for "endemicity" and southern experience shows a higher risk for reporting no cases.

Risk related to population of county is also shown in table 2 and is illustrated graphically in the chart. Among northern counties epidemic risk is relatively great (0.0646) in counties with less than 10,000 population and decreases regularly as population increases. Thus, though the total risk in 15 years has been shown to be similar for northern counties in all these population classes (*1*), the annual risk is inversely related to size of population. Among southern counties annual epidemic risk is similar to northern experience only in counties of less than 100,000. Both annual and total risk increase in the two other population classes.

The two sections show the same general difference in risk of reporting no cases and for recording rates regarded as endemic; such differences that exist are differences in degree rather than of kind.

Frequency distributions of rates for northern and southern counties recorded for each year, 1932 to 1946, are presented in table 3. Considerable annual variation is observed around the mean experience presented in table 1. Thus, while the average epidemic risk was 0.0514 for northern counties, this probability varied from 0.0046 to 0.2520 during the 15 years. Similarly, the risk of a severe epidemic varied from 0.0000 to 0.0642 around the mean probability of 0.0092. Comparable annual variability is observed among the southern counties.

Observed and Expected Epidemic Recurrence

Table 4 shows the frequency distribution of epidemics, as previously defined, reported in 15 years in northern and southern sections. It is seen that 1,051 of the 1,948 northern counties reported epidemics once or oftener in 15 years for a total of 1,501 epidemics. Of these, 702 counties recorded one epidemic, 267 two epidemics and so on up to one county reporting epidemic rates 6 times in 15 years. A similar compilation is shown for the southern counties.

If the average annual probability for an epidemic is equal to p, then the chance occurrence of multiple epidemics in 15 years may be calculated [2] by expansion of the point binomial $(p+q)^{15}$. These

[2] We are indebted to Dr. Harold Dorn and Jerome Cornfield of the National Cancer Institute for suggesting this method of computing chance recurrence of epidemics.

Table 4. *Observed and expected epidemic recurrence during the 15-year period, 1932–46*

Number of epidemics	Number of counties having epidemics			
	Northern		Southern	
	Observed	Expected [1]	Observed	Expected [1]
0	897	883	590	562
1	702	717	380	411
2	267	272	129	140
3	66	64	38	30
4	14	10	6	4
5	1	1	2	----
6	1	1	1	----
7	----	----	0	----
8	----	----	1	----
Number of counties	1,948		1,147	
Counties having 1 or more epidemics in 15 years	1,051		557	
County epidemics	1,501		800	
Epidemic opportunities	29,220		17,205	
Average annual epidemic probability, p	.0514		.0465	
	$P=>0.50$		$P=<0.01$	

[1] Expected epidemic distribution $=(p+q)^{15}$.

calculations, for northern and southern counties are also given in table 4. It is readily apparent from this table that, among northern counties, the observed occurrence of two or more epidemics in the 15-year period is not significantly different from that calculated on the assumption that recurrence is due to chance. Among southern counties, however, observed recurrence is significantly greater than expected.

It has been pointed out previously that, by the epidemic definitions employed here, very few cases constitute an epidemic in a lightly populated county. In such counties, therefore, epidemic recurrence may be due to chance variability in rates alone. The counties were therefore divided into two groups, those with populations in 1939 of 50,000 or over and those with less. Observed and expected epidemic recurrence were then tabulated for each group. The results of these tabulations are not shown, but there was no difference in either section between expected and observed recurrence in counties of 50,000 or more population. The excess recurrence noted for southern counties in table 4 is limited to counties of less than 50,000 population, and therefore loses practical significance because of chance variability of annual rates in such counties.

It has never been suggested, however, that epidemic recurrence during a period of 15 years is an uncommon event. The data therefore have been reassembled, and observed and expected epidemic frequency and recurrence tabulated in table 5 for three 5-year periods. Among northern counties there is no significant difference between observed recurrence and that expected by chance. Among southern counties, however, observed recurrence is significantly less than that expected through chance in the period 1937–41, and greater (and of

Table 5. *Observed and expected epidemic recurrence in three 5-year periods, 1932–46*

Number of epidemics	Number of counties having epidemics					
	1932–36		1937–41		1942–46	
	Observed	Expected[1]	Observed	Expected[1]	Observed	Expected[1]
Northern counties						
0	1,752	1,748	1,591	1,596	1,195	1,191
1	184	191	335	324	611	616
2	12	8	21	26	125	127
3			1	1	16	13
4					1	1
5						
Number of epidemics	208		380		913	
Epidemic opportunities	9,740		9,740		9,740	
Average annual epidemic probability, p	.0214		.0390		.0937	
	P=>0.10		P=>0.20		P=>0.80	
Southern counties						
0	1,035	1,030	869	883	827	810
1	105	112	266	237	264	292
2	5	5	11	25	46	42
3	2			1	10	3
4			1			
5						
Number of epidemics	122		292		386	
Epidemic opportunities	5,735		5,735		5,735	
Average annual epidemic probability, p	.0213		.0509		.0673	
	P=>0.20		P=<0.001		P=>0.01	

[1] Expected epidemic distribution $=(p+q)^5$.

borderline significance) than expected in the period 1942–46. When the three 5-year periods are combined, however, no significant difference is found between observed and expected recurrence in either section (north, P=0.99; south, P=>0.70).

Separate tabulations, not recorded here, show that the peculiarities observed in table 5 for the two periods, 1937–41 and 1942–46, in the southern counties are limited to the counties with less than 50,000 population. Such differences therefore would appear to lack any practical significance because of chance variability in annual rates in counties of less than 50,000.

In table 6 the data have been reassembled into five 3-year periods and observed and expected epidemic frequency tabulated for each section. It is observed in each section that in four of the five periods observed recurrence is numerically less than expected by chance. However, in only two individual periods (north, 1944–46 and south 1941–43) is this difference statistically significant. When the five periods are combined, however, observed recurrence is significantly (P=<0.01) less than expected for each section.

It therefore would appear that epidemic recurrence within 15 years and within 5 years is not significantly different from that expected by chance but is significantly less frequent within a 3-year period.

Table 7 shows the intervals observed between epidemics in north-

Table 6. *Observed and expected epidemic recurrence during five 3-year periods, 1932–46*

Number epidemics	1932–1934		1935–1937		1938–1940		1941–1943		1944–1946	
	Observed	Expected [1]	Observed	Expected [1]	Observed	Expected [1]	Observed	Expected [1]	Observed	Expected [1]
Northern counties										
0	1,837	1,835	1,796	1,797	1,669	1,675	1,766	1,770	1,266	1,283
1	107	111	149	147	271	259	180	173	612	575
2	4	2	3	4	8	13	2	6	62	86
3									8	4
County epidemics	115		155		287		184		760	
Epidemic opportunities	5,844		5,844		5,844		5,844		5,844	
Average annual epidemic probability, p	.0197		.0265		.0491		.0315		.1300	
	P=>0.10		P=>0.50		P=>0.10		P=>0.05		P=<0.01	
Southern counties										
0	1,109	1,109	965	968	1,073	1,073	902	914	917	919
1	37	38	175	169	73	73	239	216	216	211
2	1		7	10		2	6	17	13	16
3					1				1	
County epidemics	39		189		76		251		245	
Epidemic opportunities	3,441		3,441		3,441		3,441		3,441	
Average annual epidemic probability, p	.0113		.0549		.0221		.0729		.0712	
	P=>0.80		P=>0.20		P=>0.30		P=<0.01		P=>0.50	

[1] Expected epidemic distribution = $(p + q)^3$.

ern and southern counties reporting more than one epidemic in the 15 years under review. In 114 instances (83 northern and 31 southern) epidemics occurred in successive years while in one instance there were 13 years between epidemics. There would appear to be no particular pattern in distribution of yearly intervals between epidemics, though in about 50 percent the period was shorter than 4 years.

Table 7. *Years intervening between epidemics*

Years intervening	Number and percent of intervals between epidemics			
	Northern counties		Southern counties	
	Number	Percent	Number	Percent
0	83	18.44	31	12.76
1	50	11.11	30	12.34
2	83	18.44	40	16.46
3	30	6.67	31	12.76
4	31	6.89	28	11.52
5	57	12.67	30	12.34
6	25	5.56	13	5.35
7	10	2.22	10	4.12
8	43	9.56	21	8.64
9	12	2.67	5	2.06
10	5	1.11	2	.82
11	11	2.44	1	.41
12	9	2.00	1	.41
13	1	.22		
Total intervals	450	100.00	243	99.99

Summary

The 3,095 counties of the United States have been divided north and south by a line representing a general westerly continuation of the parallel forming the southern boundary of Virginia and annual rates of reported incidence of poliomyelitis calculated for each county, 1932 through 1946. The frequency distributions of these rates reflect the probabilities of reporting poliomyelitis in the counties and sections during the 15-year period.

A rate observed only about 5 times or less in 100 epidemic opportunities is considered unusual enough to be regarded as epidemic. On this basis a rate of 35 or more per 100,000 is regarded as epidemic in northern counties and 25 or more per 100,000 in southern counties.

Degree of epidemicity has also been classified as "severely epidemic," "mildly epidemic," and "endemic" on the basis of observed occurrence and distribution of rates in the period 1932–46. A severe epidemic was reported about 3 times as frequently in northern as in southern counties.

When the counties are arranged in several population groups, it is found that epidemic risk decreased slightly from the less populous to the more populous counties in the northern section, but an opposite tendency was apparent in southern counties. In both sections the annual chance of a county reporting no case was, as expected, inversely related to population.

The observed frequency of recurrent epidemics within 15 years and within 5 years was not significantly different from that expected on an assumption that recurrence was due to chance. Observed recurrence within 3 years, however, was significantly less frequent.

No particular pattern was apparent in the distribution of yearly intervals between epidemics, though in approximately 50 percent this interval was less than 4 years.

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INCIDENCE 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 NOVEMBER 19, 1949

For the thirteenth consecutive week the incidence of poliomyelitis in the Nation decreased over the preceding week. The total number of cases reported for the week is 735 as compared with 751 last week. Twenty-six States and the District of Columbia reported decreases, 17 reported increases, and 5 reported no change. No State showed an increase or a decrease of more than 18 cases. The total number of cases of poliomyelitis for the year to date is 40,523 as compared with 25,691 for the corresponding week last year.

Influenza cases increased from 1,658 last week to 2,366 for the current week, chiefly because of an increase in the incidence in Texas (from 1,175 to 1,671) and Virginia (from 133 to 213). A decrease, however, was noted in West Virginia (from 28 to 13). Increases over the previous week occurred in most of the other diseases shown in the following table. Measles increased from 777 last week to 1,602 for the current week, but remained below the 1944–48 median of 1,696. Pneumonia increased from 1,001 to 1,524 for the week. Scarlet fever increased from 1,010 last week to 1,295 cases this week. Typhoid and paratyphoid fever increased from 40 to 58 cases, and infectious encephalitis increased from 9 to 21 cases. Tularemia increased from 8 to 15 cases, but no State reported more than 2 cases.

Two cases of anthrax were reported, one each in Pennsylvania and California: two cases of Rocky Mountain spotted fever were reported in North Carolina; and no cases of smallpox were reported.

Of 32 States reporting on rabies in animals, 17 reported no cases, while the remaining 15 reported a total of 104. The States reporting the largest numbers were New York (25) and Texas (19). The total number of rabies in animals reported to date is 5,016 cases as compared with 6,066 for the corresponding period last year.

A total of 8,799 deaths was recorded during the week in 93 large cities in the United States, as compared with 8,429 last week; 9,205 and 9,213, respectively, for the corresponding weeks of 1948 and 1947; and 9,205 for the 3-year (1946–48) median. For the year to date the total is 418,845, as compared with 419,834 for the same period last year. Infant deaths for the current week totaled 684; for last week 622; for the corresponding week last year 662; and the 3-year median, 686. The cumulative figure is 29,962 as compared with 30,573 for the same period last year.

Telegraphic case reports from State health officers for the week ended Nov. 19, 1949

[Leaders indicate that no cases were reported]

Division and State	Diphtheria	Encephalitis, infectious	Influenza	Measles	Meningitis, meningococcal	Pneumonia	Poliomyelitis	Rocky Mountain spotted fever	Scarlet fever	Smallpox	Tularemia	Typhoid and paratyphoid fever [a]	Whooping cough	Rabies in animals
NEW ENGLAND														
Maine				48	1	19	3		14			1	7	
New Hampshire				10					1				8	
Vermont							1		1				4	
Massachusetts	8	3		36			18		63			2	139	
Rhode Island						4	2		4				24	
Connecticut			1	11	1	36	15		13				114	
MIDDLE ATLANTIC														
New York	6	1	[c] 3	81	9	261	98		[d] 74			4	283	25
New Jersey	1		4	43	1	96	35		22				239	
Pennsylvania	2			59	7	62	13		45			8	248	
EAST NORTH CENTRAL														
Ohio	6	1	1	19	4	39	30		133			2	113	7
Indiana	9	2	7	29	1	4	13		34			1	15	8
Illinois		1	2	30	4	90	36		34		1		131	1
Michigan [a]	3	2		197	2	34	45		64		2	1	146	7
Wisconsin	1		2	60		3	26		38				127	
WEST NORTH CENTRAL														
Minnesota	2	1		82		6	20		35				10	
Iowa				20	6	1	23		8				3	
Missouri	3		1	3		1	10		11			5	6	
North Dakota	1	2	23	108			4		14				1	
South Dakota		1		10			19		4			1		
Nebraska			20	8		3	12		14					
Kansas	1		1	8	2	28	16		12				9	
SOUTH ATLANTIC														
Delaware				4	1				3				7	
Maryland [a]	1			9		108	16		21		1	1	57	
District of Columbia	1			22		19	1		7				4	
Virginia	12		213	4	3	60	6		35			3	34	1
West Virginia	9		13	38		6	3		30			4	21	
North Carolina	31			57	1		8	2	95		2	1	23	
South Carolina	13		12	2		14	2		15				11	4
Georgia	18		9	10		25	2		30			1	11	4
Florida	4		13	6	2	14	12		7		2		2	

See footnotes at end of table.

Telegraphic case reports from State health officers for the week ended Nov. 19, 1949—Continued

Division and State	Diphtheria	Encephalitis, infectious	Influenza	Measles	Meningitis, meningococcal	Pneumonia	Poliomyelitis	Rocky Mountain spotted fever	Scarlet fever	Smallpox	Tularemia	Typhoid and paratyphoid fever [e]	Whooping cough	Rabies in animals
EAST SOUTH CENTRAL														
Kentucky	8			2	1	12	22		50			1	5	10
Tennessee	10		26	20	1	45	9		62			2	41	
Alabama	25	1	26	27	5	27	6		33		1		5	5
Mississippi [a]	12		8	3	1	27	10		10				4	
WEST SOUTH CENTRAL														
Arkansas	11		55	6		20	7		3			3	10	1
Louisiana	2		2		1	29	4		5					
Oklahoma	3	1	71			22	20		8		1	2	5	2
Texas	20	2	1,671	40	1	288	39		28		1	4	65	19
MOUNTAIN														
Montana			2	32	2	1	1		9		1		1	
Idaho	2		39	12	2	9	11		10					
Wyoming	1			5		7	3		2		1		6	
Colorado	4		34	9		16	5		6				13	7
New Mexico				23	1	7	4		6				13	
Arizona			86	89	1	8	5		11			1	25	
Utah [a]				112		4	7		6		2		10	
Nevada									1					
PACIFIC														
Washington	2		2	118	1	10	6		34				25	
Oregon	5		10	18		19	8		23				31	
California	17	3	9	72	3	40	79		107			10	84	3
Total	254	21	2,366	1,602	65	1,524	735	2	1,295		15	58	2,140	
Median, 1944–48	393	7	2,104	1,696	65		289	1	1,726	2	11	75	2,132	
Year to date, 46 weeks	6,938	708	92,354	596,174	3,032	68,639	[1] 40,523	555	67,285	45	994	3,371	57,399	
Median, 1944–48	11,729 (27th)	579	206,762 (30th)	569,190 (35th)	5,257 (37th)		18,491 (11th)	514	100,983 (32d)	312 (35th)	834	3,735 (11th)	87,574 (39th)	
Seasonal low week ends	July 9		July 30	Sept. 3	Sept. 17		Mar. 19		Aug. 13	Sept. 3		Mar. 19	Oct. 1	
Since seasonal low week	3,170		16,487	7,656	516		[1] 39,608		9,025	4		2,911	10,797	
Median, 1944–45 to 1948–49 [b]	5,438		17,078	10,258	591		18,228		14,688	39		3,260	11,699	

[a] Period ended earlier than Saturday.
[b] The median of the 5 preceding corresponding periods (1944–45 to 1948–49).
[c] New York City only.
[d] Including cases reported as streptococcal infection and septic sore throat.
[e] Including paratyphoid fever currently reported separately as follows: New York 1, Virginia 2, Georgia 1, Tennessee 2, Texas 1, California 9. Cases reported as salmonella infection not included in the table were as follows: Massachusetts 2, New York 2.
[1] Deductions: Michigan, weeks ended January 29, September 17, November 5, and November 12, 1 case each.

Anthrax: Pennsylvania and California 1 case each.
Alaska: Influenza 1, measles 105, pneumonia 1.
Hawaii Territory: Influenza 359, scarlet fever 1, typhoid fever 1. Week ended November 12, diphtheria 1, influenza 51, measles 3, scarlet fever 1.

DEATHS DURING WEEK ENDED NOV. 19, 1949

[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

	Week ended Nov. 19, 1949	Corresponding week, 1948
Data for 93 large cities of the United States:		
Total deaths	9,799	9,205
Median for 3 prior years	9,205	
Total deaths, first 46 weeks of year	418,845	419,834
Deaths under 1 year of age	684	662
Median for 3 prior years	686	
Deaths under 1 year of age, first 46 weeks of year	29,962	30,573
Data from industrial insurance companies:		
Policies in force	70,047,485	70,806,389
Number of death claims	12,802	12,859
Death claims per 1,000 policies in force, annual rate	9.5	9.5
Death claims per 1,000 policies, first 46 weeks of year, annual rate	9.1	9.3

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (human).—Information dated November 18, 1949, states that one case of proved human plague has been reported in Haina, Hamakua District. Onset was on October 31, 1949. This is the first case of human plague reported in Hawaii since April 1945.

Plague (rodent).—Plague infection was proved positive on October 26, 1949, in 1 mouse found dead in district 6A, Honokaa area, Hamakua District.

Panama Canal Zone

Notifiable diseases—September 1949.—Certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Residence [1]									
	Panama City		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	6		1		6		1		14	
Diphtheria	1				1				2	
Dysentery:										
Amebic	4						3		7	
Bacillary	2				2		4		8	
Hepatitis, infectious					1		2		3	
Influenza		1								1
Leprosy							1		1	
Malaria [3]	4				3		84	1	91	1
Measles					2		1		3	
Meningitis, meningococcal				1						1
Mumps					1				1	
Pneumonia		14		4	23	2		5	[2] 23	25
Poliomyelitis							1		1	
Tetanus					1				1	
Tuberculosis		9		5	5	2		8	[2] 5	24
Whooping cough		2			8				[2] 8	2
Yaws							3		3	
Yellow fever								1		1

[1] If place of infection is known, cases are so listed instead of by residence.
[2] 5 recurrent cases. [3] Reported in the Canal Zone only.

Virgin Islands

Notifiable diseases—July–September 1949.—Cases of certain notifiable diseases were reported in the Virgin Islands of the United States as follows:

Disease	July	August	September
Ascaris		3	
Cancer of lower lip	1		
Chickenpox	1		
Enterobius		1	
Filariasis	3	2	4
Gonorrhea	11	12	16
Measles	1		
Mumps	1		1
Schistosomiasis	1		1
Strongyloidiasis			2
Syphilis	8	15	12
Tapeworm		2	
Trichuriasis	13	12	19
Tuberculosis, pulmonary			2
Whooping cough			1

FOREIGN REPORTS

CANADA

Provinces—Notifiable diseases—Week ended November 5, 1949.—During the week ended November 5, 1949, cases of certain notifiable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox			20	5	146	198	69	69	68	135	710
Diphtheria					20	6		4			30
Dysentery, bacillary					9	7	2				18
Encephalitis, infectious							1				1
German measles	1				9	17	1	2	4	13	47
Influenza			7			4	6	1			18
Measles			9		88	45	116	139	49	123	569
Meningitis, meningococcal					1	2	2	1			6
Mumps			75		24	121	5	11	12	60	308
Poliomyelitis	1			2	2	7	1	7	7	1	28
Scarlet fever	3				56	32	6	1	37	13	148
Tuberculosis (all forms)	1		2	12	233	19	26	12	15	60	380
Typhoid and paratyphoid fever					18					2	20
Undulant fever					4	3				2	9
Venereal diseases:											
Gonorrhea	9	2	17	5	107	61	30	8	50		289
Syphilis	4	2	12	5	59	23	8	6	3		122
Whooping cough					86	50			2	8	146

CUBA

Habana—Notifiable diseases—5 weeks ended October 1, 1949.—During the 5 weeks ended October 1, 1949, certain notifiable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	23		Poliomyelitis	1	
Leptospirosis	1		Scarlet fever	1	
Malaria	2		Tuberculosis	3	1
Measles	3		Typhoid fever	11	1

Provinces—Notifiable diseases—5 weeks ended October 1, 1949.—During the 5 weeks ended October 1, 1949, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana[1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	12	8	21		20	63
Chickenpox					1	2	3
Diphtheria	2	32	2			2	38
Leprosy	1	1					2
Malaria	4	2	1	3	3	6	19
Measles		3	3		2	13	21
Poliomyelitis	1	1				1	3
Rabies						1	1
Scarlet fever		1					1
Tetanus		1					1
Trachoma			1				1
Tuberculosis	8	12	12	39	3	18	92
Typhoid fever	14	22	10	7	1	96	150
Undulant fever						1	1
Whooping cough		1	4		1		6

[1] Includes the city of Habana.

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

Note.—The following reports include only items of unusual incidence or of special interest and the occurrence of these diseases, except yellow fever, in localities which had not recently reported cases. All reports of yellow fever are published currently.

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

Plague

Madagascar—Fianarantsoa Province.—During the period October 21–31, 1949, 9 fatal cases of plague were reported in Fianarantsoa Province, Madagascar.

Netherlands Indies—Java—Jogjakarta.—Cases of plague, all fatal, have been reported in Jogjakarta, Java, as follows: In Jogjakarta Residency, week ended October 15, 1949, 42 cases, week ended October 22, 46 cases; in Jogjakarta City, week ended November 5, 6 cases.

Smallpox

Burma—Bassein and Rangoon.—During the week ended November 5, 1949, 13 cases of smallpox, with 5 deaths, were reported in Bassein, Burma, and 10 cases with 2 deaths were reported in Rangoon; during the week ended November 12, 26 cases were reported in Bassein, and 8 cases in Rangoon.

Colombia.—During the month of September 1949, 249 cases of smallpox (alastrim) were reported in Colombia, including 32 cases in the city of Medellin.

French Equatorial Africa.—During the period October 11–20, 1949, 115 cases of smallpox, with 21 deaths, were reported in French Equatorial Africa.

Great Britain—England and Wales—Liverpool.—Information dated November 11, 1949, states that 2 cases of smallpox have been reported to the Medical Officer of Health in Liverpool. It is stated that the first case developed in a laboratory employee with onset October 29, and the second in the brother of the original patient with onset November 11.

Netherlands Indies—Java.—Smallpox has been reported in cities in Java as follows: Week ended November 5, 1949, Batavia 47 cases, Bandoeng 31 cases, Pekalongan 10 cases, Semarang 16 cases; week ended November 12, Batavia 84 cases.

Syria—Hama.—During the week ended October 22, 1949, 68 cases of smallpox were reported in the city of Hama, Syria.

Typhus Fever

Colombia.—During the month of September 1949, 305 cases of typhus fever with 11 deaths, were reported in Colombia, including 51 cases (murine type) in Medellin.

Yellow Fever

Gold Coast—Accra.—During the period October 15–17, 1949, 1 fatal case of yellow fever was reported in Accra, Gold Coast. It is stated that this case is believed to have had its origin in Kpandu, with onset on October 15. Death occurred in Accra on October 17.