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LEPROSY WITH EVIDENCES OF ABNORMALITIES IN CARBOHYDRATE METABOLISM

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During the clinical study of leper patients at Kalihi Hospital in Hawaii, findings suggestive of disturbances of carbohydrate metabolism were obtained among them with remarkable frequency. Thus, among 175 patients whose leprosy affection had been active or was active at the time of examination, there were 27 who exhibited glycosuria in a morning specimen after an overnight fast, and 14 others with similar findings in an afternoon specimen collected three hours after the midday meal.¹ In other words, with the examination of but one morning and one afternoon specimen from each patient, 23.4 per cent of 175 leper patients were found to have glycosuria three hours or more after having eaten.

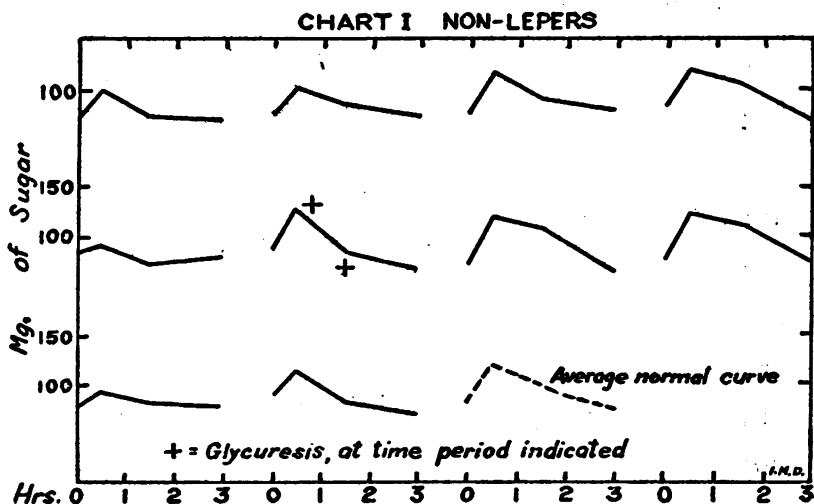
These findings were supplemented by further examinations, among smaller subgroups, of both the urine and blood after the ingestion of glucose, and of the blood after overnight fasting. Fifty-five patients were fed glucose after an overnight fast, and examination of specimens of their urine, collected within three hours subsequent to the glucose meal, revealed 24 who had glycosuria under these conditions. Twelve of the 24 had not exhibited glycosuria previously in fasting specimens. Thus 12 of 43, who had not had glycosuria after fasting, had it after the ingestion of glucose.

While the excretion of very small amounts of sugar in the urine is considered a physiological process, it is probable that amounts which are easily detected by clinical laboratory methods are usually significant of a disturbed metabolism of functional or organic origin; and experience with glucose tolerance tests indicates that glycosuria, even after the ingestion of as much as two grams of glucose per kilogram of body weight, is probable evidence either of a low physiological tolerance for carbohydrates or of functional or organic pathology affecting their metabolism. While glycosuria is largely dependent upon the rate and degree of absorption, conversion, and storage of

¹ Dr. James T. Wayson, who has had about 30 years' experience with leprosy in Hawaii as a general practitioner and as a health officer, informs us that he has had difficulty, in a number of cases, in differentiating skin and neural lesions of leprosy from those of diabetes, because of glycosuria. We have also seen individuals who were considered to have diabetes, only to be proved a few months later to be lepers with glycosuria, but without other evidence of diabetes.

carbohydrates, it is not directly correlated with the amount of sugar in the blood or tissues, at any one period. Hence, the determination of the concentration of sugar in the blood is frequently a diagnostic index of the metabolism of carbohydrates, which is of equal or of greater importance than the finding of glycosuria.

Such determinations made at short intervals after the ingestion of glucose seem to be of definite clinical value, since the average normal individual absorbs and converts a quantity of glucose equal to 1.75 to 2 grams per kilogram of his body weight, when ingested after fasting, so rapidly and completely, that the concentration of his blood sugar reaches a maximum of from 140 to 150 per cent of its fasting or basal amounts within an hour after the glucose meal, and



Glucose tolerance curves for 10 nonlepers. (Ordinates = milligrams of sugar per c. c. of blood.)
Criteria of abnormal curves based on above controls:

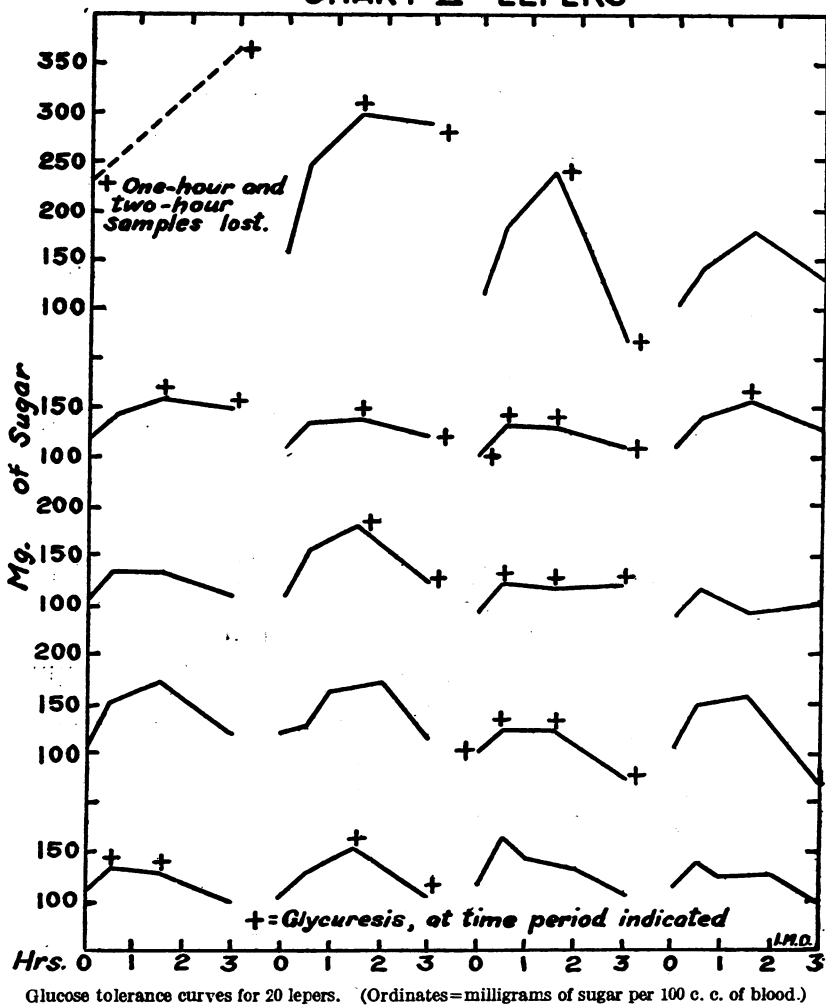
1. Basal blood sugar over 120 mg. per 100 c. c.
2. Rise of more than 50 mg. per 100 c. c. after glucose injection.
3. Highest level of rise in blood sugar reached after 1 hour.
4. Fall of less than 20 per cent of the rise in blood sugar after 1½ hours.
5. Fall of less than 40 per cent of the rise in blood sugar at the end of 3 hours.
6. Glycosuria during the test.

returns to the basal level within two hours or, at most, three hours after taking the glucose. Thus abnormalities in tolerance to, and in the absorption and conversion of, carbohydrates are suggested by unusual rises in the blood sugar percentage, by delay in reaching the maximum percentage, and by delay in return to the basal percentage, as well as by glycuresis during the period of observation.

Such blood sugar determinations and urine examinations made of 41 of the above-mentioned 55 patients, after a glucose meal, revealed 32, or 78 per cent, who exhibited findings which were abnormal in comparison with the average findings which have been obtained among normal individuals subjected to these tests. Twenty-one of the 32 patients had glycuresis during the period of the test, and all but 1 of these presented some other abnormal finding.

The average basal blood sugar percentage among the 41 patients was found to be higher than that accepted as a normal standard. Basal, or fasting, blood sugar determinations were then made on approximately 40 others of the 175 patients. The average basal blood sugar of this group of 80 patients was 108 mg. per 100 c. c., or 0.108 per cent. Fifty-eight of the group had in excess of 0.100

CHART II LEPERS

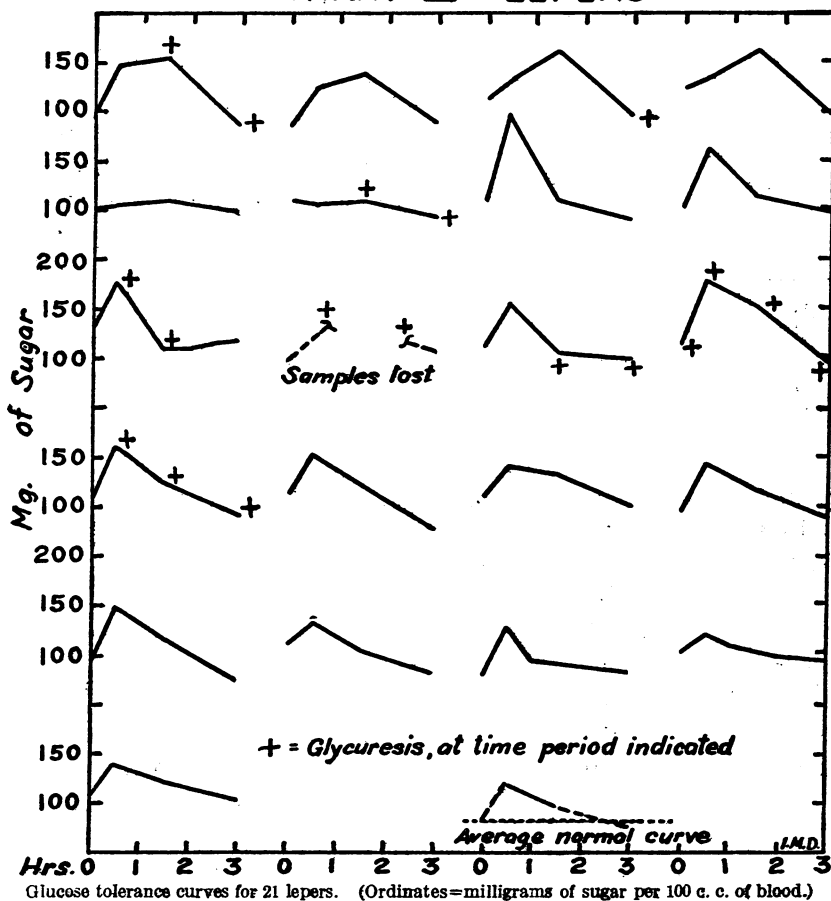


per cent; 10 of the 58 exceeded 0.120 per cent; 4 of the 10 exceeded 0.150 per cent; and 2 of the 4 exceeded 0.200 per cent.

All the patients examined were in segregation, and included cases of leprosy of varying degree and type, and in different stages of progress. The numbers of the sexes, ages, and racial strains examined were roughly proportional to the total numbers of the corresponding groups which were segregated in the institution. Individuals of Hawaiian strain form about 60 per cent of the total num-

ber in segregation. The other races included are Japanese, Chinese, Filipino, Portuguese, and a few individuals of various European strains. The greater proportion of the patients are in the age decade of 21 to 30 years, and the ratio is approximately 150 males to 100 females. Both children under 15 years of age and adults over 40 years of age were included in the group examined, but the numbers in each age decade and in each racial group were too small to present significant differences in the groups. However, through-

CHART III LEPERS



out all the observations there was a trend to a greater frequency, or degree, of abnormal findings among the female patients. There were, for example, 19.5 per cent with glycosuria among 66 females, and 12.8 per cent among 109 males. Among the group of 80 whose fasting blood sugar was determined, the 27 females had an average of 0.115 per cent, while the average among the 53 males was 0.105 per cent. These differences could not be explained by considering the age, diet, or physical activity of the two groups. The results of the examinations are tabulated in Tables 1, 2, and 3.

TABLE 1.—*Glycosuria in fasting specimens of 175 lepers and 313 nonlepers*

175 LEPERS

Race	Total number	Number with glycosuria	Females		Males	
			Number	Number with glycosuria	Number	Number with glycosuria
Hawaiian.....	64	8	27	5	37	3
Part Hawaiian.....	47	6	21	3	26	3
Others.....	111	14	48	8	63	6
	64	13	18	5	46	8
Total.....	175	27 (15.4%)	66	13 (19.5%)	109	14 (12.8%)

313 NONLEPERS

Race	Total number	Number with glycosuria	Females		Males	
			Number	Number with glycosuria	Number	Number with glycosuria
Hawaiian.....	111	0	61	3	50	0
Part Hawaiian.....	59	4	35	1	24	0
Others.....	170	4	96	4	74	0
Unknown.....	139	6	52	5	87	1
	4	0	0	0	4	0
Total.....	313	10 (3.2%)	148	9 (6.1%)	165	1 (0.6%)

Both glycosuria and the basal blood sugar concentration are modified by so many factors, aside from the technical methods employed, that a proper appraisal of these results can be made only by a comparison of the findings with those obtained in a control group of nonleprous individuals who were observed under approximately the same conditions, or at least under comparable conditions.

The available controls were not lepers, but were segregated in institutions and had been furnished a diet comparable to that furnished the leper group and subjected to at least two to three weeks of reduced physical activity. The same races and both sexes were represented, though not in the same proportions in each subgroup studied. The age distribution in the two groups was balanced, though there were more children under 10 years of age and more adults over 40 years of age in the control group, which included approximately 100 nonleprous children of lepers. Aside from these facts there was nothing known of the physical condition of the controls. They were random samples of the inmates of a hospital for mental diseases, or of a general hospital, or of asylums for the nonleprous children of lepers, or of a quarantine detention barracks, or of a penitentiary. About 50 per cent of the total number were inmates of the hospital for mental diseases.

Three hundred and thirteen controls, including the 99 nonleprous children of lepers, were examined for glycosuria after an overnight fast. Ten, or 3.2 per cent, had sugar in their urine, whereas 15.4 per cent of the leper group were found with similar findings. The ratio of positive findings was also considerably greater among the female controls.

The basal blood sugar percentage was determined on 32 male volunteers who were available among the controls. Females were not available. These males were largely of other than Hawaiian strain. Their average basal blood sugar percentage was 0.087. Four of them had a percentage of more than 0.100, and two of the four reached 0.106 per cent. The average among the leper group, (0.108 per cent), as well as among the subgroup of those leprous males of other than Hawaiian race, (0.110 per cent), was more than 20 per cent higher.

TABLE 2.—*Race and sex distribution of persons on whom fasting blood sugar determinations were made—80 lepers and 32 nonlepers*

80 LEPERS

Race	Total number	Females	Males	Average number mg. sugar per 100 c. c. blood
Hawaiian	34	11	23	
Part Hawaiian	19	19	9	
Others	53	21	32	0.106
	27	6	21	.110
Total	80	27	53	
Average blood sugar, (mg. per 100 c. c. blood)		0.115	0.105	.108

32 NONLEPERS¹

Race	Total number	Females	Males	Average number mg. sugar per 100 c. c. blood
Hawaiian	5	0	5	
Part Hawaiian	2	0	2	0.086
Others	25	0	25	.087
Total	32	0	32	
Average blood sugar				.087

¹ There were no females and no children available for these examinations.

Though it is accepted that findings of from 0.060 to 0.150 per cent of sugar in the blood may be normal for individuals, and also that 0.100 per cent may be an average among normals, (particularly those of European stock), it is believed, nevertheless, that the average findings by the same observers in control groups, which are comparable to the test groups, are of more significance than the determination of the range of findings in normal individuals, or even of the average of such findings in normal individuals, who are not comparable,

nor subjected to the same conditions. Therefore, an average of the basal blood sugar concentration which is 20 per cent higher than that of the control groups is believed to be significant.

TABLE 3.—*Glycosuria among children of lepers: Fasting specimens from 57 girls and 42 boys*¹

Race	Total number	Number with glycosuria	Females		Males	
			Number	Number with glycosuria	Number	Number with glycosuria
Hawaiian.....	51	3	23	3	23	0
Part Hawaiian.....	40	0	26	0	14	0
Others.....	8	2	8	2	0	0
Total.....	99	5 (5%)	57	5 (8.7%)	42	0

BY AGE GROUPS

Age in years	Total number	Number with glycosuria	Females		Males	
			Number	Number with glycosuria	Number	Number with glycosuria
0-5.....	19	3	12	3	7	0
6-10.....	25	2	14	2	11	0
11-15.....	30	0	14	0	16	0
16-20.....	22	0	14	0	8	0
21-30.....	3	0	3	0	0	0
Total.....	99	5	57	5	42	0

¹ The diet of the boys had been changed about three months previous to the test. The change consisted in a lowering of the carbohydrates and an increase in milk, proteins, and green vegetables.

The responses to be expected in the rate of absorption, the percentage of blood sugar, and in the excretion of sugar after its ingestion was determined likewise by the examination of controls. These results were considered together with previous results and experience with the methods employed, and with a composite average of the results of other workers who examined presumably normal individuals and formed the criteria for the estimation of abnormal tolerance to glucose. The controls consisted of a subgroup of 10 volunteer male prisoners, who were accepted without any knowledge of their physical condition, (females were not available). One of the ten, (10 per cent), a short, fat Hawaiian, exhibited glycuresis during the test. With the inclusion of this finding as an average normal response, it was found that among the leper group there were five times as many with glycuresis, (50 per cent), and that all abnormalities in the responses were eight times as frequent, (80 per cent), as among the controls.

METHODS OF URINE AND BLOOD EXAMINATIONS

All examinations of the urine were made within two hours after the passage of the specimen. The specimens were collected in the morning after an overnight fast, or in the afternoon three hours

after the midday meal. Blood sugar determinations were made on specimens collected in the morning, after an overnight fast. Glucose tolerance tests were made by feeding the individuals in the morning, after an overnight fast, 100 grams of glucose in 250 grams of water. Specimens of blood and urine were collected in these tests before feeding the glucose and at intervals of one-half hour, one hour, one and one-half or two hours, and three hours after feeding. Two hundred grams of water was given the individual to drink one hour after the ingestion of the glucose.

All tests of the urine were made by the method of Benedict. The quantitative solutions were used, and the heating was done in a water bath at 100° C. for a constant time. This heating method was repeatedly checked by boiling samples of specimens over the open flame, and the presence of sugar was checked in a large percentage of specimens by using Fehling's solution and boiling over the open flame. Glycosuria in the fasting specimens was checked in about 60 per cent of the positive cases by examining a second specimen, and in all positive specimens by a second test or method.

All blood sugar determinations were made by standardized solutions in accordance with the Shaffer modification of Benedict's technique.

DISCUSSION

The frequency with which glycosuria was found among this group of lepers, supplemented by the findings among subgroups of lepers of an average of the basal blood sugar concentration 20 per cent higher than that of the controls and a great frequency of abnormal responses following glucose ingestion, is believed to be indicative of a high incidence of disturbances of carbohydrate metabolism among them.

It is not felt that a definite correlation between abnormal carbohydrate metabolism and leprosy has been established. However, the association of the two seems of significance when these findings are considered in conjunction with the clinical and experimental observations in other affections the characteristic features of which are simulated in greater or lesser degree by leprosy. The prominent clinical manifestations of leprosy occur in the skin and in the central nervous system. But in the evolution and development of these manifestations the autonomic nervous system, the vasomotor system, and the endocrine glands appear to be involved to varying degree; and the association of disturbances in carbohydrate metabolism with affections of the skin, central nervous system, and these other organic systems occurs with a frequency of recognized clinical significance. Skin affections and peripheral neuritis are of common occurrence in diabetes. Glycosuria, or some other evidence of faulty carbohydrate metabolism, is not infrequently found in pruritis,

eczema, urticaria chronica, psoriasis, and in parasitic infections and in other "skin diseases." The skin lesions of leprosy may have the same clinical characteristics exhibited in any of these conditions.

Usher (1) (2) has found experimentally a marked disproportion between the amount of sugar excreted in the sweat of those with reduced glucose tolerance and those with normal tolerance, and that patients suffering with eczema are more prone to lowered glucose tolerance than prevails among the general class of patients.

A causal relationship between skin affections and the metabolism of carbohydrates has not been determined. But Folin (3) and his coworkers have found that a large amount of the glucose injected into guinea pigs and dogs, shortly before they were killed, was stored in their skins. These experimental investigations of Usher and Folin suggest that the skin may take part in this metabolism. The basal pathology of many skin affections is apparently a derangement of the vasomotor system, and involvement of this system may be the origin of the disturbed sugar metabolism. The small vessels of the skin are damaged rather constantly in leprosy, and involvement of the vasomotor system would readily explain many of the clinical phenomena.

The disturbances in carbohydrate metabolism in organic or functional affections of the central nervous system, of the autonomic nervous system, and of the endocrine system have been determined by both clinical and experimental observations. These are exemplified in the observations in psychoses, neuroses, peripheral neuritis, scleroderma, myxoedema, Grave's disease, and Addison's disease. Claude Bernard's "puncture diabetes" and the glycosuria resulting from sections of the sciatic nerves, or from extirpation of ganglia of the autonomic nervous system, are examples of experimental investigations which tend to confirm the clinical observations. Pharmacological investigations of the actions of drugs and glandular extracts, such as that of adrenalin, which affect the autonomic and vasomotor system, contribute further evidence.

The involvement of the central nervous system is an essential feature of the clinical picture of leprosy. Many of its dermal manifestations are undoubtedly the results of changes in the central nervous system and others are suggestive of lesions of either the central nervous system or of the autonomic system, or of both. The edema, cyanosis, wheals, Raynaud phenomena, alopecia of the outer angle of the eyebrows, the distribution of lesions in the blush area of the face and ears, and the rapid trophic changes in the skin, muscles, and bones all suggest pathology of the autonomic and vasomotor systems; while the scleroderma, myxoedema, pigmentations, and exacerbations at puberty and in relation to menstruation and pregnancy are phenomena which are probably resultant to functional or organic changes in the endocrine glands.

Acute intoxications by drugs and by bacterial products are also associated with disturbances of carbohydrate metabolism; but, though much of the pathogenesis of leprosy is resultant to toxemia, it is believed that the factors of a specific toxemia and of an intoxication were not of importance in these observations, since abnormal findings were noted in convalescent or arrested cases and in those of varying degrees of activity without any relationship to a specific medication or to other acute intoxications. Furthermore, the quantitative findings in both the urine and blood of the cases were materially decreased by a modification of the diet of the patients.

The factors of diet and individual or racial predisposition may be of essential importance in the development of an abnormal carbohydrate metabolism. The immoderate consumption of carbohydrates by those who are predisposed to a faulty mechanism for their metabolism may result in diabetes. Both Bhatia (4) and McCoy (5) found a high frequency of low tolerance to glucose among apparently normal East Indians, and Bhatia attributes the high rate of incidence of diabetes among well-to-do Bengalese to their habits of excessive consumption of carbohydrates and of indolence.

It is likewise true among the race which is afflicted with the greatest leprosy morbidity in Hawaii that both their diets are excessive in carbohydrates, usually poorly balanced, and their habits are relatively indolent. However, it is believed that both diet and degree or extent of physical exercise, per se, can be disregarded as the causally operative factors in these observations, because of the selection of a control group from among the same races, who were provided with a comparable diet, under conditions of segregation.

It is interesting to consider the relation of leprosy and an hereditary predisposition to a faulty mechanism for the metabolism of carbohydrates. That such predisposition may be inherited is strongly suggested, if not established, by the distribution and by the rate of incidence of diabetes in certain family strains; and deductions from such clinical observations are strengthened by the experimental work of Cammidge (6). He has produced hyperglycemic individuals in succeeding generations of mice, in accordance with Mendelian distribution, by selective mating. Leprosy is notoriously a family disease, even to two or more generations; but our knowledge of its mode of dissemination, of the possible rôle of abortive cases, of carriers, and of the factors of acquired immunity is so limited that we can only hypothesize as to much of its epidemiology.

Hopkins and Denny (7), have recently studied the occurrence of cases in 100 family groups in Louisiana, with regard to probable contact of the case with other leprous members of the family. They find that of 100 original patients, representing 100 families of an average number of 6.7 persons, there were 64 who constituted the

only known cases in the respective families in the course of 15 years or more. In the families of the remaining 36 original cases there had developed 83 additional cases. They attribute the secondary cases to contact with original cases. Neill (8) reported the relative incidence among over 700 families, in Hawaii, in which cases developed. His figures are as follows: The attack rates among sons and daughters was 6.35 per cent; among brothers and sisters, 5.47 per cent; and the attack rate in leper families was more than twice that among the general population of similar race.

A comprehensive explanation of the disproportion between these case rates for the sons and daughters and the brothers and sisters, and for the families of lepers, seems to necessitate the inclusion of some factors in addition to the factor of contact with the infecting virus. Furthermore, if leprosy is a disease of such a low degree of communicability as it is considered to be by most observers, it is difficult to explain the occurrence of many cases on the basis only of contact with the infection. The element of the susceptibility of the host to an infection must be considered in arriving at the etiology of many diseases. The conditions which are essential to susceptibility or predisposition are for the most part unknown quantities. If in leprosy an individual or family susceptibility to the infection plays an important rôle in its development, and if this susceptibility or predisposition is specifically related to an inherited faulty mechanism for metabolism of carbohydrates, then by analogy with diabetes and with hyperglycemia in mice the nonleprous children and relatives of lepers should exhibit a higher percentage of those with evidences of disturbed carbohydrate metabolism than is found among the corresponding nonleprous population.

In pursuance of such findings an examination for glycosuria was made on the morning fasting specimens of 99 of such nonleprous children who were separated from their parents at birth and maintained in institutions without any gross contact with leprosy. Among 42 boys there were no cases of glycosuria. Unfortunately, for the test, these boys had been given for about two months previously, a fairly well balanced diet, including a greater quantity of milk and vegetables, and with some restriction of carbohydrates. It had been found that such a diet also reduced or suppressed glycosuria among the lepers. Among the 57 girls, however, there were five, or 8.7 per cent, who exhibited glycosuria, (see Table 4). This is a rate nearly twice as great as that obtained among 90 nonleprous females whose parentage was not considered and whose average age was much greater. It was about 45 per cent of the rate among the female leper group.

It is felt that these results are interesting and may be of significance, but they can not be regarded as of definite value without further

confirmation. They would be more evidently confirmatory of a relationship between leprosy and a predisposition to abnormalities of carbohydrate metabolism were it not for the general observation that males outnumber females in a ratio of about one and a half to one in most large groups of lepers, while female children of lepers and female lepers show a greater rate or degree of the specific metabolic disturbances.

As previously stated, we have been unable to establish a definite correlation between leprosy and abnormal carbohydrate metabolism. In view, though, of the above stated findings and observations in leprosy and in analagous clinical conditions it is believed that further investigations of the probability of a relation between this metabolism in the development of and susceptibility to leprosy is desirable.

SUMMARY

Twenty-three and four-tenths per cent of 175 lepers segregated in Hawaii had glycosuria after fasting for three hours or overnight. In addition to these findings, 80 per cent of 41 lepers examined exhibited abnormalities in their glucose tolerance time curves, and the average basal blood sugar of these, and of 40 others, was 20 per cent higher than that of 32 controls.

The thesis is suggested that disturbances in carbohydrate metabolism and the development of leprosy may be interrelated. This is discussed from the standpoints of the analogies between leprosy and other diseases in which such disturbances occur, and of the possibly similar factors operative in the inheritance of a predisposition to infection with leprosy, and to the inheritance of a faulty mechanism for metabolism of carbohydrates.

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COOPERATIVE RURAL HEALTH WORK OF THE PUBLIC HEALTH SERVICE IN THE FISCAL YEAR 1929¹

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In the fiscal year ended June 30, 1929, the United States Public Health Service cooperated in demonstration projects in rural health work in 198 counties in 22 States, as follows:

Alabama.—Colbert, Franklin, Jackson, Lauderdale, Lawrence, Limestone, Madison, and Walker Counties.

Arkansas.—Arkansas, Ashley, Chicot, Conway, Crittenden, Cross, Desha, Drew, Faulkner, Garland, Jackson, Jefferson, Little River, Mississippi, Monroe, Phillips, Pope, Pulaski, Saline, Union, White, Woodruff, and Yell Counties.

California.—San Diego and Santa Barbara Counties and San Joaquin District.

Georgia.—Floyd, Glynn, Laurens, and Walker Counties.

Idaho.—Twin Falls County.

Illinois.—Pulaski County.

Kansas.—Brown, Cherokee, Geary, Greenwood, Jefferson, Lyon, and Ottawa Counties.

Kentucky.—Ballard, Bell, Breathitt, Carlisle, Carter, Elliott, Estill, Floyd, Fulton, Hancock, Hickman, Hopkins, Knox, Lawrence, Lee, Leslie, Letcher, Magoffin, Martin, Mason, McLean, Menifee, Monroe, Morgan, Ohio, Owsley, Perry, Trigg, Webster, Whitley, and Wolfe Counties.

Louisiana.—Assumption, Avoyelles, Caldwell, Catahoula, Concordia, East Carroll, Franklin, Iberia, Iberville, Lafayette, La Fourche, La Salle, Madison, Morehouse, Ouachita, Point Coupee, Rapides, Richland, St. Landry, St. Martin, St. Mary, Tensas, Terribonne, Washington, and West Carroll Parishes.

Massachusetts.—Barnstable County.

Michigan.—Genesee and Wexford Counties.

Mississippi.—Bolívar, Harrison, Hinds, Humphries, Issaquena, Jackson, Sharkey, Sunflower, Union, Warren, Washington, and Yazoo Counties.

Missouri.—Boone, Buchanan, Dunklin, Greene, Jackson, Marion, Mississippi, New Madrid, Nodaway, Pemiscot, Scott, St. Francois, and St. Louis Counties.

¹ This report applies to work provided for with funds appropriated specifically for "special studies of and demonstration work in rural sanitation." It does not cover all cooperative activities of the Public Health Service in rural communities.

Montana.—Cascade, Gallatin, and Lewis and Clark Counties.

New Mexico.—Bernalillo, Chaves, Dona Ana, Eddy, Santa Fe, Union, and Valencia Counties.

North Carolina.—Edgecombe, Richmond, and Robeson Counties.

Oklahoma.—Okmulgee, Ottawa, Pittsburg, and Seminole Counties.

South Dakota.—Pennington County.

Tennessee.—Anderson, Bledsoe, Cumberland, Dyer, Fentress, Gibson, Grundy, Hamilton, Lake, Lauderdale, Montgomery, Obion, Rhea, Roane, Sequatchie, Shelby, Sullivan, Unicoi, Washington, Weakley, and Williamson Counties.

Texas.—Cameron County.

Virginia.—Accomac, Alleghany, Bath, Charlotte, Chesterfield, Essex, Fairfax, Henry, Lee, Northampton, Pittsylvania, Powhatan, Prince Edward, Pulaski, Roanoke, Smyth, and Washington Counties.

West Virginia.—Berkeley, Boone, Brooke, Fayette, Gilmer, Hancock, Harrison, Kanawha, Logan, Marion, Ohio, Preston, Raleigh, and Wood Counties.

The results were thoroughly in line with the conclusions in the reports on this activity for the fiscal years 1920,² 1921,³ 1922,⁴ 1923,⁵ 1924,⁶ 1925,⁷ 1926,⁸ 1927,⁹ and 1928.¹⁰

Plan of Work

The plan of the work was similar to that carried out in each of the eight preceding fiscal years (Reprints Nos. 615, 699, 887, 964, 1047, 1118, 1184, and 1259).

The authorization for this work is in the act of February 15, 1893 (ch. 144, 27 Stat. L. 449); the act of August 14, 1912 (ch. 288, 37 Stat. L. 309); and in the annual appropriation acts. The appropriation is specifically for "Special studies of and demonstration work in rural sanitation."

The work is conducted in cooperation with State and local health authorities. It is made a part of a well-rounded comprehensive program of local (county or district) health service.

Through such connection as this with local whole-time health service projects the Public Health Service can operate most economically and efficiently toward meeting its responsibility to help prevent the spread of human infection in interstate traffic. The cooperative projects also furnish most favorable opportunities for studies, by the Public Health Service, "of the diseases of man and conditions influ-

² Reprint No. 615, from Public Health Reports of Oct. 1, 1920, p. 15.

³ Reprint No. 699, from Public Health Reports of Oct. 7, 1921, p. 17.

⁴ Reprint No. 788, from Public Health Reports of Sept. 29, 1922, p. 22.

⁵ Reprint No. 887, from Public Health Reports of Dec. 14, 1923, p. 24.

⁶ Reprint No. 964, from Public Health Reports of Oct. 17, 1924, p. 23.

⁷ Reprint No. 1047, from Public Health Reports of Oct. 23, 1925, p. 33.

⁸ Reprint No. 1118, from Public Health Reports of Oct. 22, 1926, p. 37.

⁹ Reprint No. 1184, from Public Health Reports of Oct. 21, 1927, p. 51.

¹⁰ Reprint No. 1259, from Public Health Reports of Nov. 30, 1928, p. 57.

encing the propagation and spread thereof." Thus, this rural-sanitation activity serves a number of important general purposes besides those specified in the appropriating act, and though quite limited as yet in extent it appears to contribute to the most important results of the Federal Government's operations for the promotion of the general welfare.

The demonstration work in rural sanitation can not, under the provisions of the appropriating act, be conducted in a community unless the State, county, or municipality in which the community is located agrees to pay at least one-half the expenses of such demonstration work. The funds provided by the State, county, and municipalities, inclusive, for support of the average demonstration project far exceed the allotment from the Federal fund, and in most instances the appropriation from the local official sources (county, township, or town), covers considerably more than 50 per cent of the budget.

Under this cooperative arrangement the rural sanitation work of the Public Health Service is carried out in each project by a local health force intended to be permanent and is made a part of a general program of rural health work deemed suitable to the locality. Thus, it is accomplished more economically and with more lasting effects from a demonstration standpoint than it could be if undertaken by a specialized force working a comparatively short time in the locality.

The unit for the work, as a rule, is the county, but it may be a group of townships in the same vicinity or a district comprising two or three adjacent counties. In some of the units incorporated villages, towns, and cities (with populations of approximately 50,000) are included. Under the cooperative arrangements a good program of health work can be carried out in practically any rural county or district in the United States at a cost to the county or district easily within its means. The average cooperative demonstration project is conducted on a cost basis of less than 50 cents per capita of population served and furnishes a striking example of efficiency with economy in public service. In many counties efficient whole-time county health service can be provided at an annual cost of less than \$2 to the local taxpayer with real property assessed at \$5,000 to \$6,000.

An annual budget of \$10,000 will provide in most sections of this country the services of a county health department force consisting of 1 whole-time health officer, 1 whole-time sanitary inspector, 1 whole-time health nurse, and 1 office clerk. Such a force can render highly effective health service in any county with a population under 25,000 and an area under 500 square miles. For larger units of population larger forces are needed and should be provided, especially after the first year or two of operation.

The members of the working forces in the cooperative demonstration projects are appointed by the proper local government author-

ities, but the appointees must be acceptable to the cooperative official agencies—the State board of health and the United States Public Health Service. The only ground upon which the interests of the cooperative agencies are likely to meet with respect to the appointments is fitness for efficient services. With such expressed understanding, the local authorities at times may be relieved of local political embarrassment in exercising their appointing power.

All salient branches of health work, such as acute communicable disease control measures, sanitation of private homes and public places, malaria prevention, tuberculosis control, goiter prevention, infant and maternity hygiene, venereal disease prevention, school hygiene, etc., are carried out in the projects. Attention is expected to be concentrated upon the different branches of the work in what appears to be the most advantageous sequence. The various activities can be dovetailed with one another so that every dollar invested and every unit of energy expended may yield the biggest possible return in health promotion and disease prevention. The director of the unit, the county or district health officer or sanitary officer, is given full responsibility for the detailed execution of the work. He has from time to time, and can secure at any time, advice and counsel and active assistance from specially experienced representatives of the State board of health and the United States Public Health Service.

By having all salient branches of health work for the community conducted under the direction of one head, the whole-time county health officer, who is given a status of field agent in the United States Public Health Service, and in some of the States that of deputy State health officer, a maximum of services can be rendered with a minimum of overhead expense, lost motion, and friction. Through good business management, the funds invested in the enterprise can be made to yield a remarkable dividend in the protection and promotion of human health and in a money saving to the community, resulting from the prevention of sickness and loss in wage earning, amounting to many times the cost of the service. The net economic gain is especially impressive in farming communities.

This plan of cooperative rural health work has been evolved in the course of field experience and has been tested under a wide range of local conditions. It seems applicable to all the rural districts of the United States. The provision of means for a reasonably rapid extension of this work would, according to all the evidence, prove highly advantageous from every standpoint—individual, community, State, and national.

Appropriation

The appropriation for the rural sanitation work of the Public Health Service in the fiscal year 1929 was \$347,000. Against the amount appropriated was set up a budget saving of \$1,900. The

unexpended balance from the operations of the preceding fiscal year was \$2,500.¹¹ Thus, \$347,600 was available.

Rural health work is applicable to communities in the United States comprising about 60 per cent (or over 70,000,000) of our total population. Such communities include farm and other open-country homes, incorporated towns and villages (with populations under 2,500), and, as the county is the logical political unit for official rural health-work administration, many towns and cities with populations from 2,500 to 50,000.

Under present conditions of transportation and travel, rural and urban health conditions constantly react upon each other. Therefore rural health work is of importance to our entire population. The sanitary quality of the tremendous volume of raw foods now shipped daily through interstate traffic is of keen importance, for both humane and business reasons, to our public and our private interests and may be enhanced and safeguarded by reasonably adequate, coordinated, joint activities of governmental agencies—local, State, and Federal. To undertake sanitary control of traffic and travel by inspection and quarantine at our city borders and on our interstate lines now would be futile and ridiculous. The efficient local health department, in doing its local work, performs a duty of state-wide and nation-wide importance with which the State and the Federal health services are concerned. Therefore it seems reasonable and proper for State and Federal agencies to encourage and help in the development and permanent maintenance of such departments.

Only about 23 per cent of our rural population is as yet provided with local health service approaching adequacy under the direction of whole-time local (county or district) health officers.¹² Because of lack of efficient, whole-time rural health service, infections of man are spread constantly within the State and very frequently across interstate lines.

In our rural communities there are about 1,000,000 persons incapacitated all the time by illness, much of which is preventable; about 70 per cent of the school children are handicapped by physical defects, most of which are preventable or remediable; about 30 per cent of persons of military age are incapacitated for arduous productive labor or for general military duty, largely from preventable causes; and over 60 per cent of the men and women between 40 and 60 years

¹¹ The unexpended balance was due not to an excessive amount of money being available, but to temporary suspensions of the work and consequent decreased expenditure in some of the projects to which allotments had been made for the whole fiscal year 1928. Such suspensions are necessitated by various local circumstances and can not be anticipated when the contracts are made. With the existing differences between the Federal fiscal year and the fiscal years of some of the States and localities in which the work is conducted, it would not be practicable, without lessening the degree of economy striven for, to arrange contracts so that the allotment of Federal funds to every project would be expended exactly by the end of the Federal fiscal year.

¹² Reprint No. 1284. from Public Health Reports of May 17, 1923.

of age are in serious need of physical reparation, largely as a result of preventable causes. In the registration area of the United States the rural death rate in recent years has been higher than the urban for malaria, influenza, typhoid fever, and tuberculosis of the respiratory tract. In view of these conditions there is no room for reasonable doubt about the need for more and better rural health service in this country.

Efficient health service results in life saving, disease prevention, health promotion, and economic saving. The saving in dollars and cents amounts to many times the cost of the service. Most of our rural county governments are not disposed to establish reasonably adequate county health service without an offer of financial assistance and competent counsel from some outside agency.

The amounts specifically appropriated by Congress for the rural sanitation work of the United States Public Health Service have been as follows:

Fiscal year	Amount	Fiscal year	Amount
1917.....	\$25, 000	1924.....	\$50, 000
1918.....	150, 000	1925.....	74, 300
1919.....	150, 000	1926.....	75, 000
1920.....	50, 000	1927.....	75, 000
1921.....	50, 000	1928.....	85, 000
1922.....	50, 000	1929.....	347, 000
1923.....	50, 000	1930.....	346, 000

Of the amount appropriated for the fiscal year 1930, \$85,000 is available for general use and \$261,000 for use in the flood counties of the Mississippi Valley.

The total for this activity in the last 14 years has been less than one forty-thousandth of the total congressional appropriation.

Expenditures

The expenditures in the fiscal year 1929 totaled \$339,865.84. Of this sum, \$333,839.96 was expended in allotments for direct support of cooperative projects in counties or districts, and \$6,025.88 was expended for general administration, supervision of local projects, and special studies of the problem of rural sanitation.

Of the expenditures for direct support of units, \$252,321.64 was expended in the flood county projects in the Mississippi Valley and \$81,518.32 was expended in regular demonstration projects. Of the unexpended balance of \$7,734.16¹³ at the end of the fiscal year, \$7,671.77 was in the allotments to the 90 flood county projects and only \$62.39 in the allotments to the 108 regular demonstration projects outside the flood area.

For the support of the work in the 198 local projects the expenditures from all sources totaled \$2,053,091.51. Of this sum, \$333,839.96

¹³ The reason for the balance at the end of each fiscal year is presented in footnote 11 of the report.

was allotted from the rural sanitation funds of the Public Health Service; an aggregate of \$1,461,482.13 was derived from State, county, and municipal governmental sources; and \$257,769.42 was derived from other sources, including local health associations, tuberculosis associations, local Red Cross chapters, the Rockefeller Foundation, and the Children's Bureau of the United States Department of Labor. Thus this investment of the Federal funds appropriated for rural sanitation work was met with odds of over 5 to 1. For the regular demonstration projects outside the "flood" counties the odds were over 10 to 1, as was the case in each of the several preceding fiscal years.

It is significant that organizations entering the public health field to promote or conduct some specialized activity—such as typhoid fever prevention, hookworm control, tuberculosis prevention, trachoma control, malaria control, venereal disease prevention, school hygiene, or advancement of child and maternity hygiene—realize, as a rule, after practical experience, the advantage of dovetailing their specific activities with and making them a part of a well-rounded, comprehensive program of local official health service under the immediate direction of a qualified, whole-time local health officer. Such arrangement is obviously in the interest of efficiency with economy in public health work in our rural districts.

Detailed Data

The expenditures from the different sources for support of the cooperative demonstration projects, the scope, the principal activities, and some of the results of the work are presented in the accompanying tabular statement.

In attempting to measure the efficiency of health service, consideration is to be given to the local conditions—climatic, topographical, geographical, social, economic, and other—under which the work is done, the duration, nature, and scope of the activities, the cost of the service, and the results achieved. The 198 cooperative projects listed in this tabular statement present a wide range of local conditions. From equivalent, well-directed efforts, much larger results are obtainable in one such project than in another. Considering the cost of the service, the activities and results reported, and the findings from direct surveys of the situations by representatives of the Public Health Service and the State boards of health concerned, it is apparent that in the fiscal year 1929 some of the projects were highly successful, others were not up to reasonable expectations, and the average was good.

Counties (or districts)	8 in Alabama	23 in Arkansas	3 in California	4 in Georgia	1 in Idaho	1 in Illinois	7 in Kansas	31 in Kentucky	25 in Louisiana	1 in Massachusetts	2 in Michigan	12 in Mississippi
Total number of months of operation in fiscal year 1920	92	264	34	48	2	12	72	290½	273½	12	10	131
A. EXPENDITURES												
1. Rural sanitation funds (P. H. S.)	\$7,274.95	\$79,819.46	\$5,833.29	\$1,200.00	\$300.00	\$3,000.00	\$9,900.00	\$67,620.32	\$65,786.10	\$1,500.00	\$1,260.86	\$27,963.31
2. State	21,053.23	25,103.02	900.00	400.00	400.00	1,800.00	3,750.00	64,292.43	45,264.39	2,143.11	29,445.47	91,239.75
3. County	40,473.41	66,077.98	186,765.35	29,082.70	642.50	2,500.00	68,110.00	56,490.25	45,523.80	5,641.71	6,887.86	23,729.25
4. Municipalities	10,287.67	8,824.00	-----	8,824.00	-----	1,000.00	19,550.00	13,382.50	41,066.40	-----	4,028.14	21,010.13
5. Other agencies	17,440.39	57,436.86	-----	466.66	-----	-----	-----	-----	-----	-----	-----	-----
Total	96,529.65	229,337.94	193,498.64	40,173.36	1,342.50	8,300.00	101,310.00	201,785.50	197,660.69	7,141.71	14,343.59	193,287.73
B. ACTIVITIES												
1. Educational:												
(a) Lectures	844	4,878	101	280	6	23	731	718	1,345	39	63	2,189
(b) Attendance	53,725	106,240	3,249	18,240	180	340	24,618	41,302	83,077	1,850	5,070	120,107
(c) Bulletins distributed	24,541	106,667	15,326	9,867	784	368	82,919	136,942	119,542	31	7,774	46,649
(d) Newspaper articles	15,646	2,438	1,184	202	70	24	1,730	1,716	535	35	101	68,883
(e) Circular letters	11	38,887	25,973	2,737	57	327	27,120	3,838	84,631	14	2,101	68,946
(f) Health exhibits	-----	306	17	1	-----	10	141	663	203	1	16	17
2. Sanitary inspections:												
(a) Private premises	17,069	49,651	5,521	84,140	54	59	2,202	0	16,642	389	18	84,663
(b) Public premises—Schools, churches, stores, camps, etc.	2,176	14,597	2,881	1,027	74	63	2,890	1,050	3,224	378	9	8,668
3. Special inspections:												
(a) Dairies	1,051	2,077	8,217	318	2	6	354	710	528	1,452	28	4,145
(b) Other food-producing or food-handling places	2,586	1,363	11,609	465	84	46	1,214	3,018	1,895	544	6	64,492
4. Examinations:												
(a) For life-extension advice	353	907	1,803	41	3	0	260	0	559	0	0	1,223
(b) For marriage license	657	0	0	0	0	0	13	0	0	0	0	1,114
(c) For work certificates (children)	648	61	61	208	0	3	0	0	1	77	7	104
(d) For lunacy	133	331	24	8	0	0	37	0	9	0	2	12
(e) Of prisoners	533	1,751	265	38	0	0	1,100	0	160	0	0	16
(f) Of food handlers	321	3,498	189	373	339	0	85	0	856	1	0	1,064
5. Acute communicable disease control:												
(a) Visits to cases, carriers, contacts, or suspects	2,267	5,623	20,583	1,753	160	178	8,542	3,719	3,042	605	1,968	1,962
(b) Cases or carriers, isolated or quarantined	1,897	3,410	2,744	673	61	63	4,597	2,064	1,511	757	547	732
6. Venereal disease control:												
(a) Suspects examined	1,187	666	948	937	3	0	191	5,703	338	2	4	6,382
(b) Prophylactic treatments	1,460	219	0	51	0	0	12	5,688	6	0	0	6
(c) Curative treatments	4,245	1,006	9,334	1,554	0	0	101	6,440	747	70	0	1,847

Counties (or districts).....	8 in Alabama	23 in Arkansas	3 in California	4 in Georgia	1 in Idaho	1 in Illinois	7 in Kansas	31 in Kentucky	23 in Louisiana	1 in Massa- chusetts	2 in Michigan	12 in Missis- sippi
Total number of months of operation in fiscal year 1922.....	92	264	34	48	2	12	72	290½	273½	12	10	131
C. RESULTS												
1. Sanitary privies installed:												
Type—												
(a) Septic or L. R. S.....	11	5	49	6	0	0	20	14	19	0	2	390
(b) Water-tight vault.....	24	5	0	0	0	0	50	0	2	0	0	2,500
(c) Bucket and box.....	97	93	0	0	0	0	10	0	2	30	0	0
(d) Pit.....	940	5,471	1,828	1,834	2	6	17	1,424	4,160	68	3	7,651
Total.....	1,072	5,574	49	1,834	2	6	97	1,438	4,183	98	5	20,541
2. Privies restored to sanitary type.....	1,446	1,744	58	456	4	0	266	654	810	51	14	2,784
3. Septic tanks installed.....	82	182	499	218	2	1	37	8	220	67	12	848
4. New sewer connections.....	520	2,006	1,832	776	0	6	162	381	244	0	4	9,117
5. New water connections.....	546	1,339	1,644	533	0	0	138	597	664	0	3	776
6. Wells or springs improved.....	67	467	6	23	3	10	117	4,260	512	0	3	434
7. Public milk supplies radically improved.....	18	500	0	86	0	2	55	0	32	53	2	541
8. Public food-handling places radically im- proved.....	258	1,034	21	76	14	12	141	40	270	3	6	157
9. Places producing foods for sale radically im- proved.....	45	585	1	67	0	0	87	0	121	9	6	26
10. Dwellings effectively screened against flies and mosquitoes.....	129	1,098	14	50	0	2,968	20	0	1,102	0	3	34
11. Stables made sanitary.....	113	1,270	1	20	1	0	46	0	50	3	0	37
12. Nuisances corrected.....	2,015	9,217	685	1,107	27	13	414	5,291	1,828	300	45	914
13. Convictions for violation of sanitary laws.....	24	139	7	1	0	0	7	0	12	26	0	45
14. Nutritional cases improved.....	32	1,611	105	645	0	0	853	0	1,394	0	0	200
15. Corrections of physical defects induced:												
(a) In infants.....	33	149	149	120	4	0	90	0	60	0	3	124
(b) In preschool children.....	271	673	521	111	14	0	185	483	136	390	8	510
(c) In school children.....	2,763	11,179	2,682	1,316	0	518	10,322	10,859	7,993	1,711	1,837	14,330
(d) In adults.....	26	353	303	89	4	0	42	0	179	0	3	9

Counties (or districts).....	13 in Missouri	3 in Montana	7 in New Mexico	3 in North Carolina	4 in Oklahoma	1 in South Dakota	21 in Tennessee	1 in Texas	15 sanitary officer projects and 1 whole-time county health unit in Virginia	14 in West Virginia	Total
Total number of months of operation in fiscal year 1929	138½	26	79	36	39	6	216	5	166½	161½	2,114½
A. EXPENDITURES											
1. Rural sanitation funds (P. H. S.).....	\$13,829.13	\$3,605.97	\$3,032.50	\$1,237.47	\$5,799.93	\$1,100.00	\$17,323.39	\$1,200.00	\$8,644.96	\$6,608.30	\$333,839.96
2. State.....	31,647.99	3,480.00	536.66	11,036.36	10,599.95	2,763.03	47,665.96	1,312.50	15,044.62	38,601.38	354,377.09
3. County.....	69,080.22	17,053.31	42,124.66	12,895.38	16,905.17	2,763.03	114,289.61	2,363.45	20,429.25	92,482.71	990,722.10
4. Municipalities.....	18,316.15	16,427.18				400.00		3,328.20		34,746.27	116,332.34
5. Other agencies.....	38,212.18	8,290.00	1,614.00		3,599.96	1,544.96	16,894.84			12,222.40	257,769.42
Total.....	171,065.67	48,856.46	47,607.82	25,169.21	36,605.01	5,807.99	196,163.82	8,204.15	44,118.83	184,661.06	2,053,091.51
B. ACTIVITIES											
1. Educational:											
(a) Lectures.....	2,023	56	202	126	356	7	1,159	21	285	621	16,032
(b) Attendance.....	75,996	3,675	14,120	10,770	11,319	370	66,020	1,343	13,638	32,589	778,175
(c) Bulletins distributed.....	153,106	19,869	6,114	14,194	15,541	171	90,678	232	49,000	91,261	2,249,597
(d) Newspaper articles.....	1,869	238	584	85	281	40	1,097	21	264	1,077	15,117
(e) Circular letters.....	43,177	11,832	5,573	10,341	698	365	10,922	733	11,195	27,757	341,784
(f) Health exhibits.....	156	741	0	12	55	0	66	9	0	89	1,850
2. Sanitary inspections:											
(a) Private premises.....	7,403	1,124	1,819	3,616	1,686	462	73,074	89	37,109	51,027	436,847
(b) Public premises—Schools, churches, stores, camps, etc.....	3,765	774	1,705	3,260	2,526	210	11,252	242	1,190	5,375	67,366
3. Special inspection:											
(a) Dairies.....	1,580	164	569	179	98	55	3,008	535	0	2,439	27,545
(b) Other food-producing or food-handling places.....	717	541	938	2,008	883	94	2,893	255	2,369	4,826	102,866
4. Examinations:											
(a) For life-extension advice.....	2,552	47	14	457	72	0	252	0	0	494	8,543
(b) For marriage license.....	3	42	0	70	0	0	7	0	0	0	906
(c) For work certificates (children).....	433	30	5	300	46	0	238	0	0	623	2,835
(d) For lunacy.....	310	0	11	84	0	0	352	6	0	81	1,475
(e) Of prisoners.....	2,130	0	298	1,072	376	0	688	0	0	2,286	10,713
(f) Of food handlers.....	45	92	952	144	72	0	581	37	0	1,308	9,912
5. Acute communicable disease control:											
(a) Visits to cases, carriers, contacts, or suspects.....	11,370	6,802	10,579	497	1,441	54	9,303	114	0	7,808	98,324
(b) Cases or carriers, isolated or quarantined.....	5,461	3,200	6,151	560	529	11	3,037	119	344	7,658	46,176

Counties (or districts).....	13 in Missouri	3 in Montana	7 in New Mexico	3 in North Carolina	4 in Oklahoma	1 in South Dakota	21 in Tennessee	1 in Texas	15 sanitary officer projects and 1 whole-time county health unit in Virginia	14 in West Virginia	Total
Total number of months of operation in fiscal year 1929	138½	26	79	36	39	6	216	5	166½	161½	2,114½
B. ACTIVITIES—continued											
6. Venereal disease control:											
(a) Suspects examined.....	1, 102	172	92	1, 099	317	0	1, 226	4	0	2, 184	22, 537
(b) Prophylactic treatments.....	1, 42	0	61	780	21	0	306	0	0	7, 701	4, 422
(c) Curative treatments.....	5, 505	245	83	2, 399	2, 683	0	6, 435	26	0	18, 525	60, 715
7. Tuberculosis control:											
(a) Number examined.....	996	37	121	638	192	1	3, 060	44	0	1, 723	10, 999
(b) Positive.....	877	22	53	61	153	1	683	19	0	1, 267	2, 987
(c) Negative.....	819	15	68	587	39	0	2, 377	25	0	1, 359	8, 012
(d) Placed in institutions.....	293	30	4	60	58	0	129	1	0	1, 298	1, 273
(e) Home visits.....	5, 090	294	90	246	460	0	4, 402	88	0	3, 170	22, 694
8. Persons treated for removal of hookworm.....	0	0	0	0	0	0	4	0	0	107	1, 872
9. Persons treated for prevention or cure of gonorrhea.....	3, 338	71	63	172	0	0	4	0	0	852	2, 120
10. Schick tests.....	3, 442	0	0	395	4	0	3, 403	0	0	113	17, 273
11. Cows tuberculin tested.....	2, 293	2, 293	5, 297	0	733	330	34, 015	487	3, 198	18, 757	121, 813
12. Immunization:											
(a) Complete antityphoid administrations.....	7, 333	13	755	6, 197	17, 086	4	51, 721	29	4, 764	15, 862	848, 720
(b) Antismallpox vaccinations.....	10, 904	234	4, 468	1, 420	6, 677	45	11, 267	1, 101	3, 309	15, 733	181, 350
(c) Complete diphtheria toxin-antitoxin administrations.....	7, 115	1, 496	1, 434	2, 835	1, 811	113	21, 571	0	4, 555	728	141, 835
(d) Persons given prophylactic diphtheria antitoxin.....	160	20	166	159	243	0	43	0	0	39	2, 466
(e) Persons given antirabic treatment.....	109	820	10	9	40	0	258	0	15	0	1, 593
13. Child hygiene:											
(a) Prenatal—											
(1) Cases given advice.....	957	14	237	1, 042	179	0	734	50	0	2, 949	12, 555
(2) Examinations.....	248	10	79	190	51	0	1	2	0	39	3, 025
(3) Office consultations.....	730	26	175	120	55	0	99	35	0	23	4, 373
(4) Group conferences.....	654	21	0	676	28	0	110	6	0	225	2, 807
(5) Home visits.....	763	110	187	1, 279	191	0	2, 075	121	0	1, 449	13, 181
(6) Midwives instructed.....	46	0	110	264	107	0	292	83	0	11	18, 308
(b) Infant and preschool—											
(1) Babies and children examined.....	8, 496	2, 210	1, 832	2, 405	654	183	2, 733	224	0	3, 612	57, 587
(2) Office consultation, mothers.....	3, 824	1, 381	235	442	442	0	1, 580	24	0	1, 580	23, 596
(3) Group conferences with mothers.....	599	83	134	609	196	0	1, 865	22	0	1, 381	6, 489
(4) Home visits.....	5, 717	717	1, 039	2, 842	336	5	7, 363	611	0	7, 363	53, 863

A detailed description of any one of a large majority of the projects would present evidence of the remarkable effectiveness and economy of this plan of cooperative health work. For purpose of illustration reference is made to a few of the activities and results in the following projects:

In Lauderdale County, Ala. (budget, \$15,608; year of work, tenth), 473 sanitary privies were installed, 1,493 physical defects in school children were corrected, and complete immunization treatments against typhoid fever were administered to 5,336 persons.

In Jefferson County, Ark. (budget, \$14,109; year of work, fourth), 1,632 sanitary privies and 617 new sewer connections were installed, and 3,260 physical defects in school children were corrected.

In White County, Ark. (budget, \$9,000; year of work, second), 1,325 physical defects in school children were corrected, 4,800 persons were immunized against typhoid fever, 4,782 against smallpox, and 967 against diphtheria.

In Floyd County, Ga. (budget, \$9,557; year of work, sixth), 1,701 sanitary privies, 100 septic tanks, and 717 new sewer connections were installed, 4,605 persons were immunized against typhoid fever and 2,671 against smallpox.

In Hinds County, Miss. (budget, \$63,298; year of work, fifth), 3,482 sanitary privies, 419 septic tanks, and 3,108 new sewer connections were installed, 4,514 physical defects in school children, 119 in babies, and 480 in preschool children were corrected, 5,183 persons were immunized against typhoid fever, 6,463 against smallpox, and 4,647 against diphtheria.

In Seminole County, Okla. (budget, \$11,665.71; year of work, second), 6,706 persons were immunized against typhoid fever, 3,084 against smallpox, and 1,727 against diphtheria.

In Hamilton County, Tenn. (budget, \$16,947.55; year of work, third), 1,381 sanitary privies and 239 septic tanks were installed, 998 physical defects in school children were corrected, 5,976 persons were immunized against typhoid fever, 1,689 against smallpox, and 3,746 against diphtheria.

In Sullivan County, Tenn. (budget, \$9,496.13; year of work, second), 2,280 sanitary privies and 1,539 new sewer connections were installed, 2,166 dwellings were screened, and 3,403 persons were immunized against typhoid fever.

In sanitary officer district No. 3, comprising Grundy, Sequatchie, and Bledsoe Counties, in Tennessee (budget, \$4,598.58; year of work, second), 2,104 sanitary privies were installed and 707 dwellings were screened.

In Lake County, Tenn. (budget, \$8,000; year of work, second), 996 dwellings, mostly plantation tenant cabins, were screened and otherwise improved for exclusion of mosquitoes, and 2,680 persons were immunized against typhoid fever. Over 80 per cent of the

dwellings in this county are reported to be now well screened. As a result of the intensive and economical screening campaign in this project the local prevalence of malaria has been greatly reduced from its previously high rate.

In Essex County, Va. (budget, \$1,495.25; year of work, second), 804 sanitary privies were installed. These installations added to those of the previous fiscal year make a remarkable record. In the two years of work of a whole-time sanitary officer in this project sanitary systems for the disposal of human excreta were installed in all but 70 of the 1,785 homes in Essex County. Almost all of the installations were sanitary pit privies of the double wood-slab type of construction, new throughout.

In Kanawha County, W. Va. (budget, \$16,941.14; year of work, third), 1,627 sanitary privies, 60 septic tanks, and 747 new sewer connections were installed, 1,130 physical defects in school children were corrected, intensive educational work was done for promotion of infant and maternity hygiene, and 3,399 persons were immunized against typhoid fever, 5,215 against smallpox, and 2,511 against diphtheria. In the three years of cooperative whole-time county health service in this county complete immunization treatments have been given against typhoid fever to 8,597 persons, against diphtheria to 6,112 persons, and against smallpox to 31,277 persons, and measures for improvement of environmental sanitation and of the sanitary quality of water, milk, and other food supplies and for the promotion of hygiene (especially of mothers, babies, and preschool children) have been energetically and effectively carried out. Apparently as a result in the main of the activities directly conducted or induced by the health department there has been a marked reduction in the general morbidity and mortality of the county. The annual deaths from typhoid fever have been reduced from 16 to 6; from diphtheria from 14 to 1; from scarlet fever from 6 to 0; from tuberculosis from 72 to 42, and the infant mortality rate per 1,000 living births has been reduced from 84 to 48.

Sanitary Officer Projects in Virginia and Tennessee Counties

The plan of special demonstration work in rural sanitation inaugurated in Virginia in the fiscal year 1920 was carried out in 15 counties ¹⁴ in that State and in 8 counties ¹⁵ in Tennessee in the fiscal year 1929. This plan, which is described in previous reports,¹⁶ continues to prove

¹⁴ Alleghany, Bath, Charlotte, Chesterfield, Essex, Fairfax, Henry, Lee, Pittsylvania, Powhatan, Prince Edward, Pulaski, Roanoke, Smyth, and Washington.

¹⁵ Anderson, Bledsoe, Cumberland, Grundy, Fentress, Sequatchie, Rhea, and Unicoi.

¹⁶ Reprint No. 615, from Public Health Reports of Oct. 1, 1920, pp. 10, 12; Reprint No. 609, from Public Health Reports of Oct. 7, 1921, pp. 12, 14; Reprint No. 788, from Public Health Reports of Sept. 22, 1922, pp. 14, 17; Reprint No. 877, from Public Health Reports of Dec. 14, 1923, pp. 16, 18; Reprint No. 964, from Public Health Reports of Oct. 17, 1924, pp. 18, 21; Reprint No. 1047, from Public Health Reports of Oct. 23, 1925, pp. 27, 28; Reprint No. 1118, from Public Health Reports of Oct. 22, 1926; pp. 31, 32; Reprint No. 1184, from Public Health Reports of Oct. 21, 1927, pp. 35, 36; Reprint No. 1259, from Public Health Reports of Nov. 30, 1928, pp. 41, 45.

highly successful. It meets remarkably well the situations in rural counties in which effective health work, if done at all, must be done on a low-cost basis and in which environmental sanitation is especially needed. The cost for such service in the average county is about \$2,750 a year. The county sanitary officer is engaged on a whole-time basis. He does not have to be a graduate in medicine or engineering, but he must be a trained, practical sanitarian. Along with his sanitary work, he carries out, with the active cooperation of the local physicians, most of the other activities expected of a whole-time county health officer with a medical degree.

The results accomplished in the county sanitary officer projects become more impressive from year to year. Some of these counties are now among the foremost in the list of rural counties in the United States presenting high-grade demonstrations in sanitary progress.

This county sanitary officer plan, after 10 years of testing, appears to offer to the counties to which it is appropriate as large a return on the investment for county health service as any other yet tried or proposed.

General Progress in Rural Health Work

Progress in the development of whole-time rural (county) health service in the United States continued in the fiscal year 1929. According to data ¹⁷ collected from the State health departments, the number of counties or equivalent divisions provided with local health service reaching all rural sections thereof, under the direction of whole-time county or district health officers, was 467 at the beginning of the calendar year 1929, as compared with 414, 337, 307, 280, 250, 230, 202, 161, and 109 at the beginning of the calendar years 1928, 1927, 1926, 1925, 1924, 1923, 1922, 1921, and 1920, respectively. The gain of 358 within this 9-year period, though much less than it might have been had means been provided for a larger degree of cooperation from the Federal and State official agencies, is significant.

The prospects are good for a better rate of progress in this vitally important field in the next nine years. Our public-health administrators generally now appear convinced that local official health service under the direction of a whole-time local health officer is the most essential element in the development of an adequate system of effective and economical public health service in the United States, and that most of the work of the Federal and State health agencies should be conducted with and through such local health departments. The principle of cooperative rural health work appears sound in theory and is successful in practice. State health departments in increasing number from year to year are obtaining authorization and appropriations to enable them more nearly to do their due and

¹⁷ Reprint No. 1284 from Public Health Reports of May 17, 1929.

proportionate part in the development and maintenance of whole-time county health service.

The progress made in the construction of good public roads, in the provision of improved public school facilities, and in other important governmental enterprises in our rural communities generally within the last 25 years furnishes a basis of optimism for an increased rate of development from now on in efficient, economical, whole-time official county health service in this country.

It appears at this time that of all the fields of activity in which governmental and other agencies may operate for the promotion of the welfare of our people no other field offers greater net advantages than does that of rural health service. In view of the results accomplished in the demonstration projects and the needs of the situation, there is reason to expect a more active and constructive interest in the development and maintenance of well-balanced comprehensive whole-time county health service than has been manifested heretofore. With a marked increase in such service, there would no longer be an excuse for the numerous makeshifts or expedients in rural health work programs which, though comparatively expensive and ineffective, are now supported by many of our public-health minded citizens.

It has become more and more evident in the course of various health-promotion campaigns tried out in the United States during the last 25 years that the organization of whole-time county or local district health units with qualified personnel is fundamental to any and all efficient economical health service in our rural communities.

Field forces, State or National, concerned with specialized health activities such as those for the prevention of tuberculosis, malaria, or pellagra, or for the promotion of maternity, infant, preschool child, or school child hygiene, can operate best when and where they can cooperate with such units. The promotion of means to enable the Federal and the State official health agencies to apply coordinately and on an adequate scale their efforts for the organization of efficient whole-time local health service units would appear altogether advantageous.

Among the results of such service are lowering of disease and death rates, promotion of general health, and improvement in economic conditions. A recent report by the director of the bureau of rural sanitation of the State board of health of Mississippi presents impressive evidence of the lowering of morbidity and mortality rates as a result of whole-time county health service in that State. According to the records for the calendar years 1927 and 1928, the combined case rate for diphtheria, scarlet fever, typhoid fever, and smallpox was 34 per cent lower and the combined death rate for those same diseases was 44 per cent lower in the aggregate population of about 700,000 in the counties provided with whole-time county health

service than in the aggregate population of about 1,090,000 in the counties with part-time county health service.

During the flood disasters in the Mississippi Valley in the spring and summer of 1927 the advantages of previously operating whole-time county health departments were definitely demonstrated. In the flood-stricken counties provided with such departments the whole-time health officers, as a rule, acted with remarkable promptness and efficiency in the organization of working forces and in the carrying out of measures for both immediate and postflood sanitary protection of the stricken people. The contrast between this work in the minority of the counties which had whole-time county health departments and in those not so provided stood out sharply. Since the flood, cooperative agencies, including the United States Public Health Service, the Rockefeller Foundation, and the State health departments directly concerned, have undertaken to develop whole-time county health departments in the (approximately) 90 flood-stricken counties which did not have such organizations at the time of the flood. This undertaking has been attended with a number of practical difficulties, such as obtaining comparatively small appropriations from the hard-pressed county governments for the support of the budgets and securing promptly satisfactory personnel to fill the positions in the county health departments for which financial provision has been made.

Notwithstanding the difficulties of development, a large majority (over three-fourths) of the so-called "flood counties" are now provided with whole-time health service under the direction of whole-time county health officers. In the average project the work is being carried out with a good degree of efficiency and with results remarkably appreciated by the citizens generally of the counties immediately benefited. Some of these counties were again visited by floods in 1928 and 1929, but the local authorities, notwithstanding the repeated depressions in economic conditions, have shown in only a very few instances a disposition to have the health units discontinued. They appreciate the profit realized on their investment for the health work.

From all the evidence now at hand, the prophecy is made that if the health service now operating in these flood counties be continued even at its present grade of efficiency for the next four years the net economic gain from this health service in the 6-year period will more than offset the economic loss from the Mississippi Valley flood of 1927.

Whole-time county health departments as usually organized, in order to be satisfactorily effective in time of disaster, must be in full operation before the disaster. They can not, as a rule, be organized and put on an operating basis of high efficiency within a few days or even a few weeks to meet an unusual critical situation. In view of the preventable-disease disaster with which all the populated counties of the United States not provided with efficient health service

are frequently or constantly visited, there appears ample cause for the employment of every reasonable and feasible means to bring about an increased rate of development of efficient whole-time county health service in every section of the United States.

Summary

The 198 cooperative projects in the fiscal year ended June 30, 1929, yielded results exceeding in value manyfold the cost of the work. Among the activities and results presented in the tabular statement, to which especial consideration may be given, are the following:

1. Public lectures presenting the principles and details of sanitation to over 778,175 persons.

2. Over 436,847 sanitary inspections of premises, with explanation of findings to occupants or owners of the properties.

3. Physical examination of over 544,268 school children, of whom 346,068 were found to have incapacitating physical defects, with notification to parents or guardians of the defects found.

4. Exclusion from public schools of 24,349 children affected with communicable diseases—such as diphtheria, scarlet fever, measles, whooping cough, scabies, and pediculosis—or presenting evidence of being carriers of the contagions of such diseases. This was brought about through active cooperation of school teachers with the county health departments, and it must have been a very considerable factor in preventing widespread infection.

5. One hundred and one thousand, one hundred and eighty-nine recorded treatments effecting correction of incapacitating physical defects among school children. These were brought about by written notification to parents or guardians of defects found, follow-up visits to homes of the children, making available proper clinical facilities, securing active cooperation of the local medical and dental professions, and other activities of the county or district health departments.

6. Bringing about treatments for correction of serious physical defects in 2,086 infants and 5,224 preschool children.

7. Treatments to correct iodine deficiency in 2,120 persons in endemic goiter districts.

8. Ninety-eight thousand, three hundred and twenty-four visits to homes of cases of communicable diseases to advise and show the afflicted households how to prevent spread of the infections.

9. Twenty thousand two hundred and sixty-one visits by health nurses or health officers to prenatal cases to advise and assist expectant mothers in carrying out hygienic and physiological measures making for healthy mothers and healthy babies.

10. Instruction of 13,308 midwives in cleanly and careful methods.

11. Fifty-seven thousand five hundred and eighty-seven infants and children of preschool age examined and over 53,863 home visits by

health nurses or health officers to demonstrate hygienic measures for the promotion of the health and the protection of the lives of infants.

12. Three hundred and forty-eight thousand seven hundred and twenty persons given immunization injections for protection against typhoid fever.

13. One hundred and eighty-one thousand three hundred and fifty persons vaccinated against smallpox.

14. One hundred and forty-four thousand eight hundred and thirty-five children treated with toxin-antitoxin mixture for immunization against diphtheria.

15. One hundred and twenty-one thousand eight hundred and thirteen cows tuberculin tested, with elimination of reactors from herds to prevent communication of bovine tuberculosis to persons through the medium of milk.

16. One thousand eight hundred and seventy-two persons treated effectively for relief from hookworm disease and for the prevention of the spread of the infection.

17. Marked reduction in the spread of malaria in hundreds of localities, with an aggregate population of several hundred thousand.

18. Sixty thousand seven hundred and forty-five treatments to rid persons of venereal disease infection and prevent the spread of the infection.

19. Special examination of 10,999 persons for tuberculosis, of whom 2,987 were found with an active tubercular process and were advised to place themselves in the care of private physicians and to carry out hygienic measures. One thousand two hundred and seventy-three of the positive cases were sent to institutions maintained in whole or in part for the treatment of tuberculosis.

20. Forty-six thousand one hundred and seventy-six cases of dangerous communicable diseases quarantined to prevent the spread of infection in the local community, the State, and throughout the country.

21. The installation of 46,974 sanitary privies and 4,177 septic tanks at dwellings where previously there had been either insanitary privies or no toilets of any sort.

22. Seventeen thousand five hundred and sixty privies repaired so as again to be of sanitary type.

23. Twenty-seven thousand three hundred and seventy-six homes connected for the first time with sanitary sewers.

24. Fourteen thousand one hundred and thirty-four homes provided with safe water supplies in place of contaminated water supplies.

25. Radical improvement of 2,817 public milk supplies (from which milk is distributed to a considerable extent through the channels of interstate commerce) to prevent the spread, through milk and milk products, of various infections, including typhoid fever, scarlet fever,

undulant fever, diphtheria, tuberculosis, septic sore throat, and infant diarrhea.

26. Eight thousand five hundred and forty-three adult persons (most of them over 40 years of age) examined and advised about measures to conserve their health and prolong their lives.

Such activities and results indicate that the plan of the work is both comprehensive and effective. Considered from both a public health and an economic standpoint, the total result of such work stands in importance to our national welfare second to none other obtainable from equivalent investment of public funds.

COURT DECISION RELATING TO PUBLIC HEALTH

Promise to pay for medical services, etc., not implied against town from acts of health officer.—(New Hampshire Supreme Court; *Sweeney v. Town of Peterborough*, 147 A. 412; decided October 1, 1929.) The plaintiff, a physician, was called to treat a child who had diphtheria. The call was made by a neighbor who acted on his own initiative. The physician instituted a quarantine and notified the local health officer. The health officer directed the physician to give antitoxin to the other children in the family, but no change in the quarantine measures was made or suggested by the town authorities. The physician brought action against the town for professional services, medicines, and supplies furnished, but the supreme court denied recovery. The opinion of the court was as follows:

While it is well-settled law that a "promise may be implied against" a town "from the acts of its agents" acting within the scope of "their authority, as in the case of natural persons" (*Glidden v. Unity*, 33 N. H. 571, 577), this principle does not help the plaintiff's case. The only town official who did acts from which a promise could possibly be implied was the health officer. He had no authority to furnish medical attendance at the expense of the town, even by express contract (*Congdon v. Nashua*, 72 N. H. 468, 471, 57 A. 686), and a fortiori no promise on behalf of the town could be implied from his conduct. This case is governed by the principles laid down in *Pettengill v. Amherst*, 72 N. H. 103, 54 A. 944, and *Creier v. Fitzwilliam*, 76 N. H. 382, 83 A. 128, and the order must therefore be:

Judgment on the verdict.

DEATHS DURING WEEK ENDED NOVEMBER 23, 1929

Summary of information received by telegraph from industrial insurance companies for the week ended November 23, 1929, and corresponding week of 1928. (From the Weekly Health Index, November 27, 1929, issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 23, 1929	Corresponding week, 1928
Policies in force.....	75, 155, 310	72, 242, 758
Number of death claims.....	13, 602	14, 333
Death claims per 1,000 policies in force, annual rate..	9.4	10.4

Deaths from all causes in certain large cities of the United States during the week ended November 23, 1929, infant mortality, annual death rate, and comparison with corresponding week of 1928. (From the Weekly Health Index, November 27, 1929, issued by the Bureau of the Census, Department of Commerce)

City	Week ended Nov. 23, 1929		Annual death rate per 1,000, corresponding week, 1928	Deaths under 1 year		Infant mortality rate, week ended Nov. 23, 1929 ¹
	Total deaths	Death rate ¹		Week ended Nov. 23, 1929	Corresponding week, 1928	
Total (62 cities).....	6,734	12.0	12.7	619	663	54
Akron.....	41			4	10	41
Albany.....	31	13.5	18.7	4	0	79
Atlanta.....	80	16.4	17.0	10	11	104
White.....	43			5	7	
Colored.....	37	(²)	(²)	5	4	
Baltimore.....	204	12.8	16.4	25	25	80
White.....	156			17	18	68
Colored.....	48	(²)	(²)	8	7	127
Birmingham.....	59	13.9	13.4	8	9	72
White.....	30			4	3	60
Colored.....	29	(²)	(²)	4	6	92
Boston.....	193	12.6	14.6	17	25	47
Bridgeport.....	33			2	1	35
Buffalo.....	110	10.3	14.4	9	14	39
Cambridge.....	24	10.0	10.4	5	3	80
Camden.....	16	6.2	15.4	2	1	35
Canton.....	18	8.1	6.7	2	1	47
Chicago.....	734	12.2	12.7	63	49	56
Cincinnati.....	135			14	18	82
Cleveland.....	192	9.9	8.2	17	20	50
Columbus.....	70	12.2	11.9	4	4	37
Dallas.....	61	14.6	12.2	7	5	
White.....	56			7	3	
Colored.....	5	(²)	(²)	0	2	
Dayton.....	46	13.0	13.0	1	4	16
Denver.....	88	15.6	15.6	6	5	58
Des Moines.....	27	9.3	12.4	2	4	36
Detroit.....	298	11.3	11.5	40	45	64
Duluth.....	22	9.8	7.6	0	2	0
Erie.....	24			1	0	20
Fall River.....	26	10.1	14.4	0	5	0
Flint.....	29	10.2	8.4	8	8	97
Fort Worth.....	34	10.4	16.9	4	5	
White.....	28			2	3	
Colored.....	6	(²)	(²)	2	2	
Grand Rapids.....	23	7.3	11.1	1	6	15
Houston.....	55			4	4	
White.....	39			4	2	
Colored.....	16	(²)	(²)	0	2	
Indianapolis.....	122	16.7	11.5	6	7	48
White.....	109			6	5	56
Colored.....	13	(²)	(²)	0	2	0
Jersey City.....	63	10.1	14.3	15	4	116
Kansas City, Kans.....	22	9.7	15.0	1	3	22
White.....	17			1	3	25
Colored.....	5	(²)	(²)	0	0	0
Kansas City, Mo.....	103	13.8	15.0	5	9	42
Knoxville.....	26	12.9	17.9	5	8	109
White.....	20			4	5	98
Colored.....	6	(²)	(²)	1	3	211
Los Angeles.....	249			18	27	53
Louisville.....	81	12.9	11.3	7	7	57
White.....	61			4	7	37
Colored.....	20	(²)	(²)	3	0	189
Lowell.....	34			3	5	68
Lynn.....	15	7.4	8.9	1	1	27
Memphis.....	55	15.1	17.9	3	6	35
White.....	33			3	3	57
Colored.....	22	(²)	(²)	0	3	0
Milwaukee.....	101	9.7	8.1	9	12	40
Minneapolis.....	89	10.2	9.6	6	4	37
Nashville.....	50	18.7	14.6	5	6	81
White.....	32			4	3	87
Colored.....	18	(²)	(²)	1	3	63
New Bedford.....	26			1	2	21
New Haven.....	42	11.7	10.3	1	1	15
New Orleans.....	133	16.8	17.0	10	12	50
White.....	79			2	8	14
Colored.....	59	(²)	(²)	8	4	135

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended November 23, 1929, infant mortality, annual death rate, and comparison with corresponding week of 1928—Continued

City	Week ended Nov. 23, 1929		Annual death rate per 1,000, corresponding week, 1928	Deaths under 1 year		Infant mortality rate, week ended Nov. 23, 1929
	Total deaths	Death rate		Week ended Nov. 23, 1929	Corresponding week, 1928	
New York.....	1,338	11.6	12.2	121	129	50
Bronx borough.....	178	9.8	11.5	10	13	30
Brooklyn borough.....	455	10.3	10.6	38	41	39
Manhattan borough.....	528	15.8	16.8	57	65	70
Queens borough.....	131	8.0	8.3	12	10	49
Richmond borough.....	46	16.0	12.1	4	0	72
Newark, N. J.....	95	10.5	11.5	8	16	42
Oklahoma City.....	41			5	2	100
Omaha.....	63	14.8	12.7	7	2	82
Paterson.....	41	14.8	12.3	4	2	71
Philadelphia.....	462	11.7	13.0	42	45	59
Pittsburgh.....	186	14.4	13.9	34	22	117
Portland, Oreg.....	65			1	3	11
Providence.....	53	9.7	9.3	2	6	18
Richmond.....	38	10.2	15.3	7	4	98
White.....	26			4	3	85
Colored.....	12	(⁵)	(⁵)	3	1	123
Rochester.....	67	10.7	12.6	7	2	59
St. Louis.....	227	14.0	14.2	15	28	51
St. Paul.....	52			4	1	41
Salt Lake City ⁴	37	14.0	17.4	5	5	77
San Antonio.....	85	20.4	14.6	13	10	
San Diego.....	34			0	1	0
San Francisco.....	170	15.2	17.0	7	7	45
Schenectady.....	18	10.1	8.4	2	1	64
Seattle.....	75	10.2	10.6	6	3	64
Somerville.....	18	9.2	9.7	2	1	72
Spokane.....	28	13.4	16.3	0	0	0
Springfield, Mass.....	38	13.3	6.6	0	2	0
Syracuse.....	31	8.1	13.4	0	2	0
Toledo.....	75	12.5	12.7	8	12	75
Trenton.....	35	13.2	10.5	0	5	0
Utica.....	25	12.5	20.1	1	2	25
Washington, D. C.....	120	11.4	11.5	5	10	29
White.....	77			2	3	17
Colored.....	43	(⁵)	(⁵)	3	7	57
Waterbury.....	14			3	1	76
Wilmington, Del.....	19	7.7	13.4	5	2	130
Worcester.....	37	9.8	11.4	1	2	13
Yonkers.....	22	9.5	8.2	5	2	117
Youngstown.....	39	11.7	13.5	3	4	43

¹ Annual rate per 1,000 population.

² Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.

³ Data for 71 cities.

⁴ Deaths for week ended Friday.

⁵ In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 28; Richmond, 32; and Washington, D. C., 25.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for Weeks Ended November 23, 1929, and November 24, 1928

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 23, 1929, and November 24, 1928

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928
New England States:								
Maine.....	4	13	2	22	1	208	2	1
New Hampshire.....	9	5	-----	16	19	14	0	0
Vermont.....	3	2	-----	-----	7	-----	0	0
Massachusetts.....	112	83	5	9	110	485	4	4
Rhode Island.....	22	20	5	4	1	33	0	0
Connecticut.....	20	28	2	4	4	93	0	1
Middle Atlantic States:								
New York.....	202	227	12	20	154	581	21	20
New Jersey.....	148	164	9	5	36	130	6	3
Pennsylvania.....	284	297	-----	-----	455	768	10	5
East North Central States:								
Ohio.....	66	72	10	11	265	123	5	1
Indiana.....	37	59	-----	7	13	43	2	0
Illinois.....	239	242	48	20	270	318	9	5
Michigan.....	34	105	3	2	146	30	19	6
Wisconsin.....	19	20	16	38	458	61	3	3
West North Central States:								
Minnesota.....	29	23	-----	1	96	26	0	1
Iowa.....	17	9	-----	-----	83	-----	0	0
Missouri.....	66	68	17	16	39	74	7	5
North Dakota.....	5	17	-----	16	-----	7	0	3
South Dakota.....	2	3	-----	-----	3	2	0	0
Nebraska.....	30	9	4	-----	39	6	1	1
Kansas.....	30	34	-----	2	66	6	3	2
South Atlantic States:								
Delaware.....	4	-----	-----	-----	-----	-----	0	0
Maryland ¹	34	42	10	13	13	42	1	0
District of Columbia.....	10	43	1	3	2	5	2	0
Virginia.....	-----	-----	-----	-----	-----	-----	1	-----
West Virginia.....	47	46	19	13	18	42	4	0
North Carolina.....	148	199	14	-----	9	38	2	1
South Carolina.....	41	47	689	1,770	-----	3	0	0
Georgia.....	13	31	61	146	-----	33	0	0
Florida.....	14	16	3	31	3	4	0	0
East South Central States:								
Kentucky.....	26	30	-----	-----	-----	5	2	0
Tennessee.....	33	37	58	97	9	-----	5	1
Alabama.....	87	151	25	191	10	22	1	3
Mississippi.....	61	49	-----	-----	-----	-----	0	0
West South Central States:								
Arkansas.....	12	20	22	89	3	6	0	0
Louisiana.....	46	38	6	22	4	92	1	0
Oklahoma ²	96	116	79	93	7	10	3	1
Texas.....	123	77	132	19	4	2	1	0
Mountain States:								
Montana.....	-----	1	-----	421	52	29	2	3
Idaho.....	-----	8	-----	14	88	1	0	3
Wyoming.....	2	4	-----	7	2	-----	0	0
Colorado.....	11	24	1	2	5	8	2	1
New Mexico.....	8	7	-----	42	-----	2	2	0
Arizona.....	14	2	2	4	1	-----	3	0
Utah ²	2	2	-----	158	1	9	2	1

¹ New York City only.

² Week ended Friday.

² Figures for 1929 are exclusive of Oklahoma City and Tulsa.

*Cases of certain communicable diseases reported by telegraph by State health officers
for weeks ended November 23, 1929, and November 24, 1928—Continued*

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928
Pacific States:								
Washington.....	9	16	2	28	18	36	1	2
Oregon.....	17	21	35	250	16	58	3	4
California.....	97	119	38	4,843	134	20	9	10
Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928	Week ended Nov. 23, 1929	Week ended Nov. 24, 1928
New England States:								
Maine.....	0	0	27	40	0	13	5	2
New Hampshire.....	0	0	17	21	0	0	1	0
Vermont.....	0	0	17	15	5	2	0	0
Massachusetts.....	6	2	188	202	0	0	3	4
Rhode Island.....	0	1	21	17	0	0	0	0
Connecticut.....	0	3	45	51	0	0	7	3
Middle Atlantic States:								
New York.....	8	6	289	290	34	0	31	20
New Jersey.....	1	0	148	102	0	0	6	8
Pennsylvania.....	5	4	414	404	0	0	26	40
East North Central States:								
Ohio.....	8	5	206	169	112	21	14	21
Indiana.....	0	0	101	84	163	34	2	4
Illinois.....	0	2	491	288	172	40	15	21
Michigan.....	3	2	213	219	79	22	4	12
Wisconsin.....	0	1	88	148	24	18	9	0
West North Central States:								
Minnesota.....	0	2	119	113	4	0	5	1
Iowa.....	2	0	57	106	63	46	40	1
Missouri.....	0	0	122	94	19	10	4	27
North Dakota.....	0	3	16	26	7	0	0	2
South Dakota.....	0	1	5	7	24	10	0	3
Nebraska.....	0	0	37	49	55	14	1	3
Kansas.....	0	0	61	119	41	49	5	8
South Atlantic States:								
Delaware.....	0	0	2	1	0	0	0	2
Maryland.....	1	1	84	78	0	0	13	13
District of Columbia.....	0	0	13	14	0	0	2	2
Virginia.....	3							
West Virginia.....	2	1	77	75	27	10	12	20
North Carolina.....	2	0	107	149	4	10	8	15
South Carolina.....	3	1	35	11	2	0	12	13
Georgia.....	1	0	36	52	0	0	6	7
Florida.....	0	0	6	12	1	0	1	0
East South Central States:								
Kentucky.....	0	0	51	83	10	8	4	12
Tennessee.....	0	0	45	34	28	3	13	8
Alabama.....	0	0	44	54	3	8	14	32
Mississippi.....	0	0	27	21	0	0	12	17
West South Central States:								
Arkansas.....	0	0	35	17	10	2	12	20
Louisiana.....	0	0	20	27	2	43	12	7
Oklahoma.....	2	1	71	49	5	10	26	23
Texas.....	0	0	34	35	15	21	10	8
Mountain States:								
Montana.....	1	1	28	24	11	14	4	3
Idaho.....	0	0	13	10	2	12	0	0
Wyoming.....	0	0	4	24	10	5	0	0
Colorado.....	1	0	18	24	18	1	9	2
New Mexico.....	0	1	11	22	0	0	5	6
Arizona.....	0	0	5	0	1	6	3	1
Utah.....	0	0	15	10	0	1	0	1
Pacific States:								
Washington.....	1	4	65	50	74	52	9	5
Oregon.....	1	0	28	31	11	41	3	3
California.....	3	6	270	178	52	15	10	4

² Week ended Friday.

³ Figures for 1929 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Menin- gococ- cus menin- gitis	Diph- theria	Influn- za	Malaria	Measles	Peila- gra	Polio- myelitis	Scarlet fever	Small- pox	Ty- phoid fever
<i>October, 1929</i>										
Alabama.....	6	300	73	1,612	34	16	6	257	6	66
Idaho.....	20	11			142		1	46	25	1
Illinois.....	29	823	59	24	387		21	1,262	339	142
Louisiana.....	7	171	37	154	6	34	0	97	0	60
Minnesota.....	2	148			118		6	359	15	24
Montana.....	10	10	2		512		(1)	95	38	116
Nevada.....										
New York.....	59	553		9	547		100	576	72	161
Oklahoma ¹	2	306	147	340	95	46	1	160	48	130
Oregon.....	3	41	59	1	49		6	62	36	17
Pennsylvania.....	32	820		1	987		52	967	10	226
Rhode Island.....	2	53	34		4		3	48	0	8
South Carolina.....		525	1,716	3,483	13	348	15	128		107
South Dakota.....	4	21			7		0	47	145	22
Washington.....	12	91	38	1	132		7	175	119	60
West Virginia.....		129	57		70		8	225	19	113

¹ Delayed report of one case in September.

² Exclusive of Oklahoma City and Tulsa.

*October, 1929**October, 1929—Continued*

Anthrax:	Cases
New York.....	3
Oklahoma ¹	2
Pennsylvania.....	1
Chicken pox:	
Alabama.....	14
Idaho.....	63
Illinois.....	1,071
Louisiana.....	7
Minnesota.....	404
Montana.....	103
New York.....	924
Oklahoma ¹	16
Oregon.....	65
Pennsylvania.....	1,682
Rhode Island.....	9
South Carolina.....	51
South Dakota.....	42
Washington.....	498
West Virginia.....	68
Dengue:	
Alabama.....	5
South Carolina.....	9
Diarrhea:	
South Carolina.....	578
Dysentery:	
Illinois.....	15
Louisiana.....	2
Minnesota.....	2
New York.....	78
Oklahoma ¹	61
Oregon.....	8
Pennsylvania.....	11
South Carolina (amebic).....	1
Washington.....	5
German measles:	
Illinois.....	27
New York.....	49
Pennsylvania.....	25
Washington.....	10

Hookworm disease:	Cases
Louisiana.....	21
Pennsylvania.....	1
South Carolina.....	117
Impetigo contagiosa:	
Oregon.....	28
Washington.....	2
Lead poisoning:	
Illinois.....	26
Leprosy:	
New York.....	1
Lethargic encephalitis:	
Alabama.....	1
Illinois.....	2
Louisiana.....	2
Minnesota.....	2
New York.....	17
Pennsylvania.....	5
South Carolina.....	1
Washington.....	4
Mumps:	
Alabama.....	6
Idaho.....	109
Illinois.....	202
Montana.....	180
New York.....	526
Oregon.....	57
Pennsylvania.....	464
Rhode Island.....	3
South Carolina.....	42
South Dakota.....	17
Washington.....	230
Ophthalmia neonatorum:	
Illinois.....	53
New York.....	4
Oklahoma ¹	3
Pennsylvania.....	15
Rhode Island.....	1
South Carolina.....	11

¹ Exclusive of Oklahoma City and Tulsa.

October, 1929—Continued

Paratyphoid fever:	Cases
Illinois.....	6
Minnesota.....	1
New York.....	6
South Carolina.....	15
Puerperal septicemia:	
Illinois.....	4
New York.....	13
Pennsylvania.....	13
South Dakota.....	1
Washington.....	3
Rabies in animals:	
Illinois.....	14
Louisiana.....	4
Rhode Island.....	8
South Carolina.....	8
Washington.....	1
Rabies in man:	
Pennsylvania.....	1
Rocky Mountain spotted or tick fever:	
Idaho ¹	
Nevada.....	1
Washington.....	1
Scabies:	
Oregon.....	41
Septic sore throat:	
Illinois.....	7
Montana.....	2
New York.....	13
Oklahoma ²	33
Oregon.....	8
Rhode Island.....	4
Washington.....	3
Tetanus:	
Illinois.....	6
Louisiana.....	4
Minnesota.....	2
New York.....	8
Pennsylvania.....	3
South Carolina.....	2
Washington.....	1
Trachoma:	
Illinois.....	6
Minnesota.....	1

¹ Delayed report of one case in September.

October, 1929—Continued

Trachoma—Continued.	Cases
Montana.....	1
New York.....	4
Oklahoma ²	6
Pennsylvania.....	1
South Dakota.....	11
Trichinosis:	
New York.....	1
Tularæmia:	
Minnesota.....	1
South Carolina.....	2
Typhus fever:	
Alabama.....	5
New York.....	1
South Carolina.....	1
Undulant fever:	
Illinois.....	5
Minnesota.....	3
Nevada.....	2
New York.....	32
Pennsylvania.....	1
South Carolina.....	5
Washington.....	8
Vincent's angina:	
Illinois.....	4
Oregon.....	4
Washington.....	9
Whooping cough:	
Alabama.....	68
Idaho.....	23
Illinois.....	807
Louisiana.....	7
Minnesota.....	80
Montana.....	8
New York.....	1,084
Oklahoma ²	30
Oregon.....	19
Pennsylvania.....	1,311
Rhode Island.....	16
South Carolina.....	333
South Dakota.....	22
Washington.....	113
West Virginia.....	78

² Exclusive of Oklahoma City and Tulsa.

ADMISSIONS TO HOSPITALS FOR THE INSANE, MAY, 1929

Reports for the month of May, 1929, showing new admissions to hospitals for the care and treatment of the insane, have been received by the Public Health Service from 105 hospitals, located in 36 States, the District of Columbia, and the Territory of Hawaii.

The 105 hospitals had 84,660 male and 74,655 female patients on May 31, 1929, the ratio being 113 males per 100 females.

The following table shows the new admissions for the month of May, 1929, by psychoses:

Psychoses	Number of first admissions		
	Male	Female	Total
1. Traumatic psychoses.....	12	4	16
2. Senile psychoses.....	165	133	298
3. Psychoses with cerebral arteriosclerosis.....	199	85	284
4. General paralysis.....	217	57	274
5. Psychoses with cerebral syphilis.....	33	17	50
6. Psychoses with Huntington's chorea.....	1	1	2
7. Psychoses with brain tumor.....	2	0	2
8. Psychoses with other brain or nervous disease.....	25	14	39
9. Alcoholic psychoses.....	144	14	158
10. Psychoses due to drugs and other exogenous toxins.....	9	9	18
11. Psychoses with pellagra.....	8	21	29
12. Psychoses with other somatic diseases.....	39	58	97
13. Manic-depressive psychoses.....	172	219	391
14. Involution melancholia.....	18	31	49
15. Dementia præcox.....	348	267	615
16. Paranoia and paranoid conditions.....	28	30	58
17. Epileptic psychoses.....	45	25	70
18. Psychoneuroses and neuroses.....	20	40	60
19. Psychoses with psychopathic personality.....	17	13	30
20. Psychoses with mental deficiency.....	53	43	96
21. Undiagnosed psychoses.....	93	69	162
22. Without psychosis.....	105	46	151
Total.....	1,753	1,196	2,949

Of the new admissions, 59.4 per cent were males and 40.6 per cent were females, giving a ratio of 147 males per 100 females. Of the 159,315 patients, 8,376 males and 6,824 females were on parole or otherwise absent but still on the books at the end of the month—9.9 per cent of the male patients, 9.1 per cent of the females, and 9.5 per cent of the total.

Dementia præcox constituted 20.9 per cent of the first admissions; manic-depressive psychoses, 13.3 per cent; senile psychoses, 10.1 per cent; psychoses with cerebral arteriosclerosis, 9.6 per cent; general paralysis, 9.3 per cent; undiagnosed psychoses, 5.5 per cent; and 5.1 per cent were "without psychosis."

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,550,000. The estimated population of the 90 cities reporting deaths is more than 29,980,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 16, 1929, and November 17, 1928

	1929	1928	Estimated expectancy
<i>Cases reported</i>			
Diphtheria:			
46 States.....	2,567	2,615	-----
97 cities.....	966	958	1,228
Measles:			
45 States.....	1,995	2,679	-----
97 cities.....	341	564	-----
Meningococcus meningitis:			
45 States.....	125	79	-----
97 cities.....	63	44	-----
Poliomyelitis:			
46 States.....	63	72	-----
Scarlet fever:			
46 States.....	3,702	3,389	-----
97 cities.....	1,245	1,000	989
Smallpox:			
45 States.....	908	386	-----
97 cities.....	82	21	27
Typhoid fever:			
46 States.....	358	418	-----
97 cities.....	47	61	67
<i>Deaths reported</i>			
Influenza and pneumonia:			
90 cities.....	618	674	-----
Smallpox:			
90 cities.....	0	0	-----

City reports for week ended November 16, 1929

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

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1920 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Population, July 1, 1928, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND									
Maine:									
Portland.....	78,600	17	2	0	-----	0	1	2	1
New Hampshire:									
Concord.....	(1)	0	0	1	-----	0	3	0	1
Manchester.....	85,700	0	2	0	-----	1	0	0	0
Vermont:									
Barre.....	(1)	0	0	0	-----	0	0	0	1
Massachusetts:									
Boston.....	799,200	49	37	37	3	3	7	26	16
Fall River.....	134,300	4	4	7	-----	0	1	0	2
Springfield.....	149,800	40	4	8	-----	0	0	1	2
Worcester.....	197,600	11	6	1	-----	0	8	0	0
Rhode Island:									
Pawtucket.....	73,100	5	1	3	-----	0	0	0	0
Providence.....	286,300	0	11	11	1	0	0	1	2
Connecticut:									
Bridgeport.....	(1)	9	8	2	1	0	0	0	3
Hartford.....	172,300	21	7	4	-----	1	0	2	5
New Haven.....	187,900	5	2	1	-----	0	0	3	6

¹ No estimate of population made.

City reports for week ended November 16, 1929—Continued

Division, State, and city	Population, July 1, 1928, estimated	Chick-en pox, cases reported	Diphtheria		Influenza		Meas-sles, cases reported	Mumps, cases reported	Pneu-monia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC									
New York:									
Buffalo.....	555,800	32	18	24	-----	0	0	1	21
New York.....	6,017,500	107	176	111	9	4	6	41	115
Rochester.....	328,200	10	8	2	-----	0	0	1	3
Syracuse.....	199,300	12	9	1	-----	0	1	16	4
New Jersey:									
Camden.....	135,400	3	9	5	-----	0	0	0	3
Newark.....	473,600	74	16	43	1	0	21	5	6
Trenton.....	139,000	1	3	0	-----	0	3	0	2
Pennsylvania:									
Philadelphia.....	2,064,200	113	75	19	3	2	9	21	37
Pittsburgh.....	673,800	90	31	25	1	3	12	3	21
Reading.....	115,400	21	3	3	-----	0	1	0	1
EAST NORTH CENTRAL									
Ohio:									
Cincinnati.....	413,700	14	17	14	1	2	14	0	9
Cleveland.....	1,010,300	121	57	19	7	2	4	5	8
Columbus.....	299,000	22	15	7	2	2	3	0	6
Toledo.....	313,200	89	15	4	1	1	147	5	5
Indiana:									
Fort Wayne.....	105,300	4	5	3	-----	0	0	0	1
Indianapolis.....	382,100	0	14	15	-----	0	2	0	5
South Bend.....	86,100	4	3	2	-----	0	0	0	0
Terre Haute.....	73,500	1	3	2	-----	0	0	0	3
Illinois:									
Chicago.....	3,157,400	155	109	174	9	6	30	25	55
Springfield.....	67,200	7	2	0	1	0	0	0	0
Michigan:									
Detroit.....	1,378,900	99	70	76	3	0	51	36	16
Flint.....	148,800	22	8	2	-----	0	2	0	1
Grand Rapids.....	164,200	8	5	1	-----	2	0	1	2
Wisconsin:									
Kenosha.....	56,500	17	2	0	-----	0	0	0	1
Madison.....	50,500	1	2	0	-----	0	13	2	0
Milwaukee.....	544,200	160	27	6	1	0	2	14	4
Racine.....	74,400	10	3	0	-----	0	0	0	0
Superior.....	(1)	4	0	0	-----	0	35	0	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth.....	116,800	3	1	1	-----	0	3	0	3
Minneapolis.....	455,900	133	34	14	-----	0	1	15	8
St. Paul.....	(1)	44	16	2	-----	1	1	2	4
Iowa:									
Davenport.....	(1)	0	1	0	-----	-----	0	0	-----
Des Moines.....	151,900	0	4	2	-----	-----	0	0	-----
Sioux City.....	80,000	19	3	1	-----	-----	1	3	-----
Waterloo.....	37,100	29	1	0	-----	-----	16	0	-----
Missouri:									
Kansas City.....	391,000	18	11	3	-----	0	0	0	12
St. Joseph.....	78,500	1	2	4	-----	0	0	0	-----
St. Louis.....	848,100	13	50	36	-----	-----	1	4	-----
North Dakota:									
Fargo.....	(1)	17	0	1	-----	0	0	2	0
Grand Forks.....	(1)	10	0	0	-----	-----	0	1	-----
South Dakota:									
Aberdeen.....	(1)	9	0	0	-----	-----	0	2	-----
Sioux Falls.....	(1)	0	1	0	-----	-----	0	0	-----
Nebraska:									
Omaha.....	222,800	24	12	17	-----	0	2	0	7
Kansas:									
Topeka.....	62,800	22	3	0	-----	0	0	7	3
Wichita.....	99,300	6	4	7	-----	0	1	0	1
SOUTH ATLANTIC									
Delaware:									
Wilmington.....	128,500	1	3	1	-----	0	0	0	1
Maryland:									
Baltimore.....	830,400	66	33	12	6	1	3	16	17
Cumberland.....	(1)	0	0	0	-----	0	0	0	0
Frederick.....	(1)	0	0	0	-----	0	0	0	0

¹No estimate of population made.

City reports for week ended November 16, 1929—Continued

Division, State, and city	Population, July 1, 1928, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—CON.									
District of Columbia:									
Washington.....	552,000	7	23	10	-----	0	1	0	12
Virginia:									
Lynchburg.....	38,600	14	5	3	-----	0	0	7	3
Norfolk.....	184,200	2	3	3	-----	0	0	2	2
Richmond.....	194,400	3	21	9	-----	2	0	1	2
Roanoke.....	64,600	0	7	2	-----	0	0	0	0
West Virginia:									
Charleston.....	55,200	12	3	4	-----	0	0	0	2
Wheeling.....	(1)	0	3	0	-----	1	0	0	3
North Carolina:									
Raleigh.....	(1)	2	3	4	-----	0	0	0	0
Wilmington.....	39,100	2	1	2	-----	0	0	0	1
Winston-Salem.....	80,000	13	5	3	-----	0	0	1	2
South Carolina:									
Charleston.....	75,900	0	2	1	34	1	0	0	1
Columbia.....	50,600	0	1	1	-----	1	0	1	2
Georgia:									
Atlanta.....	255,100	2	9	7	17	0	0	1	7
Brunswick.....	(1)	0	0	0	-----	0	0	0	2
Savannah.....	99,900	2	3	0	-----	0	0	0	2
Florida:									
Miami.....	156,700	0	2	2	-----	0	1	1	1
St. Petersburg.....	53,300	-----	0	-----	-----	0	-----	-----	0
Tampa.....	113,400	0	3	6	-----	0	0	3	0
EAST SOUTH CENTRAL									
Kentucky:									
Covington.....	59,000	0	2	3	-----	0	0	0	2
Tennessee:									
Memphis.....	190,200	5	10	19	-----	1	0	1	11
Nashville.....	139,600	1	6	1	-----	1	0	0	8
Alabama:									
Birmingham.....	222,400	0	8	7	7	1	2	0	4
Mobile.....	69,600	0	2	3	-----	0	0	0	6
Montgomery.....	63,100	1	3	1	-----	-----	0	0	-----
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith.....	(1)	0	1	0	-----	-----	0	0	-----
Little Rock.....	79,200	0	4	3	-----	0	0	6	0
Louisiana:									
New Orleans.....	429,400	0	13	23	4	4	3	0	11
Shreveport.....	81,300	2	2	5	-----	0	1	0	5
Oklahoma:									
Oklahoma City.....	(1)	0	6	0	-----	0	0	0	7
Tulsa.....	170,500	11	6	0	-----	-----	1	0	-----
Texas:									
Dallas.....	217,600	7	17	44	-----	1	0	0	3
Fort Worth.....	170,600	3	7	11	-----	1	0	0	6
Galveston.....	50,600	0	1	4	-----	0	1	0	2
Houston.....	(1)	0	8	20	-----	0	0	0	7
San Antonio.....	218,100	1	4	13	-----	3	0	2	3
MOUNTAIN									
Montana:									
Billings.....	(1)	3	1	0	-----	0	0	35	1
Great Falls.....	(1)	13	1	0	-----	0	0	15	0
Helena.....	(1)	1	0	0	-----	0	3	0	0
Missoula.....	(1)	5	1	0	-----	0	0	1	1
Idaho:									
Boise.....	(1)	4	0	0	-----	0	0	0	1
Colorado:									
Denver.....	294,200	66	17	4	-----	3	1	6	10
Pueblo.....	44,200	3	3	0	-----	0	-----	0	1
New Mexico:									
Albuquerque.....	(1)	4	1	0	-----	0	0	0	1
Utah:									
Salt Lake City.....	138,000	30	5	1	-----	0	25	12	4
Nevada:									
Reno.....	(1)	-----	0	-----	-----	-----	-----	-----	-----

¹No estimate of population made.

City reports for week ended November 16, 1929—Continued

Division, State, and city	Population, July 1, 1928, estimated	Chick-en pox, cases re-ported	Diphtheria		Influenza		Meas-sles, cases re-ported	Mumps, cases re-ported	Pneu-monia, deaths re-ported
			Cases, esti-mated expect-ancy	Cases re-ported	Cases re-ported	Deaths re-ported			
PACIFIC									
Washington:									
Seattle-----	383, 200	28	5	1	-----	-----	1	30	-----
Spokane-----	109, 100	24	3	1	-----	-----	0	0	-----
Tacoma-----	110, 500	10	4	2	-----	0	0	2	3
Oregon:									
Portland-----	(1)	39	11	0	-----	1	1	2	4
Salem-----	(1)	6	0	0	-----	0	0	1	0
California:									
Los Angeles-----	(1)	9	52	21	23	3	1	14	14
Sacramento-----	75, 700	7	3	1	-----	0	0	20	6
San Francisco-----	585, 300	46	20	9	3	0	57	21	4

Division, State, and city	Scarlet fever		Smallpox			Tuber- culosis, deaths re-ported	Typhoid fever			Whoop- ing cough, cases re-ported	Deaths, all causes
	Cases, esti- mated expect- ancy	Cases re- ported	Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		
NEW ENGLAND											
Maine:											
Portland.....	2	7	0	0	0	1	0	1	0	1	13
New Hampshire:											
Concord.....	0	0	0	0	0	2	0	0	0	0	10
Manchester.....	1	0	0	0	0	0	0	0	0	0	23
Vermont:											
Barre.....	0	0	0	2	0	0	0	1	0	1	2
Massachusetts:											
Boston.....	44	68	0	0	0	8	2	3	1	46	194
Fall River.....	3	7	0	0	0	3	1	0	0	4	29
Springfield.....	6	6	0	0	0	0	0	0	0	7	25
Worcester.....	10	0	0	9	0	1	0	0	0	21	32
Rhode Island:											
Pawtucket.....	0	1	0	0	0	0	0	0	0	0	10
Providence.....	8	13	0	0	0	3	0	1	0	19	62
Connecticut:											
Bridgeport.....	7	2	0	0	0	2	0	0	0	0	30
Hartford.....	5	6	0	0	0	1	0	3	0	0	30
New Haven.....	5	8	0	0	0	0	1	1	0	7	31
MIDDLE ATLANTIC											
New York:											
Buffalo.....	19	45	0	0	0	8	1	0	0	13	139
New York.....	111	90	0	0	0	70	18	4	1	4	1,332
Rochester.....	6	8	0	0	0	2	1	0	0	3	65
Syracuse.....	7	16	0	0	0	1	0	1	0	10	31
New Jersey:											
Camden.....	5	2	0	0	0	0	1	0	0	0	31
Newark.....	15	8	0	0	0	7	1	0	0	47	108
Trenton.....	2	13	0	0	0	5	0	0	0	0	46
Pennsylvania:											
Philadelphia.....	66	62	0	0	0	27	5	2	1	27	431
Pittsburgh.....	39	35	0	0	0	8	0	0	0	7	169
Reading.....	2	1	0	0	0	0	0	0	0	8	16
EAST NORTH CENTRAL											
Ohio:											
Cincinnati.....	13	25	0	0	0	10	1	0	0	2	117
Cleveland.....	28	35	0	1	0	10	1	1	0	41	162
Columbus.....	10	7	1	0	0	5	0	1	0	2	64
Toledo.....	11	2	0	0	0	2	1	1	0	0	77

¹ No estimate of population made.

City reports for week ended November 16, 1929—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuber- culis, deaths re-ported	Typhoid fever			Whoop- ing cough, cases re-ported	Deaths, all causes
	Cases, esti- mated expect- ancy	Cases re- ported	Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		
EAST NORTH CENTRAL—contd.											
Indiana:											
Fort Wayne.....	2	3	0	21	0	0	0	0	0	0	19
Indianapolis.....	14	11	3	2	0	4	0	1	0	0	101
South Bend.....	4	0	1	1	0	0	0	0	0	0	9
Terre Haute.....	4	3	0	0	0	1	0	0	0	0	28
Illinois:											
Chicago.....	98	250	1	1	0	39	4	0	0	86	657
Springfield.....	3	0	0	0	0	0	0	0	0	0	18
Michigan:											
Detroit.....	72	99	1	3	0	18	2	4	1	61	266
Flint.....	12	11	0	5	0	0	0	0	0	0	25
Grand Rapids.....	9	7	0	0	0	1	0	0	0	9	48
Wisconsin:											
Kenosha.....	1	0	0	0	0	1	0	1	0	6	12
Madison.....	1	6	0	0	0	0	0	0	0	3	—
Milwaukee.....	18	18	0	0	0	4	0	2	1	47	92
Racine.....	4	6	0	0	0	0	0	0	0	1	12
Superior.....	2	12	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth.....	8	9	0	0	0	0	0	0	0	4	21
Minneapolis.....	44	7	1	0	0	4	0	0	0	4	106
St. Paul.....	19	9	2	0	0	1	0	0	0	8	50
Iowa:											
Davenport.....	0	0	0	0	—	—	0	0	—	0	—
Des Moines.....	11	6	1	6	—	—	0	0	—	0	30
Sioux City.....	3	0	0	1	—	—	0	0	—	5	1
Waterloo.....	2	1	1	13	—	—	0	0	—	4	—
Missouri:											
Kansas City.....	13	22	0	0	0	4	1	1	0	7	86
St. Joseph.....	4	1	0	2	0	0	0	0	0	1	31
St. Louis.....	34	12	0	0	0	15	3	1	2	9	225
North Dakota:											
Fargo.....	3	1	0	1	0	0	0	0	0	6	11
Grand Forks.....	1	0	0	2	—	—	0	0	—	0	—
South Dakota:											
Aberdeen.....	0	0	0	0	—	—	0	0	—	1	—
Sioux Falls.....	2	0	0	15	—	—	0	0	—	0	4
Nebraska:											
Omaha.....	5	2	1	4	0	4	0	0	0	0	48
Kansas:											
Topeka.....	4	6	0	0	0	0	0	0	0	9	18
Wichita.....	6	2	1	1	0	1	0	0	0	0	14
SOUTH ATLANTIC											
Delaware:											
Wilmington.....	5	0	0	0	0	2	1	0	0	0	28
Maryland:											
Baltimore.....	18	32	0	0	0	21	3	0	0	34	203
Cumberland.....	1	0	0	0	0	0	0	0	0	0	13
Frederick.....	1	2	0	0	0	0	0	0	0	2	2
Dist. of Columbia:											
Washington.....	16	19	1	0	0	9	2	0	0	2	126
Virginia:											
Lynchburg.....	1	3	0	0	0	0	0	0	0	25	12
Norfolk.....	3	2	0	0	0	3	0	0	0	1	—
Richmond.....	8	12	0	0	0	2	0	1	0	1	57
Roanoke.....	3	4	0	0	0	0	0	0	0	2	12
West Virginia:											
Charleston.....	2	3	0	0	0	3	0	0	0	0	32
Wheeling.....	2	2	0	0	0	0	1	0	0	3	20
North Carolina:											
Raleigh.....	2	1	0	0	0	1	0	1	0	0	14
Wilmington.....	1	2	0	0	0	0	0	0	0	0	10
Winston-Salem.....	4	8	1	0	0	2	0	0	0	5	22
South Carolina:											
Charleston.....	1	4	0	0	0	2	0	0	1	0	25
Columbia.....	0	2	0	0	0	1	0	1	0	5	16

City reports for week ended November 16, 1929—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuber- cul- osis, deaths re- ported	Typhoid fever			Whoop- ing cough, cases re- ported	Deaths, all causes
	Cases, esti- mated expect- ancy	Cases re- ported	Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		
SOUTH ATLANTIC— continued											
Georgia:											
Atlanta.....	7	26	0	0	0	4	1	1	0	4	63
Brunswick.....	0	0	0	0	0	2	0	0	0	0	7
Savannah.....	1	3	0	0	0	3	0	1	0	0	22
Florida:											
Miami.....	1	0	0	0	0	2	0	0	0	1	25
St. Petersburg.....	0	0	0	0	0	2	0	0	0	0	10
Tampa.....	0	4	0	0	0	1	0	0	0	0	21
EAST SOUTH CEN- TRAL											
Kentucky:											
Covington.....	1	1	0	0	0	0	0	1	0	0	13
Tennessee:											
Memphis.....	8	8	0	0	0	2	2	0	0	0	64
Nashville.....	4	1	0	0	0	3	2	1	0	1	44
Alabama:											
Birmingham.....	4	4	1	0	0	5	1	0	0	0	64
Mobile.....	1	6	0	0	0	2	0	0	0	0	31
Montgomery.....	0	3	0	0	0	0	0	0	0	0	0
WEST SOUTH CEN- TRAL											
Arkansas:											
Fort Smith.....	1	7	0	0	0	0	0	0	0	0	0
Little Rock.....	3	2	0	0	0	0	1	0	0	0	0
Louisiana:											
New Orleans.....	7	11	0	0	0	7	2	0	1	0	134
Shreveport.....	1	3	0	0	0	0	1	1	1	0	25
Oklahoma:											
Oklahoma City.....	3	0	0	0	0	0	0	0	0	0	47
Tulsa.....	2	3	0	2	0	0	0	2	0	19	0
Texas:											
Dallas.....	6	10	0	0	0	2	0	1	0	0	50
Fort Worth.....	2	2	0	0	0	3	1	0	0	0	52
Galveston.....	1	0	0	0	0	1	1	0	0	0	14
Houston.....	1	5	0	1	0	4	0	0	0	0	54
San Antonio.....	2	2	1	0	0	9	0	0	0	0	49
MOUNTAIN											
Montana:											
Billings.....	1	0	0	0	0	0	0	1	0	0	5
Great Falls.....	1	14	0	0	0	0	0	0	0	0	5
Helena.....	0	0	0	0	0	0	0	0	0	0	4
Missoula.....	0	2	0	1	0	0	0	1	1	0	5
Idaho:											
Boise.....	0	0	0	0	0	0	0	0	0	0	6
Colorado:											
Denver.....	10	5	0	0	0	6	1	1	0	12	71
Pueblo.....	1	0	0	0	0	0	0	1	0	0	8
New Mexico:											
Albuquerque.....	0	0	0	0	0	2	1	0	0	0	9
Utah:											
Salt Lake City.....	2	3	1	0	0	2	1	1	0	17	35
Nevada:											
Reno.....	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington:											
Seattle.....	9	9	2	1	0	0	1	1	0	14	0
Spokane.....	8	2	2	3	0	0	1	0	0	6	0
Tacoma.....	4	3	1	8	0	1	0	0	0	2	22
Oregon:											
Portland.....	9	2	4	0	0	1	1	0	0	1	71
Salem.....	0	0	0	0	0	0	0	0	0	0	0
California:											
Los Angeles.....	23	27	2	0	0	18	1	1	0	17	249
Sacramento.....	3	11	1	0	0	1	0	0	0	0	0
San Francisco.....	13	22	1	1	0	7	1	2	0	2	126

City reports for week ended November 16, 1929—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
New Hampshire:									
Manchester.....	0	0	0	1	0	0	0	0	0
Massachusetts:									
Boston.....	2	2	0	0	0	0	2	7	0
Fall River.....	1	0	0	0	0	0	0	0	0
Worcester.....	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo.....	2	0	0	0	0	0	0	3	0
New York.....	11	6	2	1	0	0	7	1	0
Rochester.....	0	0	0	0	0	0	0	2	1
New Jersey:									
Newark.....	4	3	0	0	0	0	0	0	0
Trenton.....	0	1	0	1	0	0	0	0	0
Pennsylvania:									
Philadelphia.....	1	1	0	1	0	0	0	0	0
Pittsburgh.....	2	0	0	0	0	0	0	0	2
EAST NORTH CENTRAL									
Ohio:									
Cincinnati.....	0	0	0	0	0	0	0	2	0
Cleveland.....	5	0	0	0	0	0	1	3	0
Toledo.....	1	1	0	0	0	0	1	1	0
Indiana:									
Indianapolis.....	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago.....	2	4	3	1	0	0	1	0	0
Michigan:									
Detroit.....	8	0	3	0	0	0	0	0	0
Wisconsin:									
Milwaukee.....	2	1	0	0	0	0	0	0	0
Superior.....	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis.....	1	0	0	0	0	0	0	0	0
St. Paul.....	0	0	1	1	0	0	0	0	0
Missouri:									
Kansas City.....	1	0	0	0	0	0	0	0	0
St. Joseph.....	0	0	0	0	0	0	0	1	0
St. Louis.....	2	2	0	0	0	0	0	0	0
Nebraska:									
Omaha.....	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC¹									
District of Columbia:									
Washington.....	0	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh.....	0	0	0	0	0	1	0	0	0
Winston-Salem.....	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston.....	0	0	0	0	7	0	0	0	0
Georgia:									
Atlanta.....	2	3	0	0	0	1	0	0	0
Savannah ¹	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis.....	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham.....	1	0	0	0	0	0	0	0	0

¹ Typhus fever: 2 cases; 1 case at Savannah, Ga., and 1 case at Tampa, Fla.

City reports for week ended November 16, 1926—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans.....	0	0	1	0	2	2	1	0	0
Shreveport.....	0	0	0	0	0	1	0	0	0
Texas:									
Dallas.....	0	0	0	0	1	1	0	0	0
Houston.....	0	0	0	0	0	1	0	0	0
San Antonio.....	1	0	0	0	0	0	0	1	0
MOUNTAIN									
Montana:									
Billings.....	0	0	0	0	0	0	0	1	0
Helena.....	1	0	0	0	0	0	0	0	0
Missoula.....	1	0	0	0	0	0	0	0	0
Utah:									
Salt Lake.....	5	3	0	0	0	0	0	0	0
PACIFIC									
Oregon:									
Portland.....	0	0	0	0	0	0	1	1	1
California:									
Los Angeles.....	2	1	0	0	0	0	0	0	0
Sacramento.....	2	0	0	0	0	0	1	0	0
San Francisco.....	0	0	1	0	0	0	0	2	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 16, 1929, compared with those for a like period ended November 17, 1928. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 31,000,000. The 91 cities reporting deaths have nearly 30,000,000 estimated population. The number of cities included in each group and the estimated aggregate populations are shown in a separate table below.

*Summary of weekly reports from cities, October 13 to November 16, 1929—Annual rates per 100,000 population, compared with rates for the corresponding period of 1928*¹

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 19, 1929	Oct. 20, 1928	Oct. 26, 1929	Oct. 27, 1928	Nov. 2, 1929	Nov. 3, 1928	Nov. 9, 1929	Nov. 10, 1928	Nov. 16, 1929	Nov. 17, 1928
98 cities.....	136	² 126	134	131	144	140	³ 157	155	⁴ 160	161
New England.....	129	145	111	156	115	90	120	122	170	159
Middle Atlantic.....	88	84	86	99	99	110	104	109	112	135
East North Central.....	155	² 133	163	154	168	169	194	169	205	⁵ 165
West North Central.....	167	127	137	158	160	145	³ 200	211	165	198
South Atlantic.....	180	241	139	186	144	231	126	260	122	222
East South Central.....	170	231	183	168	204	196	217	238	231	126
West South Central.....	352	199	411	174	451	223	498	276	443	243
Mountain.....	70	62	26	27	17	71	61	71	⁴ 45	239
Pacific.....	90	72	125	67	115	64	100	79	87	97

¹ The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1929 and 1928, respectively.

² South Bend, Ind., not included.

³ Fargo, N. Dak., not included.

⁴ Reno, Nev., not included.

Summary of weekly reports from cities, October 13 to November 16, 1929—Annual rates per 100,000 population, compared with rates for the corresponding period of 1928—Continued

MEASLES CASE RATES

	Week ended—									
	Oct. 19, 1929	Oct. 20, 1928	Oct. 26, 1929	Oct. 27, 1928	Nov. 2, 1929	Nov. 3, 1928	Nov. 9, 1929	Nov. 10, 1928	Nov. 16, 1929	Nov. 17, 1928
98 cities.....	30	* 40	30	53	38	59	* 44	74	* 56	95
New England.....	59	179	29	244	27	338	20	402	45	382
Middle Atlantic.....	17	20	21	25	33	33	20	43	26	69
East North Central.....	40	* 24	47	41	40	39	68	57	91	86
West North Central.....	31	76	21	49	52	63	* 95	43	50	63
South Atlantic.....	9	34	9	69	15	46	9	59	7	90
East South Central.....	0	14	20	0	0	7	7	0	14	0
West South Central.....	4	0	16	0	0	8	4	8	20	12
Mountain.....	52	71	26	124	244	80	61	177	* 258	204
Pacific.....	75	41	65	43	60	15	117	43	147	51

SCARLET FEVER CASE RATES

	138	* 111	138	115	156	125	* 191	165	* 206	138
98 cities.....	174	* 152	163	117	179	131	278	175	267	193
New England.....	69	69	75	57	89	69	102	95	135	108
Middle Atlantic.....	214	* 137	192	151	226	172	294	233	310	245
East North Central.....	173	139	173	215	160	198	* 177	254	138	225
West North Central.....	127	124	174	113	139	117	167	153	238	199
South Atlantic.....	231	133	109	126	204	147	177	161	156	224
East South Central.....	107	73	154	77	154	138	158	178	158	199
West South Central.....	157	89	235	62	226	62	357	89	* 214	97
Mountain.....	117	151	107	179	187	148	182	169	185	143
Pacific.....										

SMALLPOX CASE RATES

	12	* 3	10	2	13	1	* 9	4	* 14	4
98 cities.....	0	0	0	2	0	0	2	0	25	0
New England.....	0	0	0	0	0	0	0	0	0	0
Middle Atlantic.....	7	* 3	12	3	20	0	15	7	22	4
East North Central.....	21	2	31	2	42	2	* 29	6	42	2
West North Central.....	0	0	0	0	0	2	0	0	0	2
South Atlantic.....	0	0	0	0	14	7	0	0	0	7
East South Central.....	0	0	0	4	28	4	8	4	4	0
West South Central.....	122	62	52	0	61	0	17	9	9	89
Mountain.....	87	10	52	15	30	5	20	15	32	3
Pacific.....										

TYPHOID FEVER CASE RATES

	18	* 18	15	19	11	13	* 9	10	* 8	10
98 cities.....	9	7	16	16	7	7	11	9	23	16
New England.....	8	23	8	18	8	11	8	7	3	10
Middle Atlantic.....	10	* 7	7	10	6	5	6	5	6	6
East North Central.....	25	10	6	14	17	18	* 12	4	4	14
West North Central.....	24	40	21	44	13	34	13	17	9	11
South Atlantic.....	68	42	48	63	34	42	20	42	14	14
East South Central.....	16	8	43	24	20	20	12	41	8	20
West South Central.....	192	53	200	27	78	18	17	27	* 45	18
Mountain.....	20	13	5	13	2	5	7	3	10	5
Pacific.....										

* South Bend, Ind., not included.

* Fargo, N. Dak., not included.

* Reno, Nev., not included.

Summary of weekly reports from cities, October 13 to November 16, 1929—Annual rates per 100,000 population, compared with rates for the corresponding period of 1928—Continued

INFLUENZA DEATH RATES

	Week ended—									
	Oct. 19, 1929	Oct. 20, 1928	Oct. 26, 1929	Oct. 27, 1928	Nov. 2, 1929	Nov. 3, 1928	Nov. 9, 1929	Nov. 10, 1928	Nov. 16, 1929	Nov. 17, 1928
91 cities	8	² 10	9	11	11	10	² 8	13	⁴ 9	15
New England.....	2	2	0	5	2	2	5	5	9	9
Middle Atlantic.....	6	7	12	8	9	5	8	12	4	9
East North Central.....	9	² 7	10	5	9	10	8	9	9	10
West North Central.....	9	12	3	12	6	12	³ 3	3	3	9
South Atlantic.....	9	6	4	10	19	11	4	8	11	13
East South Central.....	7	46	22	8	30	31	37	38	22	23
West South Central.....	16	21	20	12	28	25	12	37	32	33
Mountain.....	17	62	17	44	26	18	0	27	⁴ 27	53
Pacific.....	7	27	3	54	3	27	16	40	10	64

PNEUMONIA DEATH RATES

91 cities	97	² 105	108	89	106	88	² 105	94	⁴ 99	105
New England.....	97	126	63	74	75	90	120	80	88	57
Middle Atlantic.....	118	124	144	92	113	83	115	105	103	125
East North Central.....	81	² 67	91	78	101	78	78	77	71	82
West North Central.....	69	77	72	61	135	107	³ 110	98	120	110
South Atlantic.....	81	115	112	117	116	96	137	75	107	132
East South Central.....	111	92	133	130	155	115	89	169	230	161
West South Central.....	93	75	89	83	110	121	130	92	126	71
Mountain.....	122	62	122	124	131	97	131	97	⁴ 160	115
Pacific.....	85	98	46	98	33	87	75	125	89	98

Number of cities included in summary of weekly reports and aggregate population of cities of each group, approximated as of July 1, 1929 and 1928, respectively

Groups of cities	Number of cities reporting cases	Number of cities reporting deaths	Aggregate population of cities reporting cases		Aggregate population of cities reporting deaths	
			1929	1928	1929	1928
Total	98	91	31,568,400	31,052,700	29,995,100	29,498,600
New England.....	12 ²	12	2,305,100	2,273,900	2,305,100	2,273,900
Middle Atlantic.....	10	10	10,809,700	10,702,200	10,809,700	10,702,200
East North Central.....	16	16	8,181,900	8,001,300	8,181,900	8,001,300
West North Central.....	12	9	2,712,100	2,673,300	1,736,900	1,708,100
South Atlantic.....	19	19	2,783,200	2,732,900	2,783,200	2,732,900
East South Central.....	6	5	767,900	745,500	704,200	682,400
West South Central.....	8	7	1,319,100	1,289,900	1,285,000	1,256,400
Mountain.....	9	9	598,600	590,200	598,600	590,200
Pacific.....	6	4	2,090,600	2,043,500	1,590,300	1,551,200

² South Bend, Ind., not included.

³ Fargo, N. Dak., not included.

⁴ Reno, Nev., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 9, 1929.—The Department of Pensions and National Health reports cases of certain communicable diseases in eight Provinces of Canada for the week ended November 9, 1929, as follows:

Province	Cerebro-spinal fever	Dysentery	Influenza	Polio-myelitis	Smallpox	Typhoid fever
Prince Edward Island.....						
Nova Scotia.....			1			
New Brunswick.....				1		2
Quebec.....	1			5		6
Ontario.....			3	8	3	7
Manitoba.....				1		1
Alberta.....				1	1	
British Columbia.....		2				
Total.....	1	2	4	16	4	16

Ontario Province—Communicable diseases (comparative)—Four weeks ended October 26, 1929.—The following table shows the number of cases of certain communicable diseases reported in Ontario Province for the four weeks ended October 26, 1929, as compared with the corresponding period of the year 1928:

Disease	1929		1928	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis.....	11	1	2	2
Chancroid.....	1			
Chicken pox.....	587		411	
Diphtheria.....	369	18	287	14
Dysentery.....		7	2	
German measles.....	4		8	
Goiter.....	1	1	2	1
Gonorrhoea.....	212		185	
Influenza.....		5	12	6
Lethargic encephalitis.....		4	2	
Measles.....	399	1	185	
Mumps.....	94		196	
Pneumonia.....		131		69
Polio-myelitis.....	105	5	23	1
Scarlet fever.....	333		194	1
Septic sore throat.....	6			
Smallpox.....	9		23	
Syphilis.....	181		86	
Tuberculosis.....	112	44	102	41
Typhoid fever.....	77	3	89	3
Whooping cough.....	188	10	250	5

Quebec Province—Communicable diseases—Week ended November 16, 1929.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 16, 1929, as follows:

Disease	Cases	Disease	Cases
Chicken pox.....	89	Scarlet fever.....	154
Diphtheria.....	90	Smallpox.....	1
German measles.....	4	Tuberculosis.....	38
Influenza.....	1	Typhoid fever.....	8
Measles.....	104	Whooping cough.....	68
Mumps.....	42		

CHINA

Canton—Meningitis.—During the month of October, 1929, meningitis was reported in Canton, China, as follows:

	Week ended—			
	Oct. 5, 1929	Oct. 12, 1929	Oct. 19, 1929	Oct. 26, 1929
Cases.....	3	1	5	5
Deaths.....	3	0	5	4

During the weeks ended November 9 and November 18, respectively, 8 cases and 8 deaths, and 10 cases and 2 deaths were reported in the city of Canton.

CZECHOSLOVAKIA

Communicable diseases—September, 1929.—During the month of September, 1929, certain communicable diseases were reported in the Republic of Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax.....	31	—	Puerperal fever.....	53	22
Cerebrospinal meningitis.....	10	3	Scarlet fever.....	1,763	25
Diphtheria.....	1,449	95	Trachoma.....	196	—
Dysentery.....	89	10	Typhoid fever.....	1,172	52
Malaria.....	53	—	Typhus fever.....	1	1
Paratyphoid fever.....	30	2			

PANAMA CANAL ZONE

Communicable diseases—July–August, 1929.—During the months of July and August, 1929, certain communicable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	July		August	
	Cases	Deaths	Cases	Deaths
Chicken pox.....	41	1	34	.....
Diphtheria.....	41	2	33	.....
Dysentery (amebic).....	3	.....	.....	.....
Dysentery (bacillary and unclassified).....	3	1	.....	.....
Leprosy.....	.....	.....	1	1
Malaria.....	153	1	88	3
Measles.....	54	.....	25	.....
Mumps.....	20	.....	11	.....
Pneumonia.....	.....	29	.....	27
Poliomyelitis.....	.....	.....	.....	1
Smallpox.....	18	.....	23	.....
Tuberculosis.....	.....	38	.....	21
Typhoid fever.....	3	.....	2	1
Whooping cough.....	17	.....	12	.....

PORTO RICO

San Juan—Communicable diseases—Five weeks ended November 2, 1929.—During the five weeks ended November 2, 1929, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria.....	2	Syphilis.....	13
Filariasis.....	1	Tetanus.....	2
Malaria.....	9	Tuberculosis.....	76
Ophthalmia neonatorum.....	1	Typhoid fever.....	4

VIRGIN ISLANDS

Communicable diseases—October, 1929.—During the month of October, 1929, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases	St. Thomas and St. John—Contd.	Cases
Chancroid.....	2	Syphilis.....	12
Dysentery.....	2	Tuberculosis.....	1
Gonorrhea.....	2	Uncinariasis.....	5
Malaria.....	1	Saint Croix:	.....
Pellagra.....	3	Syphilis.....	2

YUGOSLAVIA

Communicable diseases—October, 1929.—During the month of October, 1929, communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax.....	146	20	Measles.....	611	3
Cerebrospinal meningitis.....	4	2	Scarlet fever.....	2,035	263
Diphtheria and croup.....	792	116	Tetanus.....	32	16
Dysentery.....	412	64	Typhoid fever.....	858	110
Glanders.....	.....	1	Typhus fever.....	1	.....

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

[C indicates cases; D, deaths; P, present]

[illegible]

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

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place	March, 1929	April, 1929	May, 1929	June, 1929	July, 1929			August, 1929			Sept. 1-10, 1929	
					1-10	11-20	21-31	1-10	11-20	21-31		
Indo-China (French) (see also table above):												
Annam.....	6	20	120	-----	2	5	2	-----	3	14	1	
Cambodia.....	29	84	: 215	-----	55	71	60	-----	21	14	4	
Cochin-China.....	183	88	: 123	-----	146	123	46	-----	45	15	45	
Laos.....	-----	-----	-----	-----	1	-----	12	-----	3	-----	-----	
Tonkin.....	-----	-----	5	4	-----	-----	-----	-----	-----	-----	-----	

PLAQUE

[C indicates cases; D, deaths; P, present]

[illegible]

[C indicates cases; D, deaths; P, present]

Place	May 5- June 1, 1929	June 30- July 27, 1929	July 25- Aug. 24, 1929	Aug. 23- Sept. 21, 1929	Week ended—									
					October, 1929				November, 1929					
					Sept. 23, 1929	5	12	19	26	2	9	16	23	
Hawaii: Hamakua—Kukuihaele—Plague-infected rats	6	1												
India:	1,394	677	4,221	6,326	3									
Basseln:	1,205	414	2,266	3,354	2,135									
Bombay:	2	4	1	4	1,081									
Plague-infected rats:	1	1	1	2										
Madras Presidency:	44	35	23	28	7	8	7	10	6	3				
Rangoon:	64	85	97	186	51					27				
Plague-infected rats:	40	38	52	107	22					14				
Indo-China (see also table below):	2	9	24	11	1									
Pnompenh:	3	6	18	12	2	1	2	1	3					
Salgon and Cholon:	5	4	7	8	4	1								
Iraq:	3	3	8	4	1									
Baghdad:	14	12	1	2										
Plague-infected rats:	5	2												
Diyalah Liwa:	1	1	1											
Naudham:	7	1	1											
Italy: Naples Province:					2									
Plague-infected rats:					1									
Japan: Osaka—Plague-infected rats:	2				3									
Madagascar (see also table below):														
Tamatave:	P	2	6	1	2	2	2	1	1	2	2	2	2	2
Morocco:	42	16	39	4	13	2	1			1	1	1	1	1
	4	5	17		1					p				

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place	Week ended—												
	May 5— June 1, 1920	June 2— 30-July 27, 1920	June 30-July 27, 1920	July 28— Aug. 24, 1920	Aug. 25— Sept. 21, 1920	October, 1920				November, 1920			
						Sept. 28, 1920	5	12	19	26	2	9	16
Algeria:													
Algiers.....	5	6	7	1									
Cherchell.....	5	1			5								
Oran.....	40	110	103	38	4			3	1		1		
Arabia: Aden.....	20	20	56	37	1								
Australia: Fremantle Quarantine Station.....													
Bermuda: Hamilton.....		1											
Brazil:													
Porto Alegre.....	1			3	2								
Rio de Janeiro.....	3												
British East Africa (see also table below):													
Tanganyika.....	4	7	10	5	9	2	1						
British South Africa:													
Northern Rhodesia.....			73										
Southern Rhodesia.....			4										
Canada:	12		5			3	2						
Alberta.....		12		4	4						2	4	1
Calgary.....				2									
Edmonton.....		4		1									
British Columbia—Vancouver.....		13	14	8	5			2		2	4	1	
Manitoba.....	23	6	6	1				13		2	2	1	
Winnipeg and vicinity.....	6	2								1	1		
Nova Scotia.....													
Ontario.....	40	84	57	2	7	19	5	1	1	3	5	3	
London.....													
Niagara Falls.....	3												
North Bay.....	8	2	7	3	3	4	2		1	1	5		
Ottawa.....		1	1	1									
Sarnia.....													
Toronto.....		5	7		3	1				1	1	1	
Windsor.....	3	2	2		2								
Prince Edward Island.....													

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

SMALLPOX—Continued

[C Indicates cases; D, deaths; P, present]

Place	May 5-June 2- 20, June 1, 1929	June 30-July 24, 27, 1929	July 28- Aug. 24, 1929	Aug. 28- Sept. 21, 1929	Week ended—								
					October, 1929								
					Sept. 28, 1929	5	12	19	26	2	9	16	
Canada—Continued.													
Quebec.....	C 12	10	2	3	1								
Montreal.....	C 1	1				2			5	8	7	6	
Quebec.....	C 1	2		1									
Riviere du Loup.....	C		2										
Saskatchewan.....	C 14			1	4					9	1		
Saskatoon.....	C				1					8		6	
China:													
Amoy.....	C 2												
Canton.....	C 46	16	12	2									
Canton.....	C 4	1	2										
Chefoo.....	C P												
Fochow.....	C		P	P	P								
Hong Kong.....	C 29	10	1	5	2	P	1	1			4	5	
Manchuria.....	C 25	6	5	4	2		1	2			2	7	
Harbin.....	C			1									
Kwantung—	C												
Dairen.....	C 21	11	14		2								
Port Arthur.....	C 8	3	9	1									
Nanking.....	C 3			P	P								
Shanghai.....	C			P	P								
Foreigners only.....	C 6	7	3						1	1			
Including natives.....	C 18	5	3										
Swatow.....	C 62	24	15	2									
Tientsin.....	C 12	P			2				2	1			
Tientsin.....	C P												
Chosen (see table below):													
Colombia:													
Barranquilla.....	C		2		4								
Buenaventura.....	C								4	5	6	8	14
Dutch East Indies:													
Batavia.....	C 4	1											
Belkapan.....	C 1	1	2	1	1								
Belawan Deli.....	C												
Borneo—Samarinda.....	C 3	13	7										
	C 1								9	2	3	6	
	C								1	2			

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

[illegible]

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place	Week ended—											
	May 5- June 1, 1929	June 2-30, 1929	June 30-July 28- July 27, Aug. 24, 1929	Aug. 31, 1929	September, 1929				October, 1929			
					7	14	21	28	5	12	19	26
Algeria:												
Algiers.....	1	1	9	4		2	1	3		1	6	
Constantine Department.....		11		2								
Oran.....	14	6	9	2		3						
Bolivia: Potosí Province—Caleoto Canton.....				19								
British South Africa: Northern Rhodesia.....	3			6								
Bulgaria.....	21	4	12									
	1	1	2	7		7						
Sofia.....			1									
Chile:												
Concepcion.....	1											
Valparaiso.....			1	1								
China: Tientsin.....												
Chosen (see table below).....												
Czechoslovakia (see table below).....												
Egypt:												
Alexandria.....							1	1	1			
Behadra Province.....	1											
	159	13	8	31			6	9	3	4	2	
Calcutta.....	24	6	4				2	2		2	1	
	2		2	4		1		1				
Port Said.....												
Suez.....	2	2	4	3								
Greece (see table below).....				2						1	1	
Hungary.....												
Ireland (Irish Free State):												
Cavan County.....	1											
Down County.....												
Dougal County.....												
Tyrone County—Strabane.....	1	1										
Latvia (see table below).....												

During the period from Apr. 14 to May 21, 1929, 18 cases of typhus fever with 4 deaths were reported in Strabane, Tyrone County, Ireland.

TYPHUS FEVER--Continued

[C indicates cases; D, deaths; P, present]

[illegible]

