

# PUBLIC HEALTH REPORTS

VOL. 46

AUGUST 21, 1931

No. 34

## PUBLIC HEALTH SERVICE IN KNOX COUNTY, TENN.

FISCAL YEAR JULY 1, 1929-JUNE 30, 1930

By JOSEPH W. MOUNTIN, *Surgeon, United States Public Health Service*

### Introduction

#### SOCIAL AND ECONOMIC DATA

Knox County forms part of the Great Valley of east Tennessee. It has an area of 624 square miles and a population of 50,093, exclusive of Knoxville.<sup>1</sup> With the exception of about 3,000 negroes, the population is mostly native white. The county is essentially rural; there is no incorporated town in the county outside of Knoxville. The population of the several unincorporated villages is estimated to be as follows:

Fountain City.....	3,917
Mascot.....	1,700
Bearden.....	1,257
Concord.....	1,000
Powell Station.....	800
Inskip.....	693
Corryton.....	258

The county is traversed by ridges of low mountains with fertile valleys between. The soil is clay, with considerable mixture of sand. It is underlaid by limestone, and outcroppings are frequently seen. There is a well developed system of state and county roads, and all farms are said to be within one mile of an "all-weather" road.

Agriculture is the principal pursuit. Hay, corn, grain, and garden truck are the principal crops. Knoxville receives the major part of its milk supply from dairies in Knox County. The two other major industries are marble quarries, which employ about 1,500, and zinc mines, which employ about 450 persons.

The assessed value of Knox County including Knoxville is \$103,125,-470, and the tax rate is \$1.25 on each \$100 valuation.

<sup>1</sup> Knoxville, a city of 105,795 inhabitants, is the county seat. Since Knox County and Knoxville are quite distinctly separated in their political organization and public services, the data presented in this report relate to Knox County exclusively, except where specific mention of Knoxville is made.

## RELATION OF KNOX COUNTY AND KNOXVILLE

From the social and political point of view Knoxville is quite independent of Knox County. The same is true to a lesser degree of the economic structure. The suburbs and satellite villages which usually surround a large city have recently been included within the city limits of Knoxville. The county, however, benefits in many ways from having Knoxville within its borders. Knoxville pays a large part of the county taxes; it affords a ready market for the farm products; and the rural people have access to many social and economic advantages which attain a higher development in centers of population.

## HEALTH ORGANIZATION

Prior to July 1, 1928, the health organization of the county consisted of a part-time county physician and two visiting nurses. The program, for the most part, was the care of the sick poor and the handling of such complaints and emergencies as demanded attention.

On July 1, 1928, Knox County, in cooperation with the Tennessee State Health Department, organized a county health department to serve the area outside the city limits of Knoxville. The personnel of the county health department proper consists of 1 full-time medical health officer, 2 public health nurses, 1 sanitary officer, and 1 clerk. The total annual budget is \$14,500, of which \$9,500 is appropriated by the county and \$5,000 is obtained from the State. The county Red Cross chapter in conjunction with the county tuberculosis society contemplates the employment of a nutrition worker. The State health department, in addition to its allotment of \$5,000, renders consultation service in the several specialized branches of public health work.

The county physician and one visiting nurse now devote their attention exclusively to the care of the sick poor. This service is carried on a special budget separate from that of the health department.

The several elements of the health program are described in succeeding sections of this report. This report is based on a study of health service conducted in Knox County during the fiscal year July 1, 1929–June 30, 1930, and is not a study of the county health department alone. The existing service is studied in relation to the needs of the area without taking into account the fact that the present budget and personnel are not sufficient to meet these needs. In the section entitled "General Summary and Major Recommendations," appearing at the close of this report, a statement is made concerning the increase which should be made in the budget and personnel in order to carry out a program of sufficient scope and intensity to meet the needs of Knox County.

The Appraisal Form for Rural Health Work was used as a guide in estimating the quantity and quality of the existing service and in projecting a program designed to meet more nearly the needs of the area.

#### BIRTHS AND DEATHS

Birth and death rates of the rural portions of Knox County are influenced by the following factors: Many women during confinement and many of the actually ill persons are hospitalized in Knoxville; most of the child-caring institutions are located in Knoxville; the County Home and Beverly Hills Sanatorium are located in rural Knox County. The first two factors would tend to lower the birth rate, the death rate of infants, and death rates from diseases which are treated in hospitals. The last factor would tend to increase the death rates from tuberculosis and diseases affecting the aged. It is impossible to weigh these influences, since it has not been the practice of the county to classify deaths according to residence. The city of Knoxville segregates nonresident deaths, but the place of residence is not stated.

In reviewing the accompanying table, the following items arrest one's attention: The birth rate has been consistently lower than that for other east Tennessee counties and that for the State as a whole. In part this may be explained by births occurring in the Knoxville hospitals. The Knoxville physicians attending deliveries in the county may file such certificates in the city and the error escape the attention of the city registrar. The recorded low birth rate should be investigated, since it may be due to poor registration as well as other factors.

The typhoid fever death rate, while lower than that of the State as a whole, is still excessive. The diarrhea and enteritis death rate among children under two years of age is high and periodically assumes epidemic proportions. Death rates from typhoid fever and diarrhea and enteritis show a definite need for intensifying the immunization and sanitation program now in progress.

Heart disease shows an alarming increase, having risen steadily from 48.6 in 1918 to 140.8 in 1929.

The published tuberculosis death rate is remarkably high, but it is influenced to a great extent by Beverly Hills Sanatorium. During the years 1927, 1928, and 1929, respectively, 12, 25, and 46 deaths occurred which were chargeable to Knoxville. After deducting these, the rate, while high, is well below that of surrounding counties and that of the State as a whole.

The number of deaths from pellagra is astonishingly high—in fact, pellagra is a major cause of death. The general presence of the disease is usually considered to reflect adverse economic conditions; but the high rate of Knox County as contrasted with rates of other sections of the State is not in keeping with the relatively advanced position Knox

County is believed to occupy. Pellagra as it exists in Knox County deserves special study.

*Births, and deaths from selected causes*<sup>1</sup>

	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
<b>Live births:</b>												
Number	534	569	654	675	679	729	700	756	725	566	750	701
Rate	16.2	16.6	18.2	18.1	17.5	18.1	16.8	17.5	16.3	12.3	15.8	14.3
<b>Stillbirths:</b>												
Number	(0)	(0)	(0)	(0)	(0)	22	24	33	28	25	47	29
Rate	(0)	(0)	(0)	(0)	(0)	30.2	34.3	43.7	38.6	44.2	62.7	41.4
<b>Total deaths:</b>												
Number	335	291	344	329	376	409	363	449	472	451	478	564
Rate	10.2	8.5	10.0	8.8	9.7	10.2	8.7	10.4	10.6	9.8	10.1	11.3
<b>Deaths under 1 month of age (neonatal):</b>												
Number	16	10	23	9	17	20	26	21	37	23	16	19
Rate	30.0	17.6	35.2	13.3	25.0	27.4	37.1	27.8	51.0	40.6	21.3	27.1
<b>Infant deaths (under 1 year):</b>												
Number	37	19	45	37	30	46	46	41	54	57	47	53
Rate	69.3	33.4	68.8	54.8	44.2	63.1	65.7	54.2	74.5	100.7	62.7	75.6
<b>Maternal deaths (143-150):</b>												
Number	1	5	6	2	4	1	1	3	4	2	1	1
Rate	1.9	8.8	9.2	3.0	5.9	1.4	1.4	4.0	5.5	3.5	1.3	1.4
<b>Typhoid fever (1):</b>												
Number	4	4	8	4	7	3	0	8	4	5	5	3
Rate	12.2	11.6	22.3	10.7	18.0	7.5	0	18.5	9.0	10.9	10.5	6.1
<b>Smallpox (6):</b>												
Number	0	0	1	0	0	1	3	0	0	0	0	0
Rate	0	0	2.8	0	0	2.5	7.2	0	0	0	0	0
<b>Measles (7):</b>												
Number	0	0	3	1	0	2	2	0	0	2	3	1
Rate	0	0	8.4	2.7	0	5.0	4.8	0	0	4.3	6.8	2.0
<b>Scarlet fever (8):</b>												
Number	0	0	1	2	0	1	0	1	0	1	0	1
Rate	0	0	2.8	5.4	0	2.5	0	2.3	0	2.2	0	2.0
<b>Whooping cough (9):</b>												
Number	3	0	8	4	0	1	5	1	1	5	5	2
Rate	9.1	0	22.3	10.7	0	2.5	12.0	2.3	2.2	10.9	10.5	4.1
<b>Diphtheria (10):</b>												
Number	4	1	4	6	2	3	3	4	5	2	2	2
Rate	12.2	2.9	11.2	16.1	5.1	7.5	7.2	9.3	11.2	4.3	4.2	4.1
<b>Influenza (11):</b>												
Number	31	17	6	4	15	29	4	16	17	14	22	31
Rate	94.2	49.4	16.7	10.7	38.6	72.1	9.6	37.1	38.1	30.4	46.3	63.3
<b>Tuberculosis, all forms (31-37):</b>												
Number	52	54	58	41	53	56	41	52	68	51	65	87
Rate	158.1	157.1	161.8	109.9	136.3	139.2	98.3	120.5	152.4	110.7	136.8	177.5
<b>Cancer (43-9):</b>												
Number	13	11	11	9	14	10	14	16	13	12	20	28
Rate	39.5	32.0	30.7	24.1	36.0	24.9	33.6	37.1	29.1	26.0	42.1	57.1
<b>Pellagra (54):</b>												
Number	38	29	23	17	21	16	19	35	32	30	30	32
Rate	115.5	84.4	64.2	45.6	54.0	39.8	45.6	81.1	71.7	65.1	63.1	65.3
<b>Heart disease, all forms (87-90):</b>												
Number	16	18	34	25	29	41	36	35	46	50	57	60
Rate	48.6	52.4	94.0	67.0	74.6	101.9	86.4	81.1	103.1	108.5	119.9	140.8
<b>Pneumonia, all forms (100-1):</b>												
Number	30	16	28	30	15	40	26	24	31	22	33	35
Rate	91.2	46.5	78.1	80.4	38.6	99.4	62.4	55.6	69.5	47.8	69.4	71.4
<b>Diarrhea and enteritis under 2 (113):</b>												
Number	3	5	5	12	30	12	12	17	9	19	9	8
Rate	9.1	14.5	14.0	32.2	77.1	29.8	28.8	39.4	20.2	41.2	18.9	16.3
<b>Acute and chronic nephritis (129):</b>												
Number	25	24	17	29	25	38	27	38	27	30	47	40
Rate	76.0	69.8	47.4	77.7	64.3	94.5	64.8	88.1	60.5	65.1	98.9	81.6
<b>Auto accidents (189c):</b>												
Number	0	0	1	6	25	3	0	3	3	2	2	4
Rate	0	0	2.8	16.1	64.3	7.5	0	7.0	6.7	4.3	4.2	8.2

<sup>1</sup> The numbers and rates used in this table were prepared from the records of the State registrar of vital statistics, compiled on the basis of the calendar year.

<sup>2</sup> Not tabulated prior to 1923.

Total live birth and total death rates per 1,000 population; stillbirth, infant death, and maternal death rates per 1,000 live births; all other rates per 100,000 population.

**Health Activities****REGISTRATION OF BIRTHS AND DEATHS**

Knox County is in the registration area for both deaths and births, having been included when the State was admitted in 1917 and 1927, respectively. The county, exclusive of Knoxville, is divided into 15 registration districts, each under the charge of a local registrar. Certificates are collected by the local registrars and transmitted to the county health officer. The county pays the local registrars 25 cents for each certificate upon presentation of statement signed by the State health commissioner. There has been no check on the completeness of reporting of deaths since 1917 and none on births since 1926.

Upon receipt of the certificates by the health officer items are reviewed for completeness; and deaths are checked against reports of communicable diseases. To a limited extent, birth certificates are used as a means of locating new-born infants, but the resources of the department have not as yet made possible an extensive infant hygiene program. No other analyses or uses are made of certificates of births and deaths. Certain data are presented in the State annual vital statistical bulletin, but these gross figures are not adapted to local administration needs.

*Comments.*—Registration of births and deaths receives a score of 18 out of a possible 60 points. Eight of the 18 points are granted because the State is in the registration area. The greater portion of the loss in score is sustained because of failure to tabulate and analyze the information. The following recommendations are made:

*Recommendations.*—1. In view of the time which has lapsed since the last check of registration, the health department should determine the status of registration, more particularly of births.

2. The division of the county for purposes of registration should be studied as well as the efficiency of the individual registrars. Such changes in area and personnel as are indicated should be made.

3. Current tabulations such as those specified in the appraisal form should be made.

4. In order to assist in checking registration and visualizing the health problems of the county, certain data should be presented graphically.

5. The statistician of the State health department should be consulted regarding tables and graphs.

Other suggestions will be found in the "Manual for the Conduct of County Health Departments" and "The Record Manual," both published by the State health department.

**COMMUNICABLE-DISEASE CONTROL**

Control of communicable diseases is a function of the health department. Cases are reported by telephone or on a weekly morbidity

card. A large percentage of reports, particularly of minor diseases, are received on morbidity cards alone. Office index cards are made and then the original morbidity cards are sent to the State health department. Spot maps are prepared only for typhoid fever.

*Cases of and deaths from certain diseases, 1929*

	Deaths reported	Cases
Typhoid and paratyphoid.....	3	28
Diphtheria.....	2	17
Scarlet fever.....	1	40
Measles.....	1	60
Whooping cough.....	2	11

Control measures on the individual case may be instituted by either the health officer or the nurses. On an average, two visits are made on the major and most of the minor diseases.

A special communicable disease record is completed on cases of typhoid fever but on selected cases only of diphtheria and scarlet fever. An effort is made to determine the source of typhoid fever but not of other diseases. Cases of diphtheria are released on one negative culture. Release of all other diseases is based on the expiration of the time period specified in the State regulations.

Typhoid fever cases are accepted at all general hospitals in Knoxville, but the number hospitalized could not be ascertained. There are no provisions for the hospitalization of other diseases. Diagnostic service was rendered by the health officer in 24 instances.

Immunization against certain diseases is receiving due emphasis. The records of the health department show that 5,471 persons were inoculated against typhoid fever. The health department has a record of 2,626 persons who received the complete series of diphtheria toxin-antitoxin; but it is estimated that more than 80 per cent of these children were over six years of age. Smallpox vaccination is not compulsory for school attendance. It is estimated that less than 1 per cent of children entering school have been vaccinated. The health department vaccinated 427 persons.

*Comments.*—Communicable disease control practice receives a total score of 101.8 points out of a possible 175. The loss in score sustained was quite evenly distributed over the several items listed in the appraisal form under "Communicable Disease Control." Case reporting is fair, but the recording and analysis of essential data are not sufficient for good control practice or for a thorough study of the communicable disease problem. In view of the availability of the State branch laboratory, it would seem that the department might make greater use of this valuable aid in both diagnosis and control measures. Hospitalization is most essential in those cases requiring special care and where proper isolation can not be carried out in the

home. It should be possible to effect some arrangement with the city of Knoxville for hospitalization of selected cases. The immunization work could be made much more effective by reaching a larger percentage of the younger children. This is especially true of diphtheria which exacts its greatest toll among children below school age.

*Recommendations.*--1. The collection of more nearly complete data on individual cases and careful analyses of such data. The State epidemiologist should be consulted on this subject.

2. The observance of the State regulations as a minimum standard of control practice, especially with regard to release of typhoid fever and diphtheria cases.

3. The development of some plan whereby the facilities of the Knoxville General Hospital may be used by the county for selected cases of communicable disease.

4. The promotion of immunization of the children of preschool age against smallpox, diphtheria, and typhoid fever.

5. The passage of the compulsory smallpox vaccination ordinance recommended by the State health department.

#### VENEREAL-DISEASE CONTROL

During the first 10 months of the period covered by this report, the county did not operate any venereal-disease control service. In May, 1930, a plan was effected with the city of Knoxville whereby for the payment of a very nominal sum patients of the county are accepted at the clinic of the Knoxville Bureau of Health. During May and June 48 patients were treated. Thirty-seven of these were already under treatment, while 11 were new admissions.

*Comments and recommendations.*—It is reasonable to assume that the venereal-disease problem of Knox County is not less than that of the average rural county and probably slightly increased by the proximity of a large city. With existing personnel and budget the present arrangement with the city is about all that can be done. It, however, adds to the burden of the city clinic, which is already overcrowded. While all efforts toward the common use of facilities is to be encouraged, such consolidation should not impair an existing service. It is only proper that the county should pay the cost of such service, including the additional equipment and personnel which may be needed. In developing its venereal-disease program, the county should begin by perfecting its clinic facilities. However, supplemental field service must not be neglected. Among these activities may be mentioned family case work, follow-up of delinquent patients, general measures in the field of social hygiene, and control of sources of infection.

## TUBERCULOSIS CONTROL

Tuberculosis control is a joint function of the county health department and Beverly Hills Sanatorium. For purposes of clarity, each element of the service is described separately.

*Field control.*—Tuberculosis is a reportable disease, but practically all cases carried on the register are located through field clinics. One clinic per year is held in 12 different sections of the county. Some local building is used for clinic quarters. The clinician is supplied by Beverly Hills Sanatorium, and field nursing service is rendered by the county health department. The clinic work is very much in the nature of a consultation service to the local physicians, who continue to supervise the patients. Nursing service is performed as an aid to the family physician. During the year, 306 patients were seen at the clinics; in 299 the diagnosis of positive or suspected tuberculosis was made. Practically all of these patients were seen at least once by the nurses, who made a total of 942 home visits. Patients are admitted to the sanatorium from the field clinics, and on their discharge from the sanatorium the county health department is notified.

*Beverly Hills Sanatorium.*—This institution is located in Knox County proper. It is maintained jointly by Knox County and Knoxville for the care of tuberculosis patients.

*Bed capacity*

Available beds.....	161
Normal operating capacity <sup>1</sup> .....	150
Extreme capacity.....	175
Average census (1929).....	133

*Classification of patients admitted*

Adults.....	161
Children under 12 years.....	28

<b>Total</b> .....	<b>189</b>
--------------------	------------

Per Cent

Incipient.....	20
Moderately advanced.....	30
Far advanced.....	50

*Operating cost (present budget)*

Knox County.....	\$45,000
Knoxville.....	45,000
Knoxville Community Chest.....	8,582

98,582

Per patient-day cost.....	1.91
---------------------------	------

Twenty-seven county patients were admitted during 1929.

<sup>1</sup> Present budget permits operation of 150 beds at \$1.91 per day.

*Comments.*—The tuberculosis-control service receives a score of 63 out of a possible 100 points. An unjust penalty in score is sustained because of deaths in Beverly Hills Sanatorium, but correction can not be made because there is no record of Knox County deaths occurring elsewhere. While case reporting receives full score, practically all cases of which the health department has knowledge were located through clinics. An excellent beginning on clinic and nursing service has been made, but there is need for expansion of both. Once during the year is not sufficiently often to conduct a clinic at a given place. Unless the clinic service can be increased, it would seem desirable to conduct clinics at fewer points but more frequently. The county proper is not taking full advantage of the facilities at Beverly Hills Sanatorium, there being 27 admissions from the county outside of Knoxville and 162 from Knoxville. On the basis of population, there should be about 60 admissions from the county.

*Recommendations.*—1. Epidemiological and statistical study to determine causes of high death rate. Consideration should be given such factors as county institutions, marble quarries, zinc mines, etc.

2. More frequent clinic sessions at a given place and fewer points for the location of clinics.

3. Increase in nursing service.

4. Greater utilization of beds at Beverly Hills Sanatorium by the rural portion of the county.

5. Consideration of the feasibility of developing an out-patient service at Beverly Hills Sanatorium especially for X-ray diagnosis.

#### PRENATAL HYGIENE

The total number of births recorded as occurring in the county in 1929 was 739, of which 710 were live and 29 stillborn. It is estimated that, in addition, 15 per cent of births occur in Knoxville hospitals and are credited to Knoxville. It is therefore assumed that 850 pregnancies constitute the total problem in prenatal service. About 12 per cent of the births were registered for prenatal nursing service. Six per cent of the births were attended by midwives. Midwives are not licensed and are not under systematic supervision.

Prenatal hygiene service conducted by the health department is limited to field nursing. The physician who is to attend the woman at confinement is engaged for prenatal medical supervision. The exact number of cases carried by the nurses was not ascertained, since the service is not of a formal character until contact is made with the physician. About 100 patients may be classed as receiving nursing service, and to these 288 visits were made. At least 90 per cent of these patients made one or more visits to a physician.

*Comments.*—Prenatal hygiene service receives a score of 46.3 out of a possible 75 points. The loss in score was quite evenly distrib-

uted over the several items of service performed by the health department. Full score was granted on obstetrical service because more than 10 per cent of deliveries occur in hospitals and less than 10 per cent of births are attended by midwives.

*Recommendations.*—1. Increase in number of patients for both medical and nursing prenatal service and greater frequency of contact by doctors and nurses.

2. The opening of some record on all cases contacted by nurses.

3. The development of some arrangement with the Knoxville General Hospital whereby indigent patients may obtain prenatal medical supervision and obstetrical service.

#### INFANT HYGIENE

The program of the health department in infant hygiene is limited to a small amount of home nursing service. The nurses visited 79, or about 10 per cent of the births, making a total of 178 visits. Most of these infants were located when homes were visited for other purposes. Not more than 50 per cent of the infants visited by nurses were under the supervision of the family physician, and these infants would not average more than two visits per year to the physician.

*Comments and recommendations.*—It may be said that the health department has no infant hygiene program. The small beginning in nursing activities is a casual type of service rendered to infants, for the most part seen by chance in connection with other work. The whole program of infant welfare needs to be developed. It would seem that the first step to be taken should be to establish a limited number (not more than 3 or 4) of permanent infant welfare stations at strategic points. In the beginning a liberal policy concerning the clientele should be adopted; yet an effort should be made from the start to transfer infants to family physician after a specified number of visits. At the same time a definite program should be started for the development of interest in preventive pediatrics on the part of the physicians. The nursing program should be developed as a service supplementary to the work of the physician on the case and under his direction.

#### PRESCHOOL HYGIENE

The preschool hygiene program is directed essentially toward the detection and correction of physical defects in children about to enter school. During the summer, clinics are conducted at various points throughout the county. Children needing corrective work are followed up by the nurses. Other aspects of the preschool hygiene work have not been undertaken.

*Comments and recommendations.*—Preschool hygiene work receives a score of 23 points out of a possible 50 points. This score is attained

on the basis of quantity of work performed. The greatest deficiency in the program lies in the fact that children are not reached until they are about to enter school. Preschool hygiene should be a continuation of the health supervision begun in infancy. The plan of organization suggested for infant welfare work is equally applicable for the preschool child. The preschool child might well be handled in a combined infant and preschool program. The supervision need not be so close as the child grows older; otherwise there is no difference.

#### SCHOOL HYGIENE

The school population is composed of 9,487 grade children and 1,513 pupils in high school. The school hygiene program, with the exception of classroom instruction in health, is an exclusive activity of the health department.

During the year 4,525 children of all grades were examined, at the rate of about 15 per hour. The present program, however, provides for the examination of the first and fifth grades only. Of the children examined last year, 2,803 were found to have physical defects; 422 of these children are known to have had defects corrected. The nature of the defects found and the number corrected have not been tabulated.

Systematic weighing is done only in connection with routine examination. Parents are invited to be present at these examinations, but less than one per cent attend. The results of the examination are communicated to parents by notice. Nurses made 506 field visits in an effort to induce correction of defects.

School buildings are inspected at least twice each year by the health department. Fifty per cent of the school buildings have a sanitary method of excreta disposal, but facilities are not adequate in many of these schools. Lavatory facilities are present in only 3 per cent of the schools. The seating, lighting, and ventilation are not considered satisfactory except in the newer consolidated schools and in the high schools. Eighty-seven per cent of the schools have water supplies which are classed as protected from surface pollution. The drinking-water facilities are satisfactory in less than 50 per cent of the schools.

Formal health instruction is carried out by classroom teachers in the fourth, fifth, and sixth grades. Other work, such as poster making, essay writing, and systematic observance of health habits, is carried on in possibly 10 per cent of the schools. In a survey made by the specialist in health education of the State health department it was found that health education as conducted was not of a systematic character and could not be considered as meeting the minimum requirements of the State course of study. Systematic physical education is given in three of the high schools. Courses are conducted

but not well organized in the other high schools and in a few of the grade schools.

*Comments.*—School hygiene work receives a score of 56.3 out of a possible 150 points. While loss in this score is distributed over the several items, the most severe penalties are sustained because of the small number of defects corrected and because of the unorganized program of health education. Systematic weighing by teachers has not been done in the past, but the purchase of scales by schools is contemplated and regular weighing is planned as part of the nutrition program being sponsored by the health department in cooperation with the board of education, the Red Cross, and the Tuberculosis Association. The health department is following good practice in limiting its examination to children of the first and fifth grades. This should make possible a more careful type of examination and greater concentration on children needing closer supervision. In the future, child hygiene for all ages should be considered as a unit, and work with the school child should be a continuation of a program of supervision begun in infancy.

The health department has exercised good judgment in emphasizing the necessity of having a protected water supply and sanitary method of excreta disposal at the schools. As rapidly as possible, however, other parts of the school sanitation program must be put into effect, such as sanitary drinking facilities, proper seating, lighting and ventilation, and better care of school grounds and sanitary facilities.

A comprehensive program of health education must be developed. As early as possible the State course of study should be put into effect. The health department must assume a more active part in stimulating interest on the part of the teachers and school authorities. The assistance and advice of the specialist in health education of the State health department should be secured. Teachers should be induced to enroll in health courses now being given at the State University and the teachers' colleges.

*Recommendations.*—1. Purchase of scales by all schools and systematic weighing by teachers.

2. Until personnel of health department is increased, not more than 3,000 children should be examined per year.

3. Defects should be tabulated by type, and efforts at correction should be concentrated on those of greater importance.

4. Greater effort should be placed on having parents present at the time of examination and using other methods for inducing correction of defects, thus obviating the necessity of home visits by the nurses.

5. The sanitation program should be expanded to include all items of school sanitation, and the school authorities should be induced to assume a more definite responsibility for the care of sanitary facilities.

6. A comprehensive plan of health education should be inaugurated. The health department should guide and assist in the program, but the classroom teacher should carry the responsibility for systematic instruction.

#### SANITATION

*Food.*—Other than local grocery stores there are very few food-producing or dispensing establishments in the county. Most of the so-called restaurants are sandwich shops, conducted frequently in connection with filling stations and tourist camps. The health department exercises a limited amount of supervision over these establishments and during the year made 361 visits for purposes of sanitary control. Food handlers are not subject to regular physical examination.

*Milk.*—The health department does not exercise any systematic control over the milk supply. All cows in the county have been tuberculin tested under the "accredited area" program of the State and Federal departments of agriculture. A few chain grocery stores, particularly on the edge of Knoxville, handle milk produced under Knoxville supervision.

The American Zinc Co. operates a dairy which supplies the city of Mascot. The dairy is said to be producing milk which meets the requirements of the Standard Ordinance for grade A raw milk. Knoxville obtains a large part of its milk supply from Knox County. Thus, in a limited way the quality of milk consumed in Knox County is improved; but for the most part milk is produced on the premises or obtained from small dairies over which no sanitary control is exercised.

*Water.*—In Mascot, an unincorporated city of about 1,700 inhabitants, the American Zinc Co. operates a private water supply which serves about 500 people. The water is obtained from Flat Creek. After sedimentation and chlorination, it is exposed to ultraviolet rays. About 500 dwellings on the edge of Knoxville are connected to the Knoxville supply. A public supply for Fountain City is contemplated. Exclusive of those existing public supplies mentioned, water throughout the county is obtained from individual supplies. The prevailing type is the bored or drilled well. Springs are not a significant source of supply. It is estimated that about 70 per cent of the population obtains water from supplies which may be classed as reasonably well protected from surface pollution.

*Excreta disposal.*—About 50 dwellings in Mascot are connected to a private sewer which discharges into Flat Creek. The privy is the prevailing method of disposal in the remainder of the county. Since the organization of the health department, 2,886 dwellings, or approximately 25 per cent, have been provided with a sanitary method of disposal which in all but a few instances is a pit privy. It is esti-

mated that about 25 per cent of the homes are equipped with a sanitary method of excreta disposal, most of which are pit privies.

*Malaria.*—An occasional case of malaria is reported. *Anopheles quadramaculatus* mosquitoes have been found breeding in certain collections of water. The malaria problem is not regarded of sufficient importance from the public health point of view to justify more than local control measures on a selective basis.

*Comments.*—Sanitation receives a score of 98 out of a possible 175 points. In the main, the program is well adapted to the needs of the county, except that it is inadequate from the point of view of quantity. There are several unincorporated cities in which there is need for improvement in sanitation, such as a public water supply, sewerage system, and better control of the milk supply. The legal powers of these villages to pass ordinances, issue bonds, etc., should be investigated. In the absence of such legal authority, the local application of county ordinances might be considered. Such sanitary measures might be developed as private enterprises in the absence of authority for public expenditure.

*Recommendations.*—1. An increase in the intensity and an extension of the general sanitation program now being pursued. See also "Summary and Major Recommendations" regarding personnel.

2. The development in the small cities of a program more adapted to urban conditions.

3. See also School Hygiene (sanitation).

LABORATORY SERVICE

The county health department is not equipped to perform laboratory examinations of any type. All specimens are sent to a branch laboratory of the State health department, which is operated in conjunction with the Knoxville Bureau of Health laboratory.

*Specimens submitted by county health department*

Water.....	88
Tuberculosis.....	15
Diphtheria.....	2
Syphilis.....	15
Urine.....	132
Feces.....	2
Total.....	254

The records of the State branch laboratory show that 2,795 specimens were received from Knox County. The type of specimens was not ascertained.

*Comments.*—Laboratory service was allowed 50 out of a possible 70 points. While the records of the State laboratory show that more than the required number of specimens were examined for Knox

County, a deduction is made because of the failure of the health department to use the laboratory. From the above table it will be noted in particular that the laboratory was not used in the diagnosis and control of typhoid fever and only twice for diphtheria. In the section dealing with communicable disease control mention was made of the failure to use the laboratory.

*Recommendations.*—1. Greater use of laboratory by health department, especially for the control of communicable diseases.

2. Immediate reporting by State branch laboratory to county health department of all positive communicable disease examinations.

3. Annual report by State branch laboratory to county health department of all specimens by type and purpose of examination.

#### POPULAR HEALTH INSTRUCTION

The county health department distributes literature supplied by the State health department. The material obtained from the State health department has been insufficient in amount and some of it is not up to date. This deficiency, however, is being corrected, since all bulletins and leaflets are being revised and printed in liberal quantities.

The use of motion pictures and slides is confined to those obtained from the State health department. Because of the heavy statewide demands on this equipment, the use of motion pictures has been limited to 10 showings, which were attended by 1,525 persons.

The health department prepares a monthly statistical and short narrative report. One copy is sent to the State health department and a copy is filed with the county court. A summary of the monthly report and occasional news notes appear in the Knoxville newspapers only, as there are no other newspapers in the county. Members of the department gave 143 lectures, which were attended by 12,036 persons. One exhibit was prepared and placed at the East Tennessee fair.

*Comments and recommendations.*—Popular health instruction received 10 out of a possible 20 points. The small budget has made it necessary for the local health department to depend on the State for most of its material.

A county of the size and wealth of Knox County should develop its own material and not depend to such an extent on the State health department.

The monthly report prepared by the health department should be summarized in a manner suitable for popular consumption and should be given wide distribution. An annual report of a formal character should be compiled and it, too, should be summarized and widely circulated. The publicity director of the State health department should be consulted concerning the whole subject of popular health instruction.

## Summary and Major Recommendations

## SUMMARY

Knox County is a well-developed, agricultural county in east Tennessee. The population of the county, exclusive of Knoxville, is 50,093. The taxable wealth, including Knoxville, is \$103,125,470, and the tax rate is \$1.25 on each \$100 valuation. The county taxes the city of Knoxville but does not assume any part of the financial burden for city government or city services.

Organized, full-time health service was started in Knox County on July 1, 1928. The present personnel of the county health department consists of 1 medical health officer, 2 public health nurses, 1 sanitary officer, and 1 clerk, all serving on a full-time basis. The total cost of this service is \$14,500, of which \$9,500 is appropriated by the county and \$5,000 is contributed by the State health department. The total per capita expenditure for public health is 28.4 cents, but the per capita expenditure for this service by the county proper is 18.9 cents, which represents a tax of nine-tenths of a cent on each hundred dollars valuation. The exact expenditure for the care of the sick poor by the county physician was not ascertained, but in all probability it does not exceed the expenditure for public health.

The county contributes \$45,000 for the support of the Beverly Hills Sanatorium. Thus it will be seen from the data presented in the body of this report that the public expenditures in Knox County for health and care of the sick are both inadequate and unevenly distributed, since more is spent for the hospitalization of a single disease causing about 10 per cent of the mortality than for the prevention and treatment of all other diseases.

Public-health service has been rated according to the Appraisal Form for Rural Health Work developed by the American Public Health Association. The total points allowed by the Appraisal Form in a perfect score and the score attained by Knox County are given in the following table:

*Knox County score by the appraisal form*

Item of service	Appraisal form allowance	Knox County score	Per cent
Vital statistics.....	60	18.0	30.0
Communicable-disease control.....	175	101.8	58.2
Veneral-disease control.....	50	7.5	15.0
Tuberculosis control.....	100	63.0	63.0
Prenatal hygiene.....	75	46.3	61.7
Infant hygiene.....	75	5.7	7.6
Preschool hygiene.....	50	23.0	46.0
School hygiene.....	150	56.3	37.5
Sanitation (food, milk, water, sewerage).....	175	98.0	56.0
Laboratory.....	70	50.0	71.4
Popular health instruction.....	20	7.0	35.0
	1,000	476.6	47.6

The score attained is 476.6 points out of a possible 1,000 points. This score, while low in comparison with accepted standards, is indicative of more service than might be expected from the expenditure. In a measure the disparity between score and expenditure is due to special effort on the part of the health department personnel, but to a greater degree it is due to the fact that many citizens take advantage of facilities provided by Knoxville.

The program of the Knox County health department has been concentrated on three activities, viz, examination of school children, immunization, and construction of sanitary privies. While other activities are included in the program, they have not been developed to the same degree as those mentioned.

Emphasis on the examination of school children may be justified in the beginning as a means of quickly reaching a large percentage of the population. In the future greater good to the individual child will probably come by spending a corresponding effort on younger children and by limiting school work to those children in need of special attention. Immunization and improvement of methods of excreta disposal are fundamental, but the work in immunization, especially against diphtheria, should be concentrated on the younger children.

Some improvement in practice as well as in score should result from better record keeping. This change need not await an expansion of the personnel.

No great improvement in the service or increase in the score can be expected without an increase in personnel and expenditure. Knox County should rapidly expand its service to the point where at least \$1 per capita is being spent for health protection. The personnel of the health department should consist of not less than two medical officers, six public health nurses, two sanitary officers, and two clerks.

The service of the health department will be impaired in its effectiveness unless there is a corresponding development of medical service for those unable to purchase such service. In the development of facilities for medical service, special attention should be given to venereal disease clinics, hospital care of communicable diseases, prenatal and obstetrical service, dental care, and facilities for the correction of the common physical defects of children. It will probably prove more economical for the county to contract with the city of Knoxville for many of these clinical services.

A grave defect in the plan of public health service is the absence of any organized method whereby the health department can be interpreted to the general public. The health department is likewise handicapped in not being able to obtain a true expression of public opinion at all times. Until this situation is remedied, health work will

encounter difficulty in holding its place among the established and accepted public services.

#### MAJOR RECOMMENDATIONS

1. Increase in funds and personnel of the health department.
2. Improvement in records and reports.
3. Concentration on young children of work in child hygiene, immunization, and tuberculosis control.
4. The establishment of permanent health centers in at least three sections of the county.
5. An increase in the availability of medical service, especially those services which supplement the work of the health department.
6. The development of some plan of public relations whereby health will become more definitely integrated with the general program of public service and community improvement.

---

### A TECHNIQUE FOR ADJUSTMENT OF pH OF HANGING DROP TISSUE CULTURES

By W. R. EARLE, *Cytologist, Division of Pharmacology, National Institute of Health, United States Public Health Service*<sup>1</sup>

#### INTRODUCTION

One point which is a constant source of difficulty to users of the tissue culture technique is the maintenance of a constant hydrogen-ion concentration in the culture medium. While this can be overcome by buffering the solutions heavily with phosphates, it must be recognized that for much work a less abnormal, and consequently more desirable, method lies through the use of carbonates as buffers. One instance of this has been especially clearly demonstrated by the work of Warburg, Posener, and Negelein (1), who have shown that in the absence of sufficient amounts of carbonates the glycolysis of many cells is tremendously inhibited.

Bicarbonates have indeed been generally used as buffer salts in the various media used in tissue culture, but this use has raised difficulties, owing to the rapid loss of CO<sub>2</sub> from the solutions of these salts, with a resultant rapid drift of the reaction of the solution toward alkalinity. An example of this may be cited from our own work. A series of cultures was planted in hanging drops of plasma and embryo juice, each culture containing a little phenol red. The initial pH of the

---

<sup>1</sup> The experimental work reported in this paper is part of an investigation into the nature of cancer, which is in progress in the division of pharmacology of the National Institute of Health. This work has been carried on under the supervision of Prof. Carl Voegtlin, chief of the division of pharmacology, to whom the author wishes to express his appreciation for suggestions and criticisms. The author wishes also to express appreciation of the valuable technical assistance of Mr. E. L. Schilling in carrying on this work.

cultures, as shown by the phenol red, was approximately 7.0, but after two hours' incubation at 38° all the cultures had drifted to approximately pH 8.1-8.4, owing to the loss of CO<sub>2</sub> from the solution.

Under such conditions as these, for the proper use of the bicarbonate buffer system for the maintenance of a constant pH level, it appears essential that some means be devised for increasing the pressure of CO<sub>2</sub> in the gaseous phase overlying the culture fluid. This has been attempted by several observers but has, in such instances, necessitated the use of special culture dishes and, in some instances at least, has not been applicable to conditions under which the living cells could be subjected to critical microscopic study with facility.

Probably the simplest of these techniques, and at the same time one of the most satisfactory from the point of view of microscopic study of the cells, is that of Carrel (2). In this technique a circular metal ring of 5 cm. diameter and 1 cm. depth is used. The top and bottom openings of this ring are closed by sheets of mica sealed on with paraffin. In the dish so formed, the cultures are mounted in hanging drops adherent to the inner surface of one of the mica slips. Four such cultures are planted in each dish, together with a single hanging drop of medium containing a little phenol red. The pH of the cultures is then adjusted by blowing the expired air from the lungs (rich in CO<sub>2</sub>) through a small side aperture in the dish until the suspended drop of phenol red and medium shows the desired pH. The side aperture is then sealed, the CO<sub>2</sub> from the expired air serving to hold the pH of the hanging drops of culture medium at the proper level.

In the course of certain work concerning the influence of the hydrogen-ion concentration on cell metabolism, a technique has been worked out in this laboratory for cultivating cells in hanging drops *in vitro*. This technique appears to offer certain advantages over various existing procedures, as follows: (1) No special culture dishes are needed; the hanging drop is incubated on cover slips sealed to the usual hollow-ground slides. (2) The accessory apparatus needed is simple and may be constructed in almost any laboratory. (3) The technique is rapid of operation and allows of planting and maintaining a series of 25, or even more, cultures under comparable conditions of pH and CO<sub>2</sub> tension. (4) The cultures may be handled and examined with the same facility with which regular hanging drop cultures mounted on hollow-ground slides may be examined.

#### MATERIAL AND METHODS

In this technique hanging drop cultures were prepared on mica slips and were sealed to hollow-ground slides in the usual manner; the only difference was that through the seal of each culture there projected a small glass capillary tube. As they were prepared the

cultures were laid face down on a wet towel to prevent drying. When the whole series had been planted, the cultures were placed in a sealed vacuum desiccator fitted with a gas stirring device. The vessel, together with the contained slides, was then partially evacuated. An amount of  $\text{CO}_2$  necessary to produce the pH desired was then run into the vessel, after which air was run in until the desiccator was at atmospheric pressure. The stirring device was run all the while. The result was that the mixture of  $\text{CO}_2$  and air was sucked back into the chambers of the hollow-ground slides and so adjusted the pH of the hanging drop. The slides were then left for 20 minutes for equilibrium to be reached, after which the equilibration vessel was opened and the capillary tube of each slide was rapidly sealed with a drop of vaseline. The slides were examined and incubated in the usual manner.

The materials used in the technique may be summarized as follows:

The slides used were approximately 75 by 40 by 3.5 mm. in size. The diameter of the concavity of each slide was 27 mm., and the depth was approximately 1.8 mm.

The coverslips used were of mica, approximately 35 by 50 mm. in size. Care was taken in the selection of cover slips that were free from cracked or split areas, as it was found that these often allowed a leakage of gas sufficient to produce a marked change of pH even though no signs of leakage of culture fluid could be found on casual examination.

The capillary tubes used were readily drawn down from a larger size of tubing. This was a 5-mm. diameter Pyrex tubing with a 1-mm. bore. Using this sized tubing, and heating it with a large burner of the Meker type, it was found that a capillary approximately 16 to 24 inches in length gave the diameter desired. Each capillary was then examined by running the fingers along it to detect uneven places. Such uneven places were discarded. A short piece was then broken off from each end of each capillary and examined from the end by means of a low-power binocular microscope, and the diameter of the bore was measured by means of an eyepiece micrometer. In this way capillary tubing of an internal diameter of from 0.1 to 0.25 mm. was selected. This was then broken up into 25-mm. lengths and sterilized by dry heat.

The vaseline used for the inner seal on the slides was a very heavy grade of yellow petroleum jelly.

Commercial paraffin of about 56° m. p. was used.

Commercial  $\text{CO}_2$  sold in cylinders was used. The cylinder of gas was used with the usual type of pressure-reducing valve.

As an equilibration vessel for the slides during the process of adjustment of the  $\text{CO}_2$  tension, a heavy wall desiccator of 10 inches internal diameter was used. The desiccator had a tubulature through the lid. This tubulature was closed with a rubber stopper, through which passed two stopcocks, as shown in Figure 1.

The stirring device used in this vessel, though made from materials at hand, has proved very satisfactory. It consisted of an electric bell, from which the gong, clapper, and frame had been removed, while to the clapper bar a "flapper," or fan, of cardboard about  $1\frac{1}{2}$  inches square had been fastened by means of sealing wax. The whole machine was bolted to a strip of metal 2 inches long and one-half inch wide. The upper end of this metal strip was then fastened to the inside surface of the rubber stopper, which closed the tubulature, by means of a small wood screw which passed through a hole in the metal strip and screwed directly into the rubber stopper. Electrical connections for the stirrer were passed through the rubber stopper by means of two small steel needles pushed through the stopper and connected on the inside of the jar with wires running to the coils of the stirrer. Connections were made to these needles, outside the vessel, by means of wires to the end of which small "bull dog" artery clamps were soldered. In order to eliminate sparking at the contact point of the armature, with consequent production of ozone, a third connection was run through the rubber stopper. This joined the stationary armature contact point of the gas stirring device, inside the jar, while outside the jar it was connected to one terminal of a condenser of 4 mf. capacity. The other terminal of the condenser was connected to one of the wires running direct to the coil of the stirring device.

In equilibrating the cultures with a mixture of carbon dioxide and air, it is essential that these gases be saturated, or at least almost saturated, with water vapor, otherwise the evaporation of water from the medium on the slides would be so great as to injure the cultures. In order to insure the saturation of the gases, two trains of "saturation bottles" were used, one train for each gas. Each train consisted of four bottles, each with inlet and outlet tubes, and with a glass stopcock. The arrangement in each bottle was designed so as to make the gas pass over as large a moist surface as possible in order to insure rapid saturation with water vapor. To accomplish this, the lower end of the inlet tube in each bottle was fitted to the tube of a  $1\frac{1}{2}$ -inch diameter funnel, the mouth of which reached to within  $1\frac{1}{2}$  inches of the bottom of the jar. Around this funnel 10 layers of loosely woven cheesecloth were tied, through which the gas had to pass. The jar was filled with water to such a level that this cheesecloth was just below the water surface. Further, from the top of each jar a strip of cheesecloth 6 inches wide and 24 inches long was suspended by means of a pin through its ends. The cheesecloth was wadded into the jar so that it dipped below the surface of the water but so that most of its bulk was loosely packed above the level of the funnel mouth and provided a large moist surface over which the gas had to pass. When necessary, water was added through the stopcock with which each jar was fitted. These jars were all stoppered with

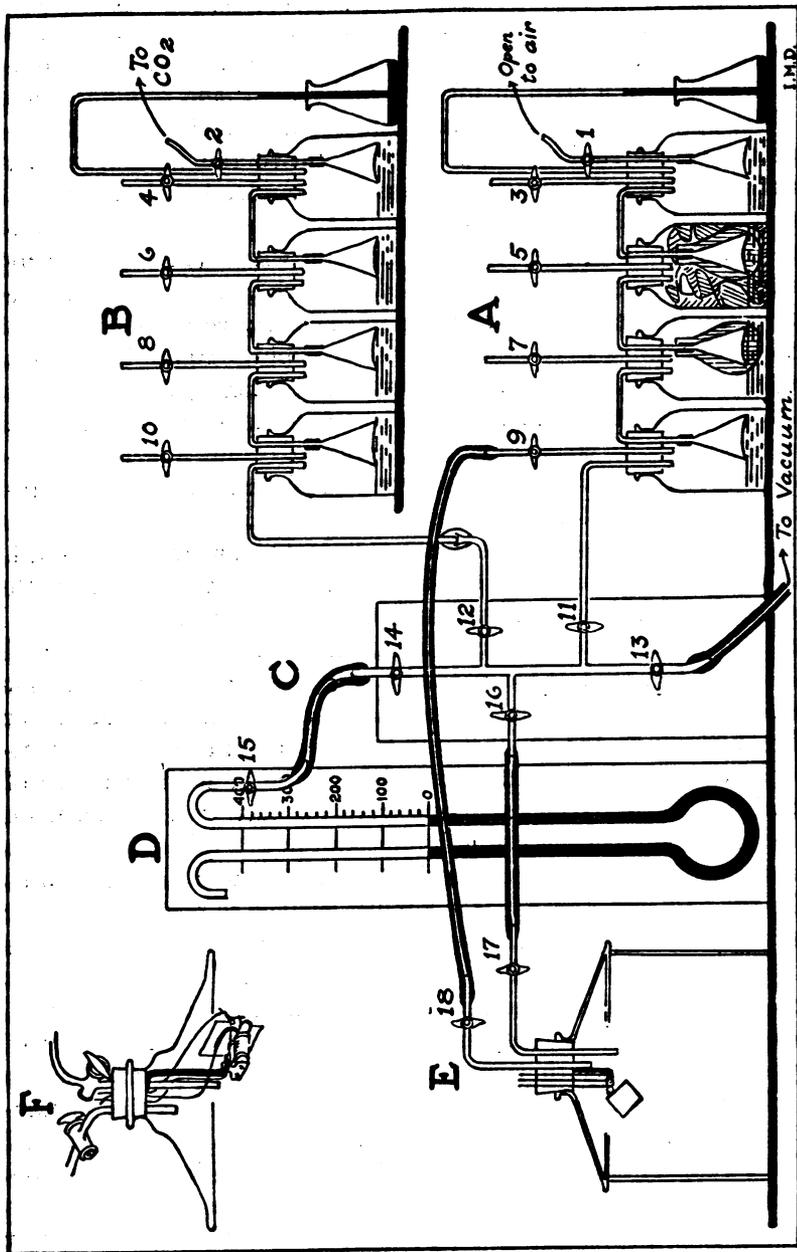


FIGURE 1.—Diagram of equilibration apparatus. A and B are the "saturation trains," to saturate the air and CO<sub>2</sub> used, with water vapor. In jar 7 is shown the arrangement of the cloth wrapped around the funnel, while in jar 5 the arrangement of the loosely packed cloth in the jar is also shown. C is the manifold, D the manometer, and E the equilibration vessel. More detail of the gas mixing device on the equilibration vessel is shown in the insert F

rubber stoppers; and when the connections were all completed, the outside of the rubber stopper and the top of the jar were covered with hot sealing wax. In addition, each train of jars was fitted with a combined vacuum gauge and safety valve, as shown in Figure 1.

It may be noted that all stopcocks used in this and other parts of the apparatus were of Pyrex glass, as a good deal of trouble was experienced with stopcocks of softer glass, due to leakage.

After having passed through the "saturation bottles" the gas was controlled through a manifold which had connections for the tubes leading from the "saturation bottles," manometer, and vacuum, and an outlet leading to the equilibration vessel. The construction of this manifold may be seen from Figure 1. A source of vacuum that would exhaust to about 300 mm. of mercury was used.

After setting up the apparatus the "saturation trains" were well flushed out with their respective gases and then sealed off. Just preceding use they were again flushed out for a minute or so, using a fairly rapid stream of gas.

The procedure in the preparation and equilibration of the cultures may be outlined as follows:

Just preceding the planting of the cultures each slide to be used in the preparation of the cultures was taken, and on one end of the slide a capillary tube was laid. The length of the tube ran approximately parallel with the length of the slide. One end of the tube projected over the concavity of the slide about 2 mm. Then, by means of a pipette filled with melted vaseline,<sup>2</sup> a heavy ring was laid down around the concavity of the slide and run over the capillary tube. This ring was a little thicker than the external diameter of the capillary tube. As these slides were prepared they were placed, face down, in a sterile tray designed to hold them.

The hanging drop of culture medium was placed on a sterile mica slip and spread out over a circular area of about 10 to 12 mm. The cell clump was planted in this area and the culture was then covered by one of the slides, prepared as described. Care was taken to see that the internal end of the capillary tube did not touch the drop of medium. The slide was then pressed down on the culture, gently and evenly, so that the vaseline made firm contact with the mica on all sides.<sup>3</sup> The culture so prepared was then laid over on a very damp towel, face down. This damp towel served to prevent evaporation from the slide during the time the other cultures of the series were being planted.

---

<sup>2</sup> Care should be taken to heat vaseline, or paraffin, which might come in contact with the culture medium, as little as possible, as with excessive heating it splits down with the liberation of substances which cause the death of the cells.

<sup>3</sup> Later work with this technique has shown that a more satisfactory seal can be made by making one vaseline ring on the slide, as above detailed, and another similar ring on the mica coverslip, and then pressing the slide down on the coverslip, so uniting the two vaseline rings.

Several control slides, each containing a drop of medium plus a little phenol red, were also planted.

Following the completion of the planting, each culture was sealed by having a coating of melted paraffin layered around the edge of the coverslip.<sup>4</sup> Care was taken at this stage to make sure that no large bubbles of air were left between the vaseline and paraffin seals, as such bubbles were sometimes found to break through the vaseline seal and cause leaks.

Several pads of gauze, each about 5 cm. square, were next soaked with water. A total of 10 c. c. of water was used. These pads were distributed along the internal surface of the wall of the equilibration jar, and adhered to the wall by their contained moisture. The slides were then stacked in the jar. In this process care was taken that the capillary tube of each slide was free from any obstruction which might be offered by other slides. The most convenient form found for this stacking was a series of "staggered" piles of slides, with the capillary tube of each slide projecting clear. The equilibration vessel was then closed and sealed. Vaseline was found satisfactory as a sealing agent. The two stopcocks of the desiccator were then connected by rubber pressure tubing with cocks 9 and 16, respectively, as shown in Figure 1. These tubes were as short as possible for convenient manipulation. Electric connections were then made to the three needles projecting through the rubber stopper of the equilibration jar, and the mixing device within the jar was set in operation.

Moist air was then drawn through the equilibration jar, in order to displace as much as possible of the unsaturated air in the jar. This was done by opening cocks 1, 9, 18, 17, 16, 14, and 15, and by controlling the flow by means of cock 13. This was continued for about three minutes, during which time the flow was rather rapid. Cocks 13, 9, and 18 were then closed.

The equilibration jar was then exhausted 300 mm. in pressure. This was done slowly, so that the process took about three or four minutes, as rapid exhaustion often caused leaks to show up later in the cultures. This exhaustion was carried on by opening cock 13. When this exhaustion had been accomplished cocks 13 and 16 were closed.

The manifold of the apparatus was then flushed out for about one minute with CO<sub>2</sub>. To do this cocks 2 and 12 were opened, while the flow was controlled by cocks 2 and 13. Cocks 13 and 12 were then closed. The pressure of gas in the manifold was then lowered to that in the equilibration jar. This was done by use of cock 13.

---

<sup>4</sup> Later work with this technique has shown that a far more satisfactory sealing agent than pure paraffin can be made by dissolving about 2 to 4 per cent of pure white crepe rubber in paraffin. This was done by cutting the rubber very fine and heating it, with constant stirring, with the paraffin, at about 150° for about an hour. This mixture was applied to the slides, by means of a pipette, very hot, so that it ran easily under the coverslip, but not so hot that it would melt through the inner vaseline seal and come in contact with the culture medium.

Cock 16 was then opened, and by regulating the flow of gas by means of cock 12 the proper number of millimeters pressure of CO<sub>2</sub> was run into the equilibration chamber. Cocks 16 and 12 and 2 were then closed.

The gas manifold was then flushed out with air. This was done by opening cocks 1 and 11, and by controlling the flow by means of cock 13. Cocks 13 and 11 were then closed.

The pressure in the manifold was then lowered to that in the equilibration jar. This need be only very approximate, and in practice the pressure in the manifold has generally been set somewhat higher than that in the jar. This was done by means of cock 13. This cock was then closed.

Air was then slowly run into the equilibration vessel until the pressure in the vessel was atmospheric. This was done by opening cock 16 and controlling the flow by means of cock 11. All cocks were then closed; cocks 11, 16, and 17 were closed first and in the order given.

With the mixing device running, the equilibration jar was then left for 20 minutes. Following this period of equilibration the jar was reopened, and then, without delay, a drop of melted vaseline was placed on the exposed end of the capillary tube on each slide. This made a satisfactory seal, but was a little troublesome to handle, as the vaseline was soft. For the sake of convenience in handling, this drop of vaseline was covered by several drops of melted paraffin. Once this external seal was applied, the cultures could be handled in the same manner and with almost the same facility as the regular hanging drop cultures.

#### DISCUSSION

We have found this method of equilibrating hanging drop cultures fairly rapid. In running a series of 50 cultures the preparation of slides and the actual planting of the cultures was probably slowed down about 15 minutes, while after the cultures are planted they were equilibrated and sealed in about 45 minutes. Once the equilibration apparatus was set up it took but little care.

This method of adjustment of the pH of the cultures has the objection that, theoretically at least, the gases to which the unsealed slides are exposed, while largely saturated with water vapor, are probably never completely saturated, and therefore there must be at least some evaporation from the hanging drop cultures. In order to get some idea of the rate of evaporation from the cultures during the process of equilibration the following test was made:

Into each of two shallow weighing bottles, each having a diameter of 4.8 cm., 10 c. c. of water was measured. Each bottle with its contents was then weighed and the weights were recorded. Following this, one of the bottles was left open in the room for one hour; the other was placed inside the equilibration chamber and exhausted

500 mm. The vacuum was slowly released and the vessel was then left to equilibrate for one hour. At the close of that time each bottle, with its contents, was weighed. The bottle exposed to the air of the room showed a loss, by evaporation, of 0.4063 gm., while the one subjected to the extreme form of equilibration process showed a loss of only 0.0346 gm. Inasmuch as this represented the evaporation of water from a surface of approximately 18 sq. cm., the evaporation from a surface of 1 sq. cm. would have been approximately 0.002 gm. If it be considered that in the equilibration process all evaporation from the cultures, other than that needed to saturate the air within the chamber of the slide, must pass through a capillary tube having a maximum bore area of 0.00049 sq. cm., and a length of 25 mm., the small amount of evaporation which would take place from each slide is readily apparent.

As a final check on any damage which any part of the process of preparation and equilibration might have caused to the cultures, a number of series of cultures of chick heart, from chicks of eight days' incubation, were set up in plasma and embryo juice. In each of these series some of the cultures were sealed at once, while others were equilibrated by the process under discussion to a pH of approximately 7.6. Each series was run approximately five to seven days. In no instance was there any sign of damage to the equilibrated cultures, and in most of the cultures examined the growth of the equilibrated cultures was markedly better than that of the cultures sealed at once.

Several sizes of capillary tubes have been tried and the size above mentioned has been adopted as being most satisfactory. Some tubes of 0.05 mm. diameter were tried, but these gave very irregular results, whereas with extremely large-sized tubes, after the gas mixture has been run into the slides, and the equilibration vessel has been opened, the interval of time required to seal the series of 30 slides sometimes allowed so much CO<sub>2</sub> to diffuse out through the tube that the pH in the last cultures of the series was altered. Using the tubes of the size specified, no difference in the pH of slide 1 and slide 30 of the series of slides examined has been noted. This has been the longest series of slides so far studied by this method.

While the process of preparation of these tubes appears rather laborious, it has been found that with a little practice about 100 tubes could be made in an hour. Once made they may be used over and over after proper cleaning.

After having worked out an approximate pH calibration curve for the culture medium used, by equilibration of various lots of the medium with different tensions of CO<sub>2</sub> by means of the apparatus under discussion, little trouble was experienced in setting the pH of a series of cultures approximately to any pH level desired within the range of pH 7.0 and 8.0. This range is the only one which has so far

been examined, but it could certainly be extended if desired. Further, if it is desired, correction may easily be introduced for barometric pressure, although where it has not been necessary to set the pH precisely at one exact level, this has not been done. No special precautions have been necessary for temperature control, other than that of using the apparatus in a room the temperature of which was about 23° C.

In order to test the accuracy that might be expected of the adjustment of the pH in the cultures of any one series equilibrated by this

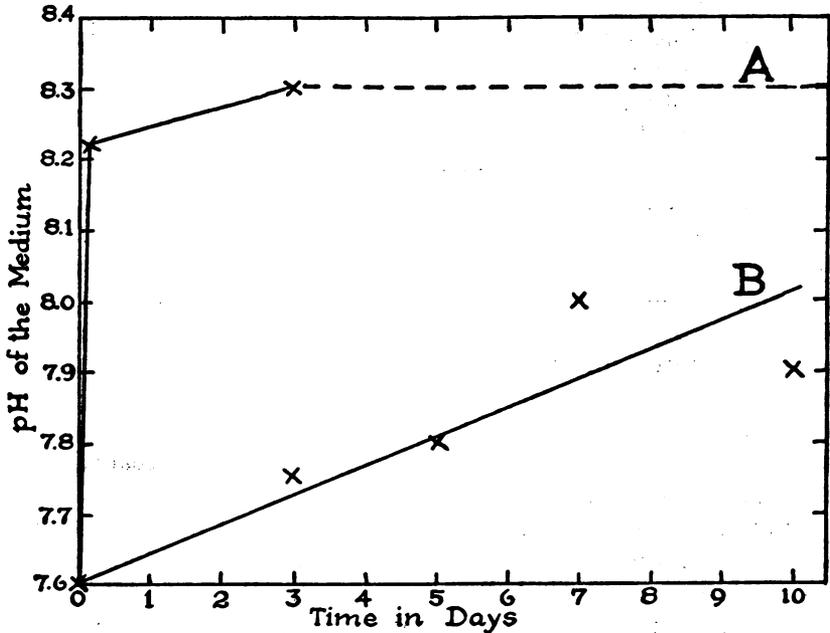


FIGURE 2.—Curves showing the change in the pH of two types of hanging drop preparations of culture medium. The medium used in these preparations was Tyrode solution, which contained 1 g. sodium bicarbonate per liter. Curve A shows the pH drift in a hanging drop mounted on a culture slide and sealed in the usual manner. The Tyrode solution used in this preparation had first been brought to a pH of 7.6 with dilute HCl, and was at this pH when the preparation was made. The dotted portion of the curve was beyond the alkaline limit of the pH indicator used, and could merely be approximated as alkaline to pH 8.2. Curve B shows the drift in a similar drop of Tyrode solution, to which no HCl was added, but which was mounted and treated by the equilibration technique described in the text

technique, several series of preparations containing hanging drops of medium plus phenol red were set up and examined. No tissue was added to such preparations. Neither at the time the preparations were completed nor later has a variation of more than 0.2 in pH between the different slides of a series been found at any one time, except in those few slides that showed obvious leaks. For the slides of any one series the drift of pH in the preparations as a function of time was generally about 0.2 in 5 days. A graph showing the drift of one representative series of preparations is shown in Figure 2.

A preliminary attempt has been made to adapt this technique to the use of flask cultures. In this attempt the regular Carrel D flasks were used, and the mouth of each flask was closed with a rubber stopper through which a capillary tube passed. This allowed the contents of the flask to be equilibrated by the general process above outlined for hanging drop cultures on slides. Our data on this subject are, however, not sufficiently complete to allow us to give the exact details of the process and the precautions necessary.

#### BIBLIOGRAPHY

- (1) Warburg, O., Posener, K., and Negelein, E.: Ueber den Stoffwechsel der Carcinomzelle. *Biochem. Zeitschr.* (1924), **152**, 309.
- (2) Carrel, Alexis: La technique de la culture des tissus en goutte pendante. *Compt. rend. des Séances de la Société de Biologie* (1929), **102**, 742.

### COURT DECISION RELATING TO PUBLIC HEALTH

*Certain statutory provisions concerning narcotic drugs held repealed by implication.*—(Montana Supreme Court; *State v. Brennan*, 300 P. 273; decided Apr. 25, 1931.) The defendant was convicted of selling morphine hydrochloride and his punishment was fixed at 10 years' imprisonment in the State prison and a fine of \$3,000. On appeal, the supreme court stated that the principal question necessary for determination was which of certain sections of the Revised Codes of 1921 was controlling.

By an act of 1895 (sec. 11239 of the Revised Codes of 1921) the sale or disposition of "any morphine, opium, cocaine, chloral-hydrate, or any of their compounds" was regulated. Punishment for violation of the act was a fine not exceeding \$200.

In 1911 the legislature passed a law (secs. 3186-3188 of the Revised Codes of 1921) regulating the sale, furnishing, or disposition of "any opium, morphine, alkaloid-cocaine, or alpha or beta eucaine, or codeine or heroin, or any derivative, mixture, or preparation of any of them." Violation of this law was made punishable by a fine of not less than \$50 nor more than \$500, or by imprisonment in the county jail for not less than 60 days nor more than 100 days, or by both such fine and imprisonment.

By a 1921 enactment (secs. 3189-3202 of the Revised Codes of 1921) it was made unlawful "for any person to sell \* \* \* at retail, or to a consumer, opium or coca leaves, or any compound, manufacture, salt, derivative, or preparation thereof, \* \* \* except upon the original written prescription of a duly licensed physician." Section 3202, prescribing the penalty for violation of the act, was amended in 1925, and, as amended, made the unlawful possession or control of

any of the drugs mentioned in the law punishable by a fine of not less than \$500 nor more than \$3,000 and by imprisonment in the State prison for not less than one year nor more than five years. The unlawful disposition of any of the drugs to a person over 18 years of age was made punishable by a fine of not less than \$1,000 nor more than \$3,000 and by imprisonment in the State prison for not less than five years nor more than ten years, while the unlawful disposition to a person of 18 years or under was made punishable by imprisonment in the State prison for not less than five years nor more than life. In 1927 the legislature amended section 3186 by adding marihuana (*Cannabis indica*) to the drugs mentioned in said section, but the penalty was not changed. In 1929 section 3186 was again amended, but in unimportant particulars so far as the instant case was concerned.

In discussing the drugs mentioned in section 3186 the supreme court said:

\* \* \* Opium is defined as a drug consisting of the inspissated juice of the opium poppy; morphine, the principal alkaloid of opium, therefore, is in some manner manufactured from opium. Cocaine is an alkaloid obtained from coca leaves; it is commonly called "cocaine," but technically "alkaloid-cocaine." In section 3186 reference is next made to "alpha or beta eucaine"; eucaine is "eucocaine," "eu" being a prefix signifying "well, good, advantageous"; clearly it is derived from cocaine; it has two distinct forms "a" and "b" (Alpha and Beta) and is used in the form of hydrochlorides. Codeine is an alkaloid associated in opium with morphine; therefore, extracted in some manner from opium. Heroin is a derivative of morphine, which in turn comes from opium. See Webster's Int. Dictionary. Therefore every drug mentioned in section 3186 is obtained in some manner from opium or coca leaves, and the courts take judicial notice of the fact that morphine is a derivative of opium. *State v. Vallie*, 82 Mont. 456, 268 P. 493.

The court then stated that the legislature in the 1921 act (secs. 3189-3202) dealing with "opium or coca leaves, or any compound, manufacture, salt, derivative, or preparation thereof," included every drug mentioned in section 3186 and clearly intended to enact an entirely new and more drastic law upon the subject, and that "when it did so, section 3186 was thereby repealed in toto." The court also stated that it was manifest that the legislature intended that, from the date of the 1921 act, the violation of the prohibition against traffic in narcotic drugs should be a felony instead of a misdemeanor as theretofore, and that, as the 1921 act entirely superseded and repealed the 1911 act, section 3202, the penalty section of the 1921 act repealed section 3188, the penalty section of the 1911 act.

In the case of *State v. Mah Sam Hing*, 295 P. 1014, decided February 2, 1931, the court had said that the 1927 and 1929 amendments to section 3186 superseded section 3189. With regard to such statement the court said: "In this we were wrong." After reference to a statutory provision declaring that "an act amending a section of an act

repealed is void," the court declared that both the 1927 and 1929 acts were void, since they attempted to amend section 3186 which had been impliedly repealed by section 3189.

One of the defendant's claims was that the information was faulty because it did not charge that the morphine decoction was not sold upon a duly licensed physician's or veterinarian's prescription. The statute recognized an exception where morphine was so sold. But it was held that there was no merit to this contention, as section 3200 specifically provided that it should not be necessary to negative any of the exceptions stated in the statute, the burden of proof as to his coming within the exceptions resting upon the accused person.

The claim that the information was defective because it contained no statement as to the age of the purchaser of the morphine was also rejected. The court said that the defendant should not be heard to complain since the trial court had instructed the jury respecting the maximum and minimum penalty prescribed for making an unlawful sale of morphine to a person over 18 years of age and had said nothing respecting the more severe penalty. "Since the punishment meted out to the defendant," said the court, "was less than the penalty prescribed for a sale of such drugs to a person under 18 years of age, and within the limits prescribed for a sale to a person over 18 years of age, the rights of the defendant were in no manner affected injuriously."

The judgment of the trial court was affirmed.

## DEATHS DURING WEEK ENDED AUGUST 1, 1931

*Summary of information received by telegraph from industrial insurance companies for the week ended August 1, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*

	Week ended August 1, 1931	Corresponding week, 1930
Policies in force.....	75, 015, 314	75, 961, 722
Number of death claims.....	12, 678	13, 785
Death claims per 1,000 policies in force, annual rate.....	8. 8	9. 5
Death claims per 1,000 policies, first 31 weeks of year.....	10. 2	10. 0

Deaths<sup>1</sup> from all causes in certain large cities of the United States during the week ended August 1, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Aug. 1, 1931				Corresponding week, 1930		Death rate <sup>2</sup> for the first 31 weeks	
	Total deaths	Death rate <sup>2</sup>	Deaths under 1 year	Infant mortality rate <sup>2</sup>	Death rate <sup>2</sup>	Deaths under 1 year	1931	1930
Total (82 cities).....	7,305	10.7	618	48	10.9	665	12.6	12.5
Akron.....	39	7.9	8	79	6.3	3	8.0	8.1
Albany <sup>3</sup> .....	37	14.9	4	79	11.4	4	14.4	15.3
Atlanta.....	62	11.6	6	61	11.3	7	15.8	16.6
White.....	31		3	48		3		
Colored.....	31	( <sup>9</sup> )	3	86	( <sup>9</sup> )	4	( <sup>9</sup> )	( <sup>9</sup> )
Baltimore <sup>4</sup> .....	220	14.1	21	71	15.8	23	15.2	14.6
White.....	171		16	69		14		
Colored.....	49	( <sup>9</sup> )	5	78	( <sup>9</sup> )	9	( <sup>9</sup> )	( <sup>9</sup> )
Birmingham.....	60	11.6	6	60	13.8	14	14.3	14.4
White.....	27		6	103		10		
Colored.....	33	( <sup>9</sup> )	0	0	( <sup>9</sup> )	4	( <sup>9</sup> )	( <sup>9</sup> )
Boston.....	191	12.7	19	54	10.8	10	14.9	14.8
Bridgeport.....	28	9.9	4	66	7.1	1	11.7	11.9
Buffalo.....	129	11.6	17	69	10.9	12	13.8	13.5
Cambridge.....	22	10.1	0	0	9.6	0	12.8	12.4
Camden.....	30	13.1	4	70	14.1	5	14.9	14.3
Canton.....	26	12.7	3	69	10.4	2	10.7	10.6
Chicago <sup>5</sup> .....	673	10.1	55	49	9.7	54	11.4	10.9
Cincinnati.....	120	14.7	16	96	16.6	11	16.6	16.1
Cleveland.....	163	9.3	20	58	8.5	12	11.7	11.7
Columbus.....	70	12.4	3	29	15.2	9	14.4	16.8
Dallas.....	49	9.4	6	29	14.1	5	11.9	12.0
White.....	34		3	3		5		
Colored.....	15	( <sup>9</sup> )	3		( <sup>9</sup> )	0	( <sup>9</sup> )	( <sup>9</sup> )
Dayton.....	42	10.6	4	56	12.6	4	12.5	10.5
Denver.....	65	11.6	3	29	12.6	10	14.6	14.9
Des Moines.....	35	12.6	2	35	11.7	2	11.8	12.3
Detroit.....	228	7.2	19	30	7.6	22	8.8	9.9
Duluth.....	24	12.3	2	49	6.2	0	11.1	11.5
El Paso.....	31	15.4	4		14.7	6	16.9	18.4
Erie.....	20	8.9	3	56	9.0	0	10.8	11.5
Fall River <sup>6</sup> .....	21	9.5	1	23	9.0	1	12.1	12.8
Flint.....	13	4.1	0	0	8.9	5	7.5	9.5
For: Worth.....	33	10.3	0		10.5	5	11.4	11.4
White.....	28		0			4		
Colored.....	5	( <sup>9</sup> )	0		( <sup>9</sup> )	1	( <sup>9</sup> )	( <sup>9</sup> )
Grand Rapids.....	22	6.7	4	59	8.3	2	9.4	10.9
Houston.....	58	9.8	7		7.9	5	11.5	12.5
White.....	35		6			3		
Colored.....	23	( <sup>9</sup> )	1		( <sup>9</sup> )	2	( <sup>9</sup> )	( <sup>9</sup> )
Indianapolis.....	90	12.7	4	33	13.0	8	14.4	14.9
White.....	83		4	38		5		
Colored.....	7	( <sup>9</sup> )	0	0	( <sup>9</sup> )	3	( <sup>9</sup> )	( <sup>9</sup> )
Jersey City.....	65	10.6	9	80	9.4	5	12.2	12.0
Kansas City, Kans.....	32	13.6	3	62	7.7	1	13.5	11.4
White.....	26		3	74		1		
Colored.....	6	( <sup>9</sup> )	0	0	( <sup>9</sup> )	0	( <sup>9</sup> )	( <sup>9</sup> )
Kansas City, Mo.....	94	12.0	11	83	13.2	10	14.0	13.6
Knorrville.....	21	10.0	2	43	13.7	3	13.1	14.4
White.....	16		2	48		2		
Colored.....	5	( <sup>9</sup> )	0	0	( <sup>9</sup> )	1	( <sup>9</sup> )	( <sup>9</sup> )
Long Beach.....	28	9.6	1	24	12.0	1	10.1	10.1
Los Angeles.....	246	9.7	17	49	9.8	18	11.1	11.4
Louisville.....	56	9.5	9	77	20.3	8	14.9	14.0
White.....	40		5	49		7		
Colored.....	16	( <sup>9</sup> )	4	265	( <sup>9</sup> )	1	( <sup>9</sup> )	( <sup>9</sup> )
Lowell <sup>7</sup> .....	20	10.4	5	127	11.9	1	13.1	14.3
Lynn.....	16	8.1	1	26	11.2	2	10.5	11.3
Memphis.....	68	13.7	7	74	20.5	12	17.0	18.2
White.....	39		3	50		7		
Colored.....	29	( <sup>9</sup> )	4	116	( <sup>9</sup> )	5	( <sup>9</sup> )	( <sup>9</sup> )
Miami.....	21	9.7	2	51	8.5	2	12.4	11.8
White.....	16		2	71		0		
Colored.....	5	( <sup>9</sup> )	0	0	( <sup>9</sup> )	2	( <sup>9</sup> )	( <sup>9</sup> )

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 1, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Aug. 1, 1931				Corresponding week, 1930		Death rate <sup>1</sup> for the first 31 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Milwaukee.....	62	5.5	7	30	8.9	10	9.8	10.1
Minneapolis.....	100	11.0	7	32	10.0	6	12.0	10.9
Nashville.....	52	17.4	7	104	18.6	10	17.3	17.0
White.....	34		5	100		6		
Colored.....	18	( <sup>2</sup> )	2	118	( <sup>2</sup> )	4	( <sup>2</sup> )	( <sup>2</sup> )
New Bedford <sup>3</sup> .....	28	13.0	3	80	6.5	2	13.1	11.7
New Haven.....	52	16.7	4	76	10.3	1	12.7	13.6
New Orleans.....	122	13.6	11	60	13.9	16	17.6	18.2
White.....	67		8	66		13		
Colored.....	55	( <sup>2</sup> )	3	49	( <sup>2</sup> )	3	( <sup>2</sup> )	( <sup>2</sup> )
New York.....	1,387	10.2	106	44	9.0	107	11.9	11.5
Bronx Borough.....	190	7.4	5	11	7.3	9	8.7	8.3
Brooklyn Borough.....	455	9.0	35	37	7.7	40	10.9	10.5
Manhattan Borough.....	535	15.4	49	83	13.3	45	18.1	17.1
Queens Borough.....	160	7.2	13	35	6.1	10	7.7	7.5
Richmond Borough.....	47	15.0	4	72	14.4	3	14.2	14.9
Newark, N. J.....	91	10.6	6	31	9.7	7	12.4	12.8
Oakland.....	41	7.3	1	13	9.5	4	10.8	11.3
Oklahoma City.....	37	9.8	5	69	9.7	7	11.5	10.6
Omaha.....	55	13.2	2	22	16.5	10	14.4	14.3
Paterson.....	32	12.0	3	52	10.2	2	14.1	12.8
Peoria.....	19	9.1	0	0	11.4	6	13.3	12.9
Philadelphia.....	390	10.3	28	41	13.2	60	14.0	13.2
Pittsburgh.....	180	13.9	20	69	12.6	22	15.6	14.5
Portland, Oreg.....	64	10.9	4	49	9.8	0	12.0	12.8
Providence.....	65	13.3	6	55	9.5	2	13.5	13.9
Richmond.....	54	15.3	6	87	14.2	3	16.4	15.6
White.....	29		3	66		1		
Colored.....	25	( <sup>2</sup> )	3	130	( <sup>2</sup> )	2	( <sup>2</sup> )	( <sup>2</sup> )
Rochester.....	52	8.2	6	55	10.1	5	12.4	12.0
St. Louis.....	179	11.3	10	34	14.2	10	16.3	15.0
St. Paul.....	46	8.7	2	21	7.8	1	11.3	10.6
Salt Lake City <sup>4</sup> .....	44	16.1	2	30	10.4	2	12.6	13.0
San Antonio.....	55	11.9	7		12.3	11	15.4	17.9
San Diego.....	37	12.3	3	61	11.2	0	14.2	14.7
San Francisco.....	155	12.4	13	86	13.1	6	13.3	13.4
Schenectady.....	18	9.8	0	0	9.8	2	10.7	11.7
Seattle.....	68	9.3	0	0	8.7	3	11.8	11.2
Somerville.....	9	4.5	0	0	9.0	2	9.6	10.3
South Bend.....	8	3.9	0	0	8.4	1	8.5	9.4
Spokane.....	31	13.9	2	52	8.6	0	12.6	12.8
Springfield, Mass.....	34	11.6	2	31	10.1	1	12.5	12.8
Syracuse.....	47	11.5	4	47	11.4	4	12.2	12.2
Tacoma.....	23	11.1	1	26	12.7	2	12.7	12.8
Toledo.....	56	9.9	4	37	12.0	4	12.5	13.2
Trenton.....	34	14.3	4	70	24.1	3	17.4	17.3
Utica.....	31	15.8	1	26	14.3	2	14.6	15.8
Washington, D. O.....	150	15.9	14	78	15.6	14	16.4	15.8
White.....	86		4	33		4		
Colored.....	64	( <sup>2</sup> )	10	172	( <sup>2</sup> )	7	( <sup>2</sup> )	( <sup>2</sup> )
Waterbury.....	13	6.7	0	0	7.8	0	10.0	10.4
Wilmington, Del. <sup>5</sup> .....	19	9.3	3	65	10.3	2	14.6	14.6
Worcester.....	42	11.1	2	27	9.6	4	12.9	13.6
Youngers.....	21	7.9	1	26	8.1	0	9.0	8.4
Youngstown.....	27	8.1	1	14	10.1	6	10.9	10.5

<sup>1</sup> Deaths of nonresidents are included. Stillbirths are excluded.  
<sup>2</sup> These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.  
<sup>3</sup> Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.  
<sup>4</sup> Data for 77 cities.  
<sup>5</sup> Deaths for week ended Friday.  
<sup>6</sup> For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 15; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.  
<sup>7</sup> Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

# 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 August 8, 1931, and August 9, 1930

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 8, 1931, and August 9, 1930*

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930
<b>New England States:</b>								
Maine.....	1	4		1	3	4	0	1
New Hampshire.....					1		0	0
Vermont.....		1			4	3	0	0
Massachusetts.....	31	35	1		53	56	1	3
Rhode Island.....	5	5			35	6	0	0
Connecticut.....	2	5	2		34	8	2	0
<b>Middle Atlantic States:</b>								
New York.....	58	56	11	13	378	230	12	21
New Jersey.....	12	31	2	1	48	109	3	5
Pennsylvania.....	38	48			154	166	7	4
<b>East North Central States:</b>								
Ohio.....	14	12	1	3	37	9	4	8
Indiana.....	8	13			16	6	3	4
Illinois.....	48	64		1	76	25	4	6
Michigan.....	11	36		1	21	71	3	6
Wisconsin.....	4	11	7	4	86	79	2	2
<b>West North Central States:</b>								
Minnesota.....	3	10	2		5	9	3	2
Iowa.....	3	3			1	1	0	2
Missouri.....	12	17		1	1	17	1	6
North Dakota.....	3				5	1	0	0
South Dakota.....	3	7			1		0	2
Nebraska.....	1	7			1	8	1	0
Kansas.....	6	1	1		10	14	0	1
<b>South Atlantic States:</b>								
Delaware.....	1	2			1		0	0
Maryland <sup>1</sup> .....	10	3			21	3	0	0
District of Columbia.....	5	3			4	5	0	0
Virginia.....								
West Virginia.....	6	7	12		46	21	0	0
North Carolina <sup>2</sup> .....	27	33	1		38	2	1	2
South Carolina <sup>3</sup> .....	18	19	70	38	6	4	1	0
Georgia <sup>4</sup> .....	5	4	6	3	3	12	0	0
Florida.....	3	1		1	4	6	0	0

<sup>1</sup> New York City only.

<sup>2</sup> Week ended Friday.

<sup>3</sup> Typhus fever: 1931, 13 cases; 2 cases in Maryland; 1 case in North Carolina; 1 case in South Carolina; 5 cases in Georgia; 2 cases in Alabama; and 2 cases in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 8, 1931, and August 9, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930
<b>East South Central States:</b>								
Kentucky		9			12	10	1	2
Tennessee	7	8	1	1	9	10	2	3
Alabama <sup>1</sup>	13	9		4	22	24	9	4
Mississippi	11	5					0	1
<b>West South Central States:</b>								
Arkansas	8	1		6	2		0	0
Louisiana	13	5	9	5		7	0	1
Oklahoma <sup>1</sup>	9	6	12	4		1	0	1
Texas <sup>1</sup>	27	22	7		1	21	0	1
<b>Mountain States:</b>								
Montana					8	4	0	0
Idaho						8	1	0
Wyoming					5	2	0	0
Colorado	6	3			3	11	0	1
New Mexico	5	6				1	0	0
Arizona	2	2			1	9	0	0
Utah <sup>1</sup>				4	5	6	0	2
<b>Pacific States:</b>								
Washington	3	12		3	6	20	2	1
Oregon	2	6	1	7	11	16	0	0
California	30	41	14	6	60	84	9	2

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930
<b>New England States:</b>								
Maine <sup>1</sup>	7	3	8	13	1	0	3	2
New Hampshire	0	1	2	1	0	0	1	2
Vermont	0	0	2	1	4	0	0	0
Massachusetts	67	23	67	46	0	0	8	5
Rhode Island	16	0	5	3	0	0	3	0
Connecticut	97	0	7	8	0	0	2	0
<b>Middle Atlantic States:</b>								
New York	676	25	118	51	2	0	34	27
New Jersey	55	1	26	23	0	0	7	8
Pennsylvania	1	8	85	52	0	0	49	37
<b>East North Central States:</b>								
Ohio	5	14	38	33	5	11	25	33
Indiana	1	2	21	10	17	33	13	13
Illinois	15	11	63	51	3	19	31	32
Michigan	17	0	70	53	5	17	10	18
Wisconsin	10	1	18	19	1	6	4	4
<b>West North Central States:</b>								
Minnesota	13	15	12	15	4	4	2	6
Iowa	3	1	8	8	10	19	4	2
Missouri	7	9	14	16	4	12	18	18
North Dakota	1	2	3	1	3	0	1	1
South Dakota	0	1	6	1	0	14	3	1
Nebraska	0	1	4	4	2	12	3	6
Kansas	0	23	10	11	14	11	13	17
<b>South Atlantic States:</b>								
Delaware	1	0	2	1	0	0	2	4
Maryland <sup>1</sup>	1	0	7	7	0	0	4	60
District of Columbia	1	0	5	1	0	0	0	2
Virginia		2				1		
West Virginia	1	1	11	8	0	1	35	30
North Carolina <sup>1</sup>	5	4	34	19	1	3	8	66
South Carolina <sup>1</sup>	0	3	1	4	0	0	112	69
Georgia <sup>1</sup>	3	1	11	13	1	0	59	58
Florida	0	0	0	1	1	0	3	1

<sup>1</sup> Week ended Friday.

<sup>2</sup> Typhus fever: 1931, 13 cases; 2 cases in Maryland; 1 case in North Carolina; 1 case in South Carolina; 6 cases in Georgia; 2 cases in Alabama; and 2 cases in Texas.

<sup>3</sup> Figures for 1931 are exclusive of Oklahoma City and Tulsa.

<sup>4</sup> Supplementary report from Maine shows 11 cases of scarlet fever during the week ended August 1, 1931.

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 8, 1931, and August 9, 1930—Continued*

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930
<b>East South Central States:</b>								
Kentucky.....	2	0	13	5	0	10	45	79
Tennessee.....	2	0	10	11	3	1	127	77
Alabama <sup>1</sup> .....	0	0	23	16	1	0	68	32
Mississippi.....	0	3	12	2	9	1	57	34
<b>West South Central States:</b>								
Arkansas.....	0	6	2	1	4	4	40	26
Louisiana.....	0	27	10	6	3	0	71	40
Oklahoma <sup>4</sup> .....	1	10	7	15	7	27	42	83
Texas <sup>2</sup> .....	4	2	19	22	5	12	29	35
<b>Mountain States:</b>								
Montana.....	2	0	4	6	2	1	5	2
Idaho.....	0	0	6	3	0	0	0	0
Wyoming.....	0	0	1	1	0	0	0	0
Colorado.....	0	0	6	5	0	0	10	6
New Mexico.....	1	0	2	0	0	1	4	3
Arizona.....	1	0	0	2	1	0	2	1
Utah <sup>3</sup> .....	0	0	1	3	0	0	0	1
<b>Pacific States:</b>								
Washington.....	4	1	9	13	17	22	6	4
Oregon.....	0	0	1	1	14	3	8	10
California.....	9	56	28	34	15	15	25	25

<sup>1</sup> Week ended Friday.

<sup>2</sup> Typhus fever: 1931, 13 cases; 2 cases in Maryland; 1 case in North Carolina; 1 case in South Carolina; 5 cases in Georgia; 2 cases in Alabama; and 2 cases in Texas.

<sup>4</sup> Figures for 1931 are exclusive of Oklahoma City and Tulsa.

### SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Men- gococ- cus menin- gitis	Diph- theria	Infl- uenza	Ma- laria	Mea- sles	Pel- lagra	Poli- myelitis	Scarlet fever	Small- pox	Ty- phoid fever
<i>June, 1931</i>										
Florida.....	2	15	4	29	270	9	1	13	0	9
Kansas.....	5	31	1	2	365	2	2	82	224	21
New Hampshire.....		1					0	4	0	0
<i>July, 1931</i>										
Alabama.....	10	34	7	285	113	133	6	39	22	120
Arizona.....	1	7	2		18		0	5	0	16
Connecticut.....	3	37	3	1	410		49	65	0	10
District of Columbia.....	3	27			38		1	24	0	6
Florida.....	2	27	3	62	65	17	2	12	0	38
Iowa.....	2	10			38		2	66	110	7
Nebraska.....	1	9			4		1	15	27	10
New Hampshire.....		2					2	12	0	2
North Dakota.....	2	15			26		0	17	36	2
Tennessee.....	14	12	9	119	158	65	3	43	27	195
Vermont.....		1			111			35	43	0
Wyoming.....		1			13			10	4	8

<i>June, 1931</i>		<b>Mumps—Continued.</b>	
	Cases		Cases
<b>Florida:</b>		<b>Florida</b> .....	9
Chicken pox.....	41	Iowa.....	30
Dysentery.....	2	Nebraska.....	70
Mumps.....	9	North Dakota.....	16
Paratyphoid fever.....	1	Tennessee.....	18
Typhus fever.....	3	Vermont.....	43
Whooping cough.....	32	Wyoming.....	4
<b>Kansas:</b>		<b>Ophthalmia neonatorum:</b>	
Chicken pox.....	208	Tennessee.....	3
Food poisoning.....	1	<b>Paratyphoid fever:</b>	
German measles.....	5	Connecticut.....	1
Impetigo contagiosa.....	1	Florida.....	1
Mumps.....	394	Tennessee.....	4
Paratyphoid fever.....	2	<b>Rabies in animals:</b>	
Septic sore throat.....	7	Connecticut.....	5
Tetanus.....	2	<b>Rocky Mountain spotted or tick fever:</b>	
Trachoma.....	1	District of Columbia.....	5
Trench mouth.....	2	Wyoming.....	2
Tularaemia.....	3	<b>Septic sore throat:</b>	
Undulant fever.....	6	Connecticut.....	5
Vincent's angina.....	22	Tennessee.....	2
Whooping cough.....	221	<b>Sprue:</b>	
		Tennessee.....	2
<i>July, 1931</i>		<b>Tetanus:</b>	
<b>Anthrax:</b>		Connecticut.....	1
Connecticut.....	1	<b>Trachoma:</b>	
Tennessee.....	1	Tennessee.....	10
<b>Chicken pox:</b>		<b>Trichinosis:</b>	
Alabama.....	12	Connecticut.....	1
Arizona.....	11	Tennessee.....	1
Connecticut.....	87	<b>Tularaemia:</b>	
District of Columbia.....	24	Iowa.....	1
Florida.....	5	<b>Typhus fever:</b>	
Iowa.....	46	Alabama.....	7
Nebraska.....	46	Florida.....	9
North Dakota.....	8	<b>Undulant fever:</b>	
Tennessee.....	17	Alabama.....	1
Vermont.....	34	Arizona.....	1
Wyoming.....	8	Connecticut.....	2
<b>Dysentery:</b>		Iowa.....	4
Arizona.....	4	Tennessee.....	3
Connecticut (bacillary).....	1	<b>Vincent's angina:</b>	
Tennessee.....	26	North Dakota.....	37
<b>German measles:</b>		Tennessee.....	3
Connecticut.....	8	<b>Whooping cough:</b>	
Iowa.....	11	Alabama.....	81
<b>Impetigo contagiosa:</b>		Arizona.....	2
Tennessee.....	2	Connecticut.....	323
<b>Lead poisoning:</b>		District of Columbia.....	139
Connecticut.....	3	Florida.....	42
<b>Lethargic encephalitis:</b>		Iowa.....	114
Alabama.....	6	Nebraska.....	36
Connecticut.....	5	North Dakota.....	31
North Dakota.....	1	Tennessee.....	215
<b>Mumps:</b>		Vermont.....	74
Alabama.....	21	Wyoming.....	35
Connecticut.....	75		

**GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES**

The 96 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 32,729,000. The estimated population of the 89 cities reporting deaths is more than 31,175,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

## Weeks ended August 1, 1931, and August 2, 1930

	1931	1930	Estimated expectancy
<i>Cases reported</i>			
Diphtheria:			
46 States.....	483	560	
96 cities.....	227	238	419
Measles:			
45 States.....	1,898	1,513	
96 cities.....	589	417	
Meningococcus meningitis:			
46 States.....	60	96	
96 cities.....	32	40	
Poliomyelitis:			
46 States.....	596	222	
Scarlet fever:			
46 States.....	882	747	
96 cities.....	298	235	293
Smallpox:			
46 States.....	179	260	
96 cities.....	13	21	16
Typhoid fever:			
46 States.....	908	930	
96 cities.....	171	111	120
<i>Deaths reported</i>			
Influenza and pneumonia:			
89 cities.....	312	318	
Smallpox:			
89 cities.....	0	0	

## City reports for week ended August 1, 1931

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 1922 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	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.....	1	0	0		0	0	0	0
New Hampshire:								
Concord.....	0	0	0		0	0	0	0
Nashua.....	0	0	0		0	0	0	0
Vermont:								
Barre.....	0	0	0		0	0	0	1
Burlington.....	0	0	1		0	0	0	0
Massachusetts:								
Boston.....	13	17	12			11	6	8
Fall River.....	0	1	2		0	6	1	0
Springfield.....	0	1	1		0	0	3	1
Worcester.....	0	1	0		0	0	12	1
Rhode Island:								
Pawtucket.....	0	0	1		0	0	0	1
Providence.....	1	3	4	1	0	32	7	2
Connecticut:								
Bridgeport.....	3	2	0		1	4	1	1
Hartford.....	0	1	2		0	2	1	0
New Haven.....	0	1	0	1	0	0	0	2

City reports for week ended August 1, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
<b>MIDDLE ATLANTIC</b>								
<b>New York:</b>								
Buffalo.....	2	7	1	-----	1	9	1	14
New York.....	34	116	55	4	5	82	37	82
Rochester.....	2	2	0	-----	0	24	2	3
Syracuse.....	9	1	0	-----	0	7	0	3
<b>New Jersey:</b>								
Camden.....	0	3	2	-----	0	0	0	2
Newark.....	3	8	2	-----	0	9	1	4
Trenton.....	0	0	1	-----	0	3	0	1
<b>Pennsylvania:</b>								
Philadelphia.....	10	30	3	-----	2	23	9	14
Pittsburgh.....	6	11	5	-----	1	18	14	10
Reading.....	0	1	1	-----	0	3	1	0
<b>EAST NORTH CENTRAL</b>								
<b>Ohio:</b>								
Cincinnati.....	0	3	4	-----	0	4	2	1
Cleveland.....	9	16	3	2	0	42	34	7
Columbus.....	0	2	2	-----	0	1	4	3
Toledo.....	14	2	1	-----	0	3	0	4
<b>Indiana:</b>								
Fort Wayne.....	0	0	0	-----	0	0	0	0
Indianapolis.....	0	2	1	-----	0	4	0	6
South Bend.....	0	0	-----	-----	-----	-----	-----	-----
Terre Haute.....	0	0	1	-----	0	0	0	0
<b>Illinois:</b>								
Chicago.....	28	57	40	-----	1	139	15	24
Springfield.....	1	0	0	-----	1	0	0	0
<b>Michigan:</b>								
Detroit.....	8	24	9	-----	1	4	4	5
Flint.....	3	1	2	-----	0	0	1	1
Grand Rapids.....	1	1	0	-----	0	7	1	0
<b>Wisconsin:</b>								
Kenosha.....	1	0	0	-----	0	0	9	0
Madison.....	4	1	0	-----	1	1	15	-----
Milwaukee.....	25	7	0	-----	0	51	43	1
Racine.....	1	0	0	-----	0	0	6	0
Superior.....	3	0	0	-----	0	0	0	0
<b>WEST NORTH CENTRAL</b>								
<b>Minnesota:</b>								
Duluth.....	2	1	0	-----	0	0	1	0
Minneapolis.....	3	8	1	-----	0	4	0	0
St. Paul.....	8	4	1	-----	0	4	0	3
<b>Iowa:</b>								
Davenport.....	0	0	1	-----	-----	0	0	-----
Des Moines.....	0	1	0	-----	-----	0	0	-----
Sioux City.....	0	1	0	-----	-----	1	1	-----
Waterloo.....	0	0	0	-----	-----	0	0	-----
<b>Missouri:</b>								
Kansas City.....	0	1	1	-----	0	1	0	4
St. Joseph.....	0	0	0	-----	0	0	0	1
St. Louis.....	0	15	5	-----	1	1	5	5
<b>North Dakota:</b>								
Fargo.....	0	0	0	-----	0	0	1	1
Grand Forks.....	0	0	0	-----	-----	0	0	-----
<b>South Dakota:</b>								
Aberdeen.....	1	0	0	-----	-----	0	0	-----
<b>Nebraska:</b>								
Omaha.....	0	2	1	-----	0	0	2	2
<b>Kansas:</b>								
Topeka.....	2	0	0	-----	0	2	9	0
Wichita.....	0	1	0	-----	0	1	0	0
<b>SOUTH ATLANTIC</b>								
<b>Delaware:</b>								
Wilmington.....	1	1	1	-----	0	2	1	1
<b>Maryland:</b>								
Baltimore.....	7	9	7	-----	1	5	4	14
Cumberland.....	0	0	0	-----	0	0	0	0
Frederick.....	0	0	0	-----	0	1	0	0
<b>District of Columbia:</b>								
Washington.....	2	5	0	-----	0	9	0	9
<b>Virginia:</b>								
Lynchburg.....	0	0	0	-----	0	0	0	0
Norfolk.....	0	0	0	-----	0	1	0	2
Richmond.....	0	2	1	-----	0	0	0	1
Roanoke.....	0	0	0	-----	0	1	0	0

## City reports for week ended August 1, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases re- ported	Mumps, cases re- ported	Pneu- monia, deaths reported
		Cases, estimated expect- ancy	Cases reported	Cases reported	Deaths reported			
<b>SOUTH ATLANTIC— continued</b>								
West Virginia:								
Charleston.....	0	0	0	-----	0	0	0	0
Wheeling.....	1	0	0	-----	0	0	0	0
North Carolina:								
Raleigh.....	0	0	2	-----	0	1	0	1
Wilmington.....	0	0	0	-----	0	0	0	0
Winston-Salem.....	0	0	0	-----	1	2	5	1
South Carolina:								
Charleston.....	0	0	0	-----	1	0	0	3
Columbia.....	0	0	0	-----	0	0	2	0
Greenville.....	0	0	0	-----	0	0	1	0
Georgia:								
Atlanta.....	0	2	3	-----	1	0	0	1
Brunswick.....	0	0	0	-----	0	0	0	1
Savannah.....	3	0	0	-----	3	3	2	1
Florida:								
Miami.....	2	1	1	-----	0	2	0	1
Tampa.....	0	0	2	-----	0	0	0	0
<b>EAST SOUTH CENTRAL</b>								
Kentucky:								
Covington.....	0	0	0	-----	0	0	0	1
Tennessee:								
Memphis.....	0	1	0	-----	0	6	0	3
Nashville.....	0	1	0	-----	0	1	0	1
Alabama:								
Birmingham.....	0	1	0	-----	1	0	0	3
Mobile.....	0	0	2	-----	1	1	0	0
Montgomery.....	0	0	0	-----	-----	0	0	-----
<b>WEST SOUTH CENTRAL</b>								
Arkansas:								
Fort Smith.....	0	0	0	-----	-----	0	2	-----
Little Rock.....	0	0	0	-----	0	0	1	1
Louisiana:								
New Orleans.....	0	5	6	-----	0	0	0	8
Shreveport.....	0	0	0	-----	0	0	0	0
Oklahoma:								
Muskogee.....	0	0	0	-----	0	0	0	0
Texas:								
Dallas.....	0	3	12	-----	0	0	0	2
Fort Worth.....	0	0	0	-----	1	0	0	2
Galveston.....	0	0	0	-----	0	0	0	0
Houston.....	0	2	0	-----	0	2	0	3
San Antonio.....	1	1	0	-----	0	1	0	3
<b>MOUNTAIN</b>								
Montana:								
Billings.....	0	0	0	-----	0	16	0	0
Great Falls.....	1	0	0	-----	0	1	0	0
Helena.....	0	0	0	-----	0	0	0	0
Missoula.....	0	0	0	-----	0	0	0	0
Idaho:								
Boise.....	0	0	0	-----	0	0	0	1
Colorado:								
Denver.....	10	7	3	-----	0	6	13	1
Pueblo.....	1	0	0	-----	0	0	1	0
New Mexico:								
Albuquerque.....	1	0	0	-----	0	0	1	0
Arizona:								
Phoenix.....	0	0	0	-----	0	0	1	3
Utah:								
Salt Lake City.....	2	1	1	-----	0	1	1	2
Nevada:								
Reno.....	0	0	0	-----	0	0	0	1
<b>PACIFIC</b>								
Washington:								
Seattle.....	3	1	0	-----	-----	1	3	-----
Spokane.....	2	0	0	-----	-----	0	0	-----
Tacoma.....	1	2	1	-----	0	1	2	2
Oregon:								
Portland.....	9	3	0	-----	0	1	3	3
Salem.....	2	0	0	-----	0	1	0	0
California:								
Los Angeles.....	4	22	20	-----	3	2	3	10
Sacramento.....	3	1	3	-----	0	-----	1	3
San Francisco.....	-----	7	-----	-----	-----	7	-----	-----

City reports for week ended August 1, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
<b>NEW ENGLAND</b>											
<b>Maine:</b>											
Portland	1	0	0	0	0	2	1	0	0	3	27
<b>New Hampshire:</b>											
Concord	0	0	0	0	0	0	0	0	0	0	8
Nashua	0	0	0	0	0	0	0	0	0	0	-----
<b>Vermont:</b>											
Barre	0	0	0	0	0	1	0	0	0	0	4
Burlington	0	0	0	2	0	0	0	0	0	6	10
<b>Massachusetts:</b>											
Boston	19	15	0	0	0	10	2	1	0	20	191
Fall River	1	6	0	0	0	2	0	1	0	2	21
Springfield	1	3	0	0	0	1	1	1	0	3	32
Worcester	2	4	0	0	0	0	0	0	0	4	-----
<b>Rhode Island:</b>											
Pawtucket	1	0	0	0	0	0	0	0	0	0	11
Providence	3	3	0	0	0	1	0	1	0	1	65
<b>Connecticut:</b>											
Bridgeport	2	3	0	0	0	2	0	0	0	0	28
Hartford	0	0	0	0	0	2	0	1	0	13	29
New Haven	0	0	0	0	0	1	0	0	0	3	52
<b>MIDDLE ATLANTIC</b>											
<b>New York:</b>											
Buffalo	6	5	0	0	0	8	0	0	0	17	121
New York	35	44	0	0	0	100	20	19	3	225	1,387
Rochester	3	7	0	0	0	1	0	0	0	5	49
Syracuse	2	0	0	0	0	1	0	0	0	17	47
<b>New Jersey:</b>											
Camden	0	1	0	0	0	1	1	1	0	8	30
Newark	5	11	0	0	0	6	1	2	0	135	93
Trenton	1	3	0	0	0	3	1	0	0	1	34
<b>Pennsylvania:</b>											
Philadelphia	19	28	0	0	0	27	6	5	1	86	390
Pittsburgh	9	16	0	0	0	9	1	0	0	65	180
Reading	0	1	0	0	0	0	0	1	0	3	33
<b>EAST NORTH CENTRAL</b>											
<b>Ohio:</b>											
Cincinnati	4	5	0	0	0	6	1	3	0	9	129
Cleveland	11	11	0	0	0	12	2	1	0	70	163
Columbus	2	1	1	0	0	3	0	0	0	8	70
Toledo	2	3	0	0	0	6	1	0	0	43	56
<b>Indiana:</b>											
Fort Wayne	0	1	0	0	0	0	0	0	1	0	23
Indianapolis	2	2	3	1	0	3	1	3	0	19	-----
South Bend	0	0	0	0	0	0	0	0	0	0	-----
Terre Haute	0	0	0	0	0	0	0	0	0	0	19
<b>Illinois:</b>											
Chicago	35	36	1	0	0	47	5	6	0	174	673
Springfield	0	0	0	1	0	0	0	0	0	1	28
<b>Michigan:</b>											
Detroit	28	22	0	0	0	20	4	5	0	192	228
Flint	5	0	0	0	0	0	0	0	0	0	13
Grand Rapids	3	4	0	0	0	0	0	0	0	4	22
<b>Wisconsin:</b>											
Kenosha	0	0	0	0	0	0	1	0	0	1	7
Madison	1	0	0	0	0	0	0	0	0	2	-----
Milwaukee	6	2	0	0	0	4	0	0	0	83	62
Racine	1	1	0	0	0	1	0	0	0	21	17
Superior	2	1	0	0	0	1	0	0	0	0	11
<b>WEST NORTH CENTRAL</b>											
<b>Minnesota:</b>											
Duluth	4	0	0	0	0	0	0	0	0	2	24
Minneapolis	11	2	1	1	0	3	0	0	0	5	100
St. Paul	7	6	1	0	0	3	1	1	0	17	-----
<b>Iowa:</b>											
Davenport	0	2	0	5	-----	-----	0	0	-----	3	-----
Des Moines	2	0	1	0	-----	-----	0	0	-----	7	35
St. Louis City	0	0	0	0	-----	-----	0	0	-----	0	-----
Waterloo	0	0	0	0	-----	-----	0	1	-----	3	-----

## City reports for week ended August 1, 1931—Continued.

Division, State, and city	Scarlet fever		Smallpox			Tuber- culo- sis, 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		
<b>WEST NORTH CENTRAL—continued</b>											
<b>Missouri:</b>											
Kansas City.....	2	0	0	0	0	0	1	5	1	7	94
St. Joseph.....	0	0	0	0	0	1	0	0	0	2	29
St. Louis.....	6	5	0	0	0	12	5	7	0	66	179
<b>North Dakota:</b>											
Fargo.....	1	0	0	2	0	1	0	0	0	10	10
Grand Forks.....	0	0	0	0			0	0		0	
<b>South Dakota:</b>											
Aberdeen.....	1	0	1	0			0	0		0	
<b>Nebraska:</b>											
Omaha.....	1	2	1	3	0	3	1	1	1	8	55
<b>Kansas:</b>											
Topeka.....	1	0	0	0	0	0	0	1	1	1	19
Wichita.....	1	1	0	0	0	1	1	0	0	5	26
<b>SOUTH ATLANTIC</b>											
<b>Delaware:</b>											
Wilmington....	1	1	0	0	0	1	0	0	0	5	19
<b>Maryland:</b>											
Baltimore.....	6	2	0	0	0	16	6	3	1	77	220
Cumberland....	0	1	0	0	0	1	0	0	0	0	11
Frederick.....	0	0	0	0	0	0	0	0	0	1	2
<b>District of Colum- bia:</b>											
Washington....	5	4	0	0	0	13	3	2	0	29	150
<b>Virginia:</b>											
Lynchburg.....	0	1	0	0	0	0	1	8	1	0	9
Norfolk.....	0	1	0	0	0	1	2	1	0	2	
Richmond.....	2	3	0	0	0	2	2	1	1	0	51
Roanoke.....	0	0	0	0	0	1	0	0	0	2	14
<b>West Virginia:</b>											
Charleston.....	0	0	0	0	0	0	1	3	0	2	6
Wheeling.....	1	0	0	0	0	1	0	0	0	0	23
<b>North Carolina:</b>											
Raleigh.....	0	3	0	0	0	0	0	0	0	6	10
Wilmington....	0	0	0	0	0	1	0	1	0	3	8
Winston-Salem..	0	0	0	0	0	2	1	1	0	10	12
<b>South Carolina:</b>											
Charleston.....	0	1	0	0	0	3	1	2	2	0	27
Columbia.....	0	0	0	0	0	1	2	4	0	0	7
Greenville.....	0	0	0	0	0	0	1	0	0	8	
<b>Georgia:</b>											
Atlanta.....	2	4	0	1	0	3	2	9	6	2	62
Brunswick.....	0	0	0	0	0	0	1	0	0	0	3
Savannah.....	1	1	0	0	0	5	2	4	0	2	33
<b>Florida:</b>											
Miami.....	0	2	0	0	0	1	1	0	0	0	21
Tampa.....	0	0	0	0	0	0	0	1	0	0	25
<b>EAST SOUTH CENTRAL</b>											
<b>Kentucky:</b>											
Covington.....	0	1		0	0	0	0	0	0	1	14
<b>Tennessee:</b>											
Memphis.....	1	0	0	1	0	3	9	4	2	11	68
Nashville.....	1	0	1	0	0	2	6	3	1	11	82
<b>Alabama:</b>											
Birmingham....	1	0	1	0	0	5	5	0	0	4	60
Mobile.....	0	4	0	0	0	0	1	0	0	0	16
Montgomery....	0	1	0	0			1	4		2	
<b>WEST SOUTH CENTRAL</b>											
<b>Arkansas:</b>											
Fort Smith.....	0	0	0	0				1		0	
Little Rock....	0	0	0	0	0	0	1	2	0	1	2
<b>Louisiana:</b>											
New Orleans....	3	1	0	0	0	8	4	139	2	6	122
Shreveport....	0	0	0	0	0	1	1	0	0	0	33
<b>Oklahoma:</b>											
Muskogee.....	1	0	0	1	0	0	1	0	1	0	

1 Nonresident, 32.

City reports for week ended August 1, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuber- culo- sis, 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		
<b>WEST SOUTH CENTRAL—continued</b>											
<b>Texas:</b>											
Dallas.....	2	4	1	0	0	3	3	8	3	15	49
Fort Worth.....	1	2	1	0	0	1	1	1	0	0	33
Galveston.....	0	0	0	0	0	1	0	0	0	0	17
Houston.....	1	0	0	1	0	4	2	0	0	0	58
San Antonio.....	1	1	0	0	0	3	2	0	0	2	55
<b>MOUNTAIN</b>											
<b>Montana:</b>											
Billings.....	0	0	0	0	0	0	0	0	0	2	7
Great Falls.....	0	1	0	0	0	0	1	0	0	4	5
Helena.....	0	0	0	0	0	0	0	0	0	1	6
Missoula.....	0	0	0	0	0	0	0	0	0	0	9
<b>Idaho:</b>											
Boise.....	0	1	1	0	0	0	0	0	0	0	3
<b>Colorado:</b>											
Denver.....	4	4	0	0	0	9	1	1	1	29	71
Pueblo.....	1	0	0	0	0	0	0	1	0	0	7
<b>New Mexico:</b>											
Albuquerque.....	0	0	0	0	0	3	0	1	0	0	9
<b>Arizona:</b>											
Phoenix.....	0	0	0	0	0	8	0	1	0	0	-----
<b>Utah:</b>											
Salt Lake City.....	1	1	0	0	0	2	0	0	0	15	44
<b>Nevada:</b>											
Reno.....	0	0	0	0	0	0	0	0	0	0	2
<b>PACIFIC</b>											
<b>Washington:</b>											
Seattle.....	2	2	1	0	-----	-----	0	0	-----	22	-----
Spokane.....	0	0	0	2	-----	-----	0	0	-----	6	-----
Tacoma.....	1	0	1	0	0	2	0	0	0	11	23
<b>Oregon:</b>											
Portland.....	2	0	5	2	0	3	1	0	0	0	64
Salem.....	0	0	0	0	0	0	0	0	0	0	-----
<b>California:</b>											
Los Angeles.....	12	4	2	0	0	24	3	2	1	31	246
Sacramento.....	1	0	0	0	0	3	0	0	0	5	23
San Francisco.....	5	-----	1	-----	-----	-----	1	-----	-----	-----	-----

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, esti- mated expect- ancy	Cases	Deaths
<b>NEW ENGLAND</b>									
<b>Maine:</b>									
Portland.....	0	0	0	0	0	0	0	1	0
<b>Massachusetts:</b>									
Boston.....	0	1	0	0	0	0	1	12	1
Fall River.....	0	0	0	0	0	0	0	1	0
Springfield.....	0	0	0	0	0	0	0	4	0
<b>Rhode Island:</b>									
Providence.....	1	0	0	0	0	0	0	8	1
<b>Connecticut:</b>									
Bridgeport.....	0	0	0	0	0	0	0	1	0
Hartford.....	0	0	0	0	0	0	0	3	0
New Haven.....	0	0	0	0	0	0	0	17	1
<b>MIDDLE ATLANTIC</b>									
<b>New York:</b>									
New York.....	9	2	2	0	0	0	5	404	55
<b>New Jersey:</b>									
Newark.....	0	0	0	0	0	0	0	4	0
<b>Pennsylvania:</b>									
Philadelphia.....	5	2	1	1	0	0	0	1	0
Pittsburgh.....	0	2	0	0	0	0	0	0	0

## City reports for week ended August 1, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Pollomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
<b>EAST NORTH CENTRAL</b>									
Ohio:									
Cincinnati.....	1	1	1	0	0	0	0	0	0
Indiana:									
Indianapolis.....	2	0	0	0	0	0	0	0	0
Illinois:									
Chicago.....	6	1	2	1	0	0	0	2	1
Michigan:									
Detroit.....	1	0	1	0	0	0	1	2	1
Grand Rapids.....	0	0	0	0	0	0	0	2	0
Wisconsin:									
Madison.....	0	0	0	0	0	0	0	5	0
Milwaukee.....	0	0	0	0	0	0	0	3	1
<b>WEST NORTH CENTRAL</b>									
Minnesota:									
Duluth.....	0	0	0	0	0	0	0	6	1
Minneapolis.....	2	0	0	0	0	0	0	1	0
St. Paul.....	0	0	0	0	0	0	0	1	0
Missouri:									
St. Joseph.....	1	0	0	0	0	0	0	0	0
St. Louis.....	0	0	0	0	0	0	0	1	0
<b>SOUTH ATLANTIC</b>									
Maryland:									
Baltimore.....	1	1	0	0	0	0	1	0	0
District of Columbia:									
Washington.....	1	1	0	0	0	0	0	1	0
Virginia:									
Lynchburg.....	1	1	0	0	0	0	0	0	0
West Virginia:									
Wheeling.....	0	0	0	0	0	0	0	1	0
North Carolina:									
Raleigh.....	0	0	0	0	1	2	0	0	0
Wilmington.....	0	0	0	0	3	0	0	0	0
South Carolina:									
Charleston.....	0	0	0	0	1	0	0	0	0
Georgia:									
Atlanta.....	0	0	0	0	0	0	0	1	1
Savannah <sup>1</sup> .....	0	0	0	0	13	2	0	0	0
Florida: <sup>1</sup>									
Miami.....	0	0	0	0	0	1	0	0	0
<b>EAST SOUTH CENTRAL</b>									
Tennessee:									
Memphis.....	0	1	0	0	0	0	0	0	0
Alabama:									
Mobile.....	0	0	0	0	1	0	0	0	0
<b>WEST SOUTH CENTRAL</b>									
Louisiana:									
New Orleans.....	0	0	0	0	1	0	1	0	0
Shreveport.....	0	0	0	0	0	2	0	0	0
Texas:									
Dallas.....	0	0	0	0	0	1	0	0	0
Fort Worth.....	0	0	0	0	0	2	1	1	0
<b>MOUNTAIN</b>									
Montana:									
Great Falls.....	0	0	0	0	0	0	0	2	0
New Mexico:									
Albuquerque.....	0	0	0	0	0	0	0	1	0
<b>PACIFIC</b>									
Washington:									
Seattle.....	1	0	0	0	0	0	0	0	0
California:									
Los Angeles.....	0	0	0	0	0	0	2	3	0

<sup>1</sup> Typhus fever: 6 cases and 1 death; 3 cases at Savannah, Ga., and 3 cases and 1 death at Tampa, Fla.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended August 1, 1931, compared with those for a like period ended August 2, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

*Summary of weekly reports from cities, June 28 to Aug. 1, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930.<sup>1</sup>*

## DIPHTHERIA CASE RATES

	Week ended—									
	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930
98 cities.....	47	57	43	58	42	48	33	37	36	38
New England.....	96	56	60	41	65	36	50	24	53	36
Middle Atlantic.....	53	50	50	49	35	46	34	33	31	34
East North Central.....	49	91	41	86	52	66	39	49	48	45
West North Central.....	33	37	31	68	31	39	33	35	17	35
South Atlantic.....	12	26	18	32	24	46	28	38	32	40
East South Central.....	12	36	23	24	29	12	12	24	12	6
West South Central.....	27	49	61	59	47	35	24	31	61	35
Mountain.....	9	9	17	26	61	70	35	70	35	35
Pacific.....	51	32	41	53	51	32	16	28	62	45

## MEASLES CASE RATES

98 cities.....	384	270	316	252	181	147	133	105	94	67
New England.....	402	544	351	460	317	256	209	191	132	106
Middle Atlantic.....	283	322	311	305	142	195	111	144	84	87
East North Central.....	769	168	527	154	320	70	214	59	155	33
West North Central.....	143	139	103	130	61	50	34	64	27	43
South Atlantic.....	310	180	259	142	107	122	83	50	47	60
East South Central.....	349	126	116	179	116	42	105	54	47	36
West South Central.....	24	24	27	17	17	10	14	7	10	10
Mountain.....	215	731	122	582	122	247	174	176	209	159
Pacific.....	149	451	182	482	123	310	125	164	54	105

## SCARLET FEVER CASE RATES

98 cities.....	105	75	79	71	70	53	53	49	47	38
New England.....	188	73	142	73	149	65	111	73	82	60
Middle Atlantic.....	135	54	89	49	64	35	56	34	52	21
East North Central.....	122	115	90	114	111	86	69	76	53	50
West North Central.....	31	105	41	85	42	43	29	31	31	48
South Atlantic.....	54	62	49	68	34	48	38	40	41	44
East South Central.....	47	12	52	42	23	18	6	48	35	6
West South Central.....	41	45	34	35	34	21	44	45	20	52
Mountain.....	36	167	52	88	26	79	0	26	61	34
Pacific.....	47	38	49	43	12	49	12	38	16	34

<sup>1</sup> 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, 1931 and 1930, respectively.

<sup>2</sup> Columbia, S. C., and Billings, Mont., not included.

<sup>3</sup> South Bend, Ind., and San Francisco, Calif., not included.

<sup>4</sup> South Bend, Ind., not included.

<sup>5</sup> Columbia, S. C., not included.

<sup>6</sup> Billings, Mont., not included.

<sup>7</sup> San Francisco, Calif., not included.

Summary of weekly reports from cities, June 28 to Aug. 1, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

## SMALLPOX CASE RATES

	Week ended—									
	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930
98 cities.....	6	6	2	7	3	6	3	7	2	4
New England.....	0	0	2	0	0	0	0	0	0	0
Middle Atlantic.....	0	0	0	0	0	0	0	0	0	0
East North Central.....	8	5	1	9	4	10	2	8	1	2
West North Central.....	10	14	4	10	4	14	10	21	11	12
South Atlantic.....	10	2	4	0	0	4	0	2	2	4
East South Central.....	23	18	6	18	0	0	6	18	6	0
West South Central.....	24	0	10	7	7	7	0	3	3	14
Mountain.....	0	53	0	9	0	18	0	18	0	0
Pacific.....	14	32	8	36	22	18	20	22	5	22

## TYPHOID FEVER CASE RATES

	10	10	14	16	13	16	16	18	27	18
98 cities.....	10	10	14	16	13	16	16	18	27	18
New England.....	10	7	2	5	12	10	10	7	12	7
Middle Atlantic.....	5	5	8	10	7	4	8	7	13	5
East North Central.....	8	1	5	6	6	9	5	13	11	12
West North Central.....	10	8	19	10	2	23	19	48	31	23
South Atlantic.....	10	28	28	60	47	44	69	42	77	32
East South Central.....	41	84	58	84	35	60	47	66	64	108
West South Central.....	71	45	81	35	57	59	10	38	169	42
Mountain.....	36	0	35	0	26	26	0	18	17	26
Pacific.....	4	4	6	14	6	16	27	10	5	16

## INFLUENZA DEATH RATES

	3	4	3	3	2	2	1	2	3	1
91 cities.....	3	4	3	3	2	2	1	2	3	1
New England.....	0	2	2	0	0	0	0	0	2	0
Middle Atlantic.....	1	4	4	4	0	3	1	1	4	0
East North Central.....	1	2	2	3	4	2	2	3	2	1
West North Central.....	1	0	0	6	3	0	0	3	0	0
South Atlantic.....	4	6	4	2	4	0	2	4	6	6
East South Central.....	19	6	6	13	0	0	0	0	13	0
West South Central.....	10	14	7	7	3	11	3	11	0	0
Mountain.....	9	0	0	0	0	9	0	0	0	9
Pacific.....	5	7	0	2	0	5	2	2	7	2

## PNEUMONIA DEATH RATES

	64	54	59	53	47	43	44	56	49	52
91 cities.....	64	54	59	53	47	43	44	56	49	52
New England.....	36	36	79	44	50	39	31	44	41	41
Middle Atlantic.....	67	55	59	54	61	54	55	68	59	59
East North Central.....	61	40	47	37	32	32	32	38	30	43
West North Central.....	77	63	88	75	71	39	53	57	47	48
South Atlantic.....	67	60	71	60	39	54	43	86	65	66
East South Central.....	82	142	50	71	44	52	44	91	59	52
West South Central.....	90	78	86	78	45	46	52	79	59	75
Mountain.....	72	62	61	106	35	53	17	79	44	62
Pacific.....	46	52	31	50	24	15	43	7	51	35

<sup>1</sup> Columbia, S. C., and Billings, Mont., not included.

<sup>2</sup> South Bend, Ind., and San Francisco, Calif., not included.

<sup>3</sup> South Bend, Ind., not included.

<sup>4</sup> Columbia, S. C., not included.

<sup>5</sup> Billings, Mont., not included.

<sup>7</sup> San Francisco, Calif., not included.

# FOREIGN AND INSULAR

## CANADA

*Provinces—Communicable diseases—Week ended July 25, 1931.*—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended July 25, 1931, as follows:

Province	Cerebro-spinal fever	Typhoid fever	Influenza	Lethargic encephalitis	Polio-myelitis	Smallpox
Prince Edward Island <sup>1</sup> .....						
Nova Scotia <sup>1</sup> .....						
New Brunswick <sup>1</sup> .....						
Quebec.....	1	22			2	
Ontario.....		13	1	1	3	1
Manitoba.....		1				
Saskatchewan.....						19
Alberta <sup>1</sup> .....						
British Columbia.....		1	1		1	2
<b>Total</b> .....	<b>1</b>	<b>37</b>	<b>2</b>	<b>1</b>	<b>6</b>	<b>22</b>

<sup>1</sup> No case of any disease included in the table was reported during the week.

*Quebec Province—Communicable diseases—Week ended August 1, 1931.*—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 1, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis.....	1	Mumps.....	5
Chicken pox.....	22	Paratyphoid fever.....	1
Diphtheria.....	20	Polio-myelitis.....	1
Erysipelas.....	4	Scarlet fever.....	22
German measles.....	1	Tuberculosis (pulmonary).....	60
Influenza.....	1	Typhoid fever.....	24
Measles.....	44	Whooping cough.....	12

## ECUADOR

*Guayaquil—Deaths—1930.*—During the year 1930 deaths from certain diseases were reported in Guayaquil, Ecuador, as follows:

Disease	Deaths	Disease	Deaths
Ancylostomiasis.....	13	Influenza.....	61
Bronchitis, acute.....	106	Leprosy.....	4
Bubonic plague <sup>1</sup> .....	4	Lethargic encephalitis.....	15
Cancer and other malignant tumors.....	48	Malaria.....	178
Cerebral hemorrhage and softening of the brain.....	63	Measles.....	36
Cirrhosis of the liver.....	22	Meningitis.....	60
Congenital debility and malformation.....	184	Nephritis (acute) and Bright's disease.....	12
Diphtheria and croup.....	1	Pneumonia and broncho-pneumonia.....	413
Diarrhea and enteritis (under 2 years).....	152	Puerperal septicemia.....	69
Dysentery.....	83	Tuberculosis, all forms.....	785
Erysipelas.....	9	Typhoid and paratyphoid fever.....	17
Heart disease.....	91	Whooping cough.....	5

<sup>1</sup> 8 cases of bubonic plague, with 4 deaths, were reported in Guayaquil during the year 1930, the last case having been reported on Mar. 26, 1930.

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

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.

#### CHOLERA

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

Place	Jan. 11- Feb. 7, 1931	Mar. 8- Apr. 7, 1931	Mar. 8- Apr. 5- May 2, 1931	Week ended—													
				May, 1931			June, 1931			July, 1931			August, 1931				
				9	16	23	30	6	13	20	27	4	11	18	25	1	8
Ceylon: Colombo.....		1					1	1									
China:																	
Canton.....			1					2				1					
Shanghai.....								1									
Swatow.....												3					
Tientsin.....												2					
India.....	16,394	11,544	8,968	11,462	3,242	3,013	3,565	3,784	3,932								
Bombay.....	8,123	6,131	4,550	6,767	1,806	1,598	1,845	2,021	2,146								
Calcutta.....	121	170	436	310	72	89	49	55	94			74	50	74	72	62	55
Karikal.....	86	112	266	176	39	44	34	32	57			47	26	38	35	34	58
Madras.....	90	8	12	14	6	1	1	1									
Negapatam.....	47	72	20	26	18	23	11	3	6			6					
Rangoon.....	3	3	3	10	6	8	2	2	1			4					
Taticorin.....	1	1										2					
Vizagapatam.....	1	1										1					
India (French):																	
Chandernagor.....	1	5	7	6	3	3	1	1				1					
Pondicherry.....	19	100	100	24	3	8	2	4	1			1					
	11	34	18	4		3		4	1			1					











## SMALLPOX

Place	Week ended—														
	April, 1931		May, 1931				June, 1931				July, 1931				
	11	18	25	2	9	16	23	30	6	13	20	27	4	11	18
Algeria:															
Algiers.....							1								
Bone.....	1		2												
Constantine.....	1					1									
Arabia: Aden.....	1														
Belgian Congo.....	50					7	10	30							
Belgium.....															
Bolivia, <sup>1</sup> .....															
Brazil: Porto Alegre (alastrim).....	3	7	49	6	2	4	7	6	2	3					1
British East Africa: Tanganyika.....	70	91	8			13			1						
British South Africa: Southern Rhodesia.....	5	6	13												
Canada:	13									1					
Alberta.....															
British Columbia.....	7	1													
British Columbia.....	2	8													
Manitoba.....	1	1			4										
Winnipeg.....	1	1													
Nova Scotia.....	1														
Ontario.....	49	20	9	6	7	17	5	3	4	3	14	3	6		
Kingston.....															
North Bay.....	1	1		2	3										
Ottawa.....	3	1													
Sault Ste. Marie.....	30	2		3	1		1								
Toronto.....	2	4		4		1									
Quebec.....	2														
Saskatchewan.....	38	63	65	5	16	3	22	7	15	8	18	13	1	13	
Regina.....	1			2		2									
Canary Islands: Las Palmas.....															
Chile:															
Antofagasta.....															
Chacaral.....															1

<sup>1</sup> Reports incomplete.<sup>2</sup> An epidemic of smallpox was reported on May 13 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Provinces, Bolivia.













