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## STUDIES ON IMMUNITY INDUCED BY MOUSE SARCOMA 180

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In view of the comprehensive publications of Woglom (1), (2) on immunity to transplantable tumors, to which the reader is referred, a review of the literature on the subject is not presented in this paper. It is known that mice may acquire an immunity to transplantable tumors, either by the growth of tumor cells or by the injection of normal living tissues. However, mouse sarcoma 180 of the Crocker Institute seems to be an exception to this rule so far as immunity induced by the injection of normal living cells is concerned. Rohdenburg and Bullock (3) state, in this connection, that it is "refractory to the immunizing power of living cells" unless its growth energy is attenuated by heat or exposure to radium. Wood and Prigosen (4) were unable to induce resistance in mice against mouse sarcoma 180 by the injection of pieces of irradiated tumor. In this laboratory, attempts have been made to immunize mice against the tumor by the injection of mouse-embryo skin, but such efforts failed to reveal any significant resistance to transplants from an actively growing tumor.

Mouse sarcoma 180 is a highly malignant growth. During the past four years it has been propagated in this laboratory [1] and, regardless of the strain of mice employed, has grown progressively in from 95 to 100 per cent of inoculated animals with less than 1 per cent of spontaneous recessions. In view of this remarkable power of proliferation and the difficulty encountered in trying to immunize mice against the tumor by the use of embryo skin, it seemed of interest to ascertain whether mice would become refractory to the growth through the process of concomitant immunization. As a rule, it is easy to detect this type of resistance in mice by inoculating the animal with the tumor to be tested, and, after 10 to 14 days, reinoculating the same strain of tumor in another region of the body. However, this procedure proved unsatisfactory in the case of sarcoma 180, since the rapid growth of the primary inoculation usually killed the mice within four to six weeks and before the result of the second inocula-

[1] We are indebted to Dr. F. C. Wood, of the Crocker Institute for Cancer Research, for this strain of tumor.

tion could be satisfactorily established. While it is feasible to test for concomitant immunity after excision of the primary tumor, search was made for a simpler procedure.

As a preliminary, a study was made of the range of sites in which the tumor cells could multiply in the body of the mouse. These gave some interesting results. A tumor developed in the majority of animals when the cells were injected intracutaneously or into the pads of the rear feet, or when rubbed into a shaved and scarified area on the skin, but these results were not constant. However, these early attempts showed that the cells of sarcoma 180 were able to grow in regions where one might expect the cells of a less malignant tumor to perish. Among the sites of implantation which were studied, that of the tail yielded the most interesting results. The first part of this paper, therefore, deals with the results of experiments in which efforts were made to grow the tumor in the tails of mice.

## TECHNIQUE EMPLOYED FOR CAUDAL INOCULATION OF MICE

Little difficulty is encountered in implanting sarcoma 180 in the tails of mice. The animals are placed in a suitable holder and either the trocar or syringe method of inoculation is employed. An 18-gage needle equipped with a snugly fitting plunger serves as a trocar if this method is deemed advisable, but the syringe method was found to be far more effective. Pieces of sarcoma 180, free from any necrotic material, are taken from an actively growing tumor, passed through a mincing machine and drawn into a sterile Bashford syringe. The syringe needle is inserted between the thick epidermal covering and the dorsal vein about midway up the tail. With a sharp needle and reasonable care, very little bleeding occurs. The needle point is inserted from 15 to 20 millimeters under the skin and then withdrawn for about three-fourths the distance before the tumor material is expelled from the syringe. With this technique, 0.5 cc of minced tumor is sufficient for about 30 caudal inoculations. In case a Bashford syringe is not available, a 1-cc tuberculin syringe and an 18-gage needle will prove satisfactory, provided the opening in the end of the syringe barrel is large enough to permit passage of the tumor mash. A thorough washing of the barrel and plunger in sterile salt solution before use in order to prevent the plunger from sticking is advisable.

## RESULTS OF CAUDAL INOCULATION OF MICE WITH SARCOMA 180

A small number of mice (97) were inoculated caudally with the trocar technique. Of these animals, 55 responded with tumors, of which 15 regressed. The trocar technique was discontinued when the syringe method was found to be more satisfactory. In 10 experi-

ments a total of 400 mice were inoculated in the tail with the syringe technique. Of these animals 386 developed tumors, of which 68 receded spontaneously. However, in most of the experiments the tails were amputated after the tumor had become established. The records show that in 30 of these experiments 1,176 mice were inoculated caudally and 1,160 responded with tumor. Thus, it is seen that in 1,576 caudal inoculations of the sarcoma by the syringe method, 1,546, or 98 per cent, were successful. These results compare favorably with those attending groin inoculation of the same tumor. In contradistinction to the results of groin implantation, the response of 386 mice in which the tail tumors either regressed or grew until the death of the animal indicates that about 18 per cent of caudal tumors recede. This implies that the tail is not so favorable a site as the groin for the progressive growth of sarcoma 180.

### FACTORS INFLUENCING THE RATE OF GROWTH OF TAIL TUMORS

As might be expected, sarcoma 180 exhibits variation in its rate of growth while in the tails of mice. As a rule, definite evidence of tumor is present one week after caudal inoculation. Two weeks after implantation the average size of 300 tail tumors was 15 mm in length and 6 mm in width. The tumor in most cases grows much larger and ulcerates, thus forming a portal of entry for infecting microorganisms which ultimately kill the mouse. Death occurs about six to eight weeks after inoculation unless the tail be amputated.

The rate of growth of tail tumors depends, apparently, upon two factors: The first of these is the growth energy of the tumor employed for inoculation; the second is the natural resistance of the inoculated animal. In this connection it should be mentioned that the following kinds of animals were employed in these experiments: A pure breed of mice was available from a colony propagated in this laboratory for the purpose of obtaining spontaneous tumors. These mice are designated as strain A mice throughout this communication. Most of the animals, however, were not of pure breed. These were purchased from three different dealers and are designated as stock mice. In order to exclude any variation in susceptibility on the part of mice from different sources, animals from the same shipment were always used as controls. The stock animals showed no pronounced variation in susceptibility to caudal inoculation of the tumor. The results presented in the preceding paragraphs include only those obtained in stock animals and coincide with those attending groin inoculation of other stock mice.

Strain A mice, however, were more susceptible to caudal inoculation than the stock animals. This difference is brought out in the following experiment which also shows the variation in growth energy of tumors employed for inoculation.

*Experiment 1*

The material consisted of 50 female mice of strain A and 100 female stock mice of like weight (20 gm to 25 gm). All the strain A and 50 of the stock mice were inoculated caudally from one sarcoma 180. On the following day the remainder (50) of the stock mice were inoculated in the same manner from another sarcoma 180. Two weeks later there was a remarkable difference in the size of the tail tumors in the strain A and stock mice inoculated at the same time. This difference is best shown in the weights of the tails of the animals which were amputated at this time. These weights were as follows:

Group 1: 50 strain A mice, 32.5 gm—an average of 0.65 gm per tail.
Group 2: 50 stock mice, 21.5 gm—an average of 0.43 gm per tail.

The comparison of the weights of amputated tails plus tumor was found to be a far better method for comparing the size of tumors than the use of actual measurements. This is particularly the case when the tumors are exceedingly small, as in the stock mice of this experiment.

Referring now to the response in this experiment of stock mice of the same batch to inoculation of two different tumors of the same strain, we again find a striking difference in the rate of growth. Two weeks following caudal inoculation of these mice the weights of tails plus tumors were as follows:

Group 2 (inoculated from tumor A): 50 mice (as stated above), 21.5 gm—an average of 0.43 gm per tail.
Group 3 (inoculated from tumor B): 50 mice (inoculated one day later), 30.5 gm—an average of 0.60 gm per tail.

Such results show that the rate of tumor growth in the tails of mice depends upon both the resistance of the animals and the growth energy of the tumor employed as inoculum. They also indicate that the response of mice to caudal inoculation may be a satisfactory test both for the resistance of the animal and the proliferative power of the tumor. It is also significant that the strain A mice which have a high spontaneous tumor rate were found to be more susceptible to caudal inoculation than the stock mice. The ability of sarcoma 180 to induce concomitant immunity in strain A mice will be discussed later.

It is clear that the factors of both individual resistance and of the proliferative energy of tumor have a decided influence upon the growth of the sarcoma in the mouse's tail. In view of this, attempts were made to discover other factors which might either retard or aid in the development of tail tumors. Most of these efforts were unsuccessful, but the influence of temperature had such a pronounced effect upon tumor growth that the observation seems worthy of presentation.

In eight experiments mice were inoculated in the tail with sarcoma 180 and some of their number kept at temperatures of from 12° to 18°

C., while others kept at room temperature (23° to 29° C.) served as controls. All these experiments gave identical results, i. e., the tumors in the mice kept at room temperature grew progressively while those in animals kept at 12° C to 18° C. grew very slowly and eventually regressed in about 35 per cent of those in which tails were not amputated. A protocol of one experiment will suffice to show the difference in the rate of growth under different temperature conditions:

*Experiment 2, August 12, 1931*

One hundred female stock mice were inoculated caudally with sarcoma 180; 50 were kept at temperatures varying between 14° and 18° C.; while 50 were kept as controls at a room temperature of from 24° to 29° C. Two weeks after inoculation all the mice showed definite evidence of tail tumors. Their tails were then amputated and weighed with the following results:

Room-temperature mice: 48 living. Total weight of tail plus tumor was 33 gm—an average of 0.68 gm per tail.

Cold-room mice: 46 living. Total weight of tail plus tumor was 19.5 gm—an average of 0.42 gm per tail.

This low range of temperature, however, had no effect upon the growth of sarcoma 180 when inoculated in the inguinal region. The influence of temperature may offer an explanation for the greater number (18 per cent) of regressions occurring among tail tumors than the few (less than 1 per cent) observed in groin tumors when the animals were kept at room temperature.

## IMMUNOLOGICAL OBSERVATIONS

Russell (5) believed that he had demonstrated that some propagable tumors elicit resistance in mice, while others lack this property. If a tumor having a high growth energy, like sarcoma 180, should belong to the group inducing resistance, in view of this high growth energy it is reasonable to assume that such resistance should be pronounced. From a search of the literature it would not appear that sarcoma 180 has been studied from the standpoint of concomitant resistance. It is evident that caudal implantation of sarcoma 180 furnishes an opportunity of determining whether or not this tumor elicits resistance, and the degree of immunity conferred. Besides this, in the event of a high order of resistance, the method should furnish immune mice in considerable numbers, since extirpation of the tumor by tail amputation is easy, once resistance has been established. This would furnish the requisite material for such studies as the means by which such acquired resistance might be modified and also the effect of acquired immunity to a transplantable tumor of high growth energy upon susceptibility to spontaneous tumor.

Consequently the experiments reported in the remainder of this paper deal principally with the concomitant immunity induced by sarcoma 180 and associated problems.

Experiment shows that successful caudal inoculation of mice with sarcoma 180 induces immunity to this tumor. The records of 17 experiments wherein 461 female mice were tested for immunity two weeks after tail inoculation show that 283 or about 60 per cent were completely resistant to reinoculation. In order to avoid repetition, the manner in which mice were tested for immunity will now be presented.

The animals received a primary inoculation of tumor in the tail by means of a Bashford (6) syringe, according to the technique previously described. In order to test for the presence of immunity, a piece of actively growing tumor was implanted in the subcutaneous tissue of one groin by means of a 13-gage trocar. Any mouse failing to respond to the first reinoculation within two to three weeks received another implant in the opposite groin. The need for this second test for immunity should be emphasized, since experience has shown that, although negative to the first inoculation, from 5 to 10 per cent of mice were susceptible to the second groin implantation. Thus, unless noted otherwise, only those animals surviving two test implantations of tumor which gave practically 100 per cent of takes in control mice were considered immune.

As might be expected, a large number of animals bearing tail tumors developed only a partial resistance to reinoculation, for the rate of tumor growth was always much slower in such mice than in the controls. However, only those mice showing complete resistance to the tumor by remaining tumor free during one month's observation after the second groin implantation are designated as "immune" in the following experiments. This procedure obviates the use of charts showing the rate of growth in control and immunized animals.

When removal of the tail tumor was desired, the animal was etherized, the tail amputated about 10 mm from the root, and the stump painted with tincture of iodine. This rather crude technique gave surprisingly satisfactory results; less than 1 per cent of the mice succumbed. The tail stump healed completely within two weeks.

## THE RELATION OF SEX TO INDUCED IMMUNITY

During the first few experiments on induced resistance to the tumor, mice of both sexes were used indiscriminately as experimental animals. However, since previous investigations (7) by the writer had given some indication that male mice were less resistant to the infection of herpetic virus than females, observations were made to determine whether such sex difference existed as well in acquiring resistance to mouse sarcoma 180.

The first three experiments suggested that sarcoma 180 induces resistance more readily in female than in male mice. Equal numbers of stock mice of the same weight (20 to 25 gm) but of different sex were inoculated caudally. In each experiment the mice were divided into three groups, each group containing an equal number of males and females. The first group was tested for immunity on the tenth day, the second on the fourteenth day, and the third on the twenty-first day after caudal inoculation. The tails of these animals were not amputated; consequently only one test for immunity was performed. The following is a summary of the three experiments:

Tested for immunity 10 days after caudal inoculation: Males, 24 mice, 6 immune, 24 per cent; females, 18 mice, 12 immune, 66 per cent.

Tested for immunity 14 days after caudal inoculation: Males, 51 mice, 8 immune, 16 per cent; females, 50 mice, 23 immune, 46 per cent.

Tested for immunity 21 days after caudal inoculation: Males, 30 mice, 6 immune, 20 per cent; females, 33 mice, 13 immune, 40 per cent.

Although these results, perhaps, are not to be accepted as conclusive evidence of more readily induced resistance on the part of females, still it is probable that there is a significant difference in this respect between the sexes. Consequently, care was taken throughout the experiments recorded in this paper to use animals of the same sex as controls. In addition it will be noted that female mice were used almost exclusively.

## THE TIME OF APPEARANCE OF INDUCED IMMUNITY

Woglom (2), in his review of immunity to transplantable tumors, states that acquired immunity is at its maximum in about 10 days. This period is only approximated as regards the immunity induced by growth of sarcoma 180 in the mouse's tail.

Stock female mice were tested for immunity at varying intervals of time following caudal inoculation. The results of three groups of such inoculations are summarized below.

| Number of days after caudal inoculation | Number of mice tested | Immune | |
|---|---|---|---|
| | | Number | Per cent |
| 3 | 20 | 4 | 20 |
| 7 | 37 | 15 | 40 |
| 10 | 43 | 18 | 42 |
| 14 | 50 | 30 | 60 |
| 21 | 52 | 32 | 62 |
| 28 | 35 | 21 | 61 |

These results were obtained during the early part of the studies before amputation of the tail became a routine procedure and consisted of but one test for immunity. However, the experiments indi-

cate that resistance to sarcoma 180 reaches its peak in about two weeks.

FLUCTUATIONS IN CONCOMITANT IMMUNITY INDUCED BY SARCOMA 180

Bullock and Rohdenburg (8) (9) have called attention to fluctuations in immunity induced both by transplantable tumors and by embryo skin. In carrying on this phase of the work, due note was taken of the fact that the stock mice used in these investigations came from three different sources, thereby introducing a factor demanding careful control. Moreover, the tumor itself may vary in its ability to produce immunity when used at different times. The use of a tumor of high virulence in the first test for immunity may also play an important rôle in the number of immune animals obtained. This factor should be considered when using a tumor such as sarcoma 180, as the virulence of the growth may vary greatly, although it may still produce tumors in 100 per cent of control animals. It was, therefore, essential to take certain precautions in carrying out experiments to determine whether or not fluctuations occurred in the resistance induced to sarcoma 180 when stock mice were employed as test animals. In the experiment to be presented, the mice were selected with the following precautions: They were of the same batch of stock animals; they were inoculated about the same time; the tail tumors were of the same size when the tails were amputated; and approximately the same rate of growth occurred in groin tumors of all the controls.

*Experiment 3, August 12, 1931*

Fifty female stock mice were inoculated caudally with sarcoma 180; two weeks later their tails were amputated and the mice tested for immunity; 85 per cent were immune to both test inoculations.

On August 21, 1931, 40 female stock mice were inoculated caudally; they were tested for immunity two weeks later, and at the same time their tails were amputated; only 52 per cent of these animals were immune.

Other experiments not exhibiting the same response in control mice but the same rate of growth of tail tumors also yielded different numbers of immune mice; but in such experiments all the control mice developed tumors which grew progressively and killed the animals. The difference in the number of immune animals in such experiments was apparently due to some difference in the properties of the tumors used for caudal inoculation.

Evidence was easily obtained that the rate of growth of tumors transplanted into the tails of stock mice was associated with their ability to elicit resistance. In four experiments comprising 96 mice, the tumors used for caudal inoculation of female stock mice grew very slowly. Of these 96 mice only 26 or about 27 per cent became

immune. Further evidence that the rate of growth of tail tumors corresponded with their ability to induce immunity was found when the mice kept at lower temperature and bearing slowly growing tumors as a result were tested for immunity. Following the confinement of the mice of experiment 2 in the cold, both they and the room-temperature controls were tested for immunity. This test took place when the tails were amputated—that is, two weeks after inoculation. All the animals after groin inoculation were kept at room temperature. The results were as follows:

Of 42 cold room mice surviving two tests for immunity, 23, or 55 per cent, were immune.

Of 48 control mice surviving two tests for immunity, 41, or 85 per cent, were immune.

This was an exceptionally high percentage of immune mice following the growth of tail tumors in the cold. It should be mentioned, however, that in experiment 2 the cold room mice developed larger caudal growths than in any other similar experiment. Following is a summary of the results of immunity tests in the other seven cold-room experiments:

Of 105 cold-room mice surviving two tests for immunity, 20, or 20 per cent, were immune.

Of 115 control mice surviving two tests for immunity, 66, or 58 per cent, were immune.

In view of the fact that slow-growing tail tumors fail to induce immunity in a high percentage of mice, one might expect conversely that a rapidly growing tail tumor would produce a large number of immune animals. Attention was accordingly paid to this point. In dealing with this phase of the work, stock mice could not be used because under normal conditions no pronounced variation in susceptibility to caudal inoculation of the tumor was observed in these animals. However, it was possible to utilize the extreme susceptibility to caudal inoculation of strain A mice in this connection. Referring once more to experiment 1 we find that a tumor which grew very slowly in the tails of stock mice, nevertheless grew rapidly when implanted in the tails of mice belonging to strain A.

In the same experiment there is also a group of stock mice inoculated from a tumor which, in the tail, produced tumors of average size. All these animals were tested for immunity two weeks after caudal inoculation. The results are as follows:

Group 1: Of 47 strain A mice surviving two tests for immunity, 10, or 20 per cent, were immune.

Group 2: Of 46 control stock mice surviving two tests for immunity, 13 or 28 per cent, were immune.

Group 3: Of 49 stock mice inoculated one day later than the mice of Groups 1 and 2 and surviving two tests for immunity, 34, or 70 per cent, were immune.

From the above it is seen that there is but little difference in the percentage of immune mice in Groups 1 and 2, although the tumor grew excellently in the tails of the more susceptible strain A animals and poorly in the tails of the stock mice. On the other hand, there is a striking difference in the percentage of immune animals of Group 3, as compared with Group 1, although the rate of growth of the tumor in both cases was practically the same, as the difference in the average weights of the amputated tails plus tumor in the two groups was only 0.05 gm.

In general, female mice of strain A were not available in any quantity for immunological investigations of this kind, since they are kept in this laboratory as a source of spontaneous tumors. For this reason, in carrying out most of these experiments, male mice of strain A were used. A protocol of one experiment which shows the difficulty encountered in immunizing strain A mice is now presented.

*Experiment 4*

Seventy-five male mice of strain A weighing 18 to 25 grams each were inoculated near the tip of the tail with sarcoma 180. All developed tumors. Ten days after the first caudal inoculation, a second tail inoculation was made in each mouse. Two weeks after the second inoculation, 73 mice were living, of which 62 had two tail tumors and the remainder, 11, had but one. The tails were then amputated and the mice tested for immunity by groin implantation. Of 64 survivors, only 7, or about 10 per cent, were immune.

In this experiment it is noted that each mouse received a second implantation of sarcoma 180, 10 days after the first, because it was found that reinoculation of the tail increases the yield of immune animals. As a rule, in the case of stock mice undergoing a double tail implantation, about 50 per cent of the male and about 75 per cent of the female mice become immune. The experiment just described is typical of others resulting in the same way, i. e., that in the case of strain A mice although the tumor grows excellently in the tail, it fails to induce concomitant immunity to the same extent as in stock mice.

Three of the factors influencing the fluctuation of immunity induced in mice by caudal inoculation of sarcoma 180 may be summarized as follows: First, an inherent property of the tumor itself. This factor is evident when two tumors produce tail growths of equal size in the same strain of mice, yet possess different powers of eliciting resistance in the mice, as shown by significant fluctuations in the percentage of mice passing the immunity test. The second factor is closely associated with variations in the growth energy of the tumor; e. g., a tumor showing subnormal growth in the tail does not induce concomitant immunity to the same degree as one which pursues a normal

development (15 mm by 6 mm in 14 days). On the other hand there is no evidence to show that a tumor of higher growth power elicits immunity in a higher percentage of mice. In these experiments the experience has been that a tumor that grows steadily but not so rapidly as to overwhelm the defense of the animal produces most immune mice. The third factor lies in the animal itself. Mice such as those of strain A which are highly susceptible to the tumor are apparently unable to build up resistance to the same extent as those animals which already have some degree of natural resistance.

### THE EFFECTS UPON AN ESTABLISHED TUMOR OF REINOCULATION WITH SARCOMA 180

Mice possessing sufficient natural resistance to bring about the regression of caudal tumors were usually found to be resistant to reinoculation. However, there were occasional exceptions to this generalization, for some animals in which a tail tumor had disappeared spontaneously developed tumors when reinoculated in the groin. Instances were also observed in which receding caudal growths resumed activity and grew rapidly as the result of a successful implantation in some other region of the body. Nor is the presence of a rapidly growing subcutaneous tumor in a mouse bearing a regressing tail tumor a rare occurrence. The influence of a successful reinoculation of the tumor upon tumor cells already present within the body was noticed very early in these studies. The following experiment is of interest in this connection:

*Experiment 5*

Ten stock mice were each inoculated in the pad of a rear foot, by using finely minced sarcoma 180 and a 1-cc syringe equipped with a 22-gage needle. Now, it is very easy to detect a small tumor in this region. Within 10 days six of the mice had pad tumors averaging 4 mm in diameter. These animals were subsequently tested for immunity and three were found to be immune. Of the four remaining mice, two proved to be of interest in this group. Each of these four had received a groin inoculation 30 days after pad inoculation; none had shown any evidence of pad tumor up to this time. Two developed groin tumors and died six weeks later. One of the remaining two mice failed to respond to groin implantation, but 43 days following pad inoculation (13 days after groin inoculation) a tumor appeared in the pad. The tumor grew for 12 days, when it reached its maximum size of 5 mm in diameter. It then began to recede and disappeared 14 days later. In the last mouse a groin and pad tumor appeared simultaneously 14 days following groin inoculation (44 days after pad inoculation). The pad tumor attained its maximum size of 3 mm in diameter within 13 days, then began to recede and dis-

appeared 10 days later. The subcutaneous tumor, however, grew progressively and killed the animal two months after inoculation.

The assumption here seems reasonable that the sudden activity of the pad tumors, after a prolonged period of quiescence, was due to the introduction of new tumor cells at another site. Of course, the delayed appearance of the pad tumors might be regarded as fortuitous; yet, from the experience at this laboratory with pad tumors, such tumors were detected, as a rule, within seven to nine days after implantation and never so late as in the case of the animals just mentioned. Conversely, no instance has been observed in the course of these studies of arrest in the development of an actively growing primary tumor because of a successful secondary implantation.

### THE RELATION BETWEEN TUMOR GROWTH AND ACQUIRED RESISTANCE

So far as sarcoma 180 is concerned, it would appear as if growth of tumor cells is essential for the production of immunity. Mice failing to develop tumors in their tails were always susceptible to reinoculation in the groin. The results of a few experiments conducted in this laboratory in which mice were given a subcutaneous injection of suspensions of sarcoma 180 cells produced further evidence along these lines. In these experiments varying dilutions of finely minced tumor were made in physiological saline. While tumors occurred in most of the animals receiving the lower dilutions (1:5 to 1:20), there were a few in which the inoculation was negative. These latter mice were always reinoculated with transplants of the tumor; none evinced any immunity. Since tumors were produced in most of the mice receiving the same dilution of tumor-cell suspension, one may assume that these mice also received living tumor cells. However, these experiments will not be gone into in detail, since there was no way of showing that by some element of chance the living and dead cells of the suspensions were not unequally divided among the various animals.

If we refer back to experiment 5 we find an animal immune to groin inoculation although it showed no sign of growth following an earlier pad inoculation. Yet this mouse finally developed a tumor at the site of the primary inoculation. The results of experiment 1 show that a slow-growing caudal tumor, while inferior in this respect to a tumor of normal growth energy, nevertheless elicits some degree of resistance. The idea consequently suggested itself that but a short period of growth of tumor cells might be required for the production of immunity. If this were so, one might expect a caudal growth of only one week's duration to elicit the same degree of immunity as one growing within the tissues of mice for a longer period of time. In order to examine this possibility the following experiments were performed:

*Experiment 6*

One hundred and twenty female stock mice were inoculated caudally with sarcoma 180. They were divided into 3 groups of 40 each and treated as follows:

Group 1: Tails amputated three days after inoculation.
Group 2: Tails amputated seven days after inoculation.
Group 3: Tails amputated fourteen days after inoculation.

All the mice of Group 2 showed evidence of beginning tumors and all of Group 3 had definite tumors at the time of amputation. Fourteen days after tail inoculation the mice were tested for immunity in the usual manner. The results were as follows:

Group 1: Of 38 mice surviving the immunity tests, 3, or 9 per cent, were immune.
Group 2: Of 38 mice surviving the immunity tests, 9, or 24 per cent, were immune.
Group 3: Of 38 mice surviving the immunity tests, 20, or 53 per cent, were immune.

*Experiment 7*

Seventy-five female stock mice were inoculated in the tail with sarcoma 180 and all developed tumors. Two weeks following inoculation, all the tails were amputated and, at the same time, 37 of the mice were inoculated in the groin. The other 38 were kept for two more weeks and then tested for immunity. The results of these tests were as follows:

Group 1: Of 35 mice inoculated in the groin two weeks after caudal inoculation, 28, or 80 per cent, were immune.
Group 2: Of 36 mice inoculated in the groin four weeks after caudal inoculation, 25, or 70 per cent, were immune.

This finding coincides with the results previously referred to in which the tail tumors grew for 30 days before the mice were tested for immunity. It therefore appears that resistance to the tumor does not reach its maximum until the tumor cells have grown in the mouse tissues for about two weeks. Moreover, once this period has elapsed, further growth of the tumor in the tail does not significantly increase the percentage of animals resistant to reinoculation. However, the fact that 9 per cent of the animals in Group 1 of experiment 6 were found to be immune after only three days with the tumor cells in their tails and the instance of the mouse cited in experiment 5 suggest that animals already possessing a high degree of natural resistance may become immune after contact of their tissues for brief periods only with tumor cells.

### AUTOTRANSPLANTATION IN MICE PREVIOUSLY IMMUNIZED TO SARCOMA 180

The literature on immunity to propagable tumors contains few references to attempts made to ascertain whether an animal exhibits the same resistance to the tumor responsible for its immunity as it does to the same tumor strain taken from another animal. Woglom (10) has studied this problem in relation to the Jensen rat sarcoma and found that autografts of a tumor were unable to grow in the rat in which it had induced immunity. The accessibility of sarcoma 180, when growing in the tail, made this a relatively easy problem to study. The tails of mice bearing a 14-day growth of sarcoma 180 were amputated and the tumors removed under aseptic precautions. One piece of the tumor was reinoculated into a groin of the mouse from which it came and another piece into a control animal. The control mice all developed tumors, thus showing that a tumor taken from an immune animal has not lost its power of proliferation. The mice into which the autotransplant had been made were now inoculated in the opposite groin with a transplant of sarcoma 180 taken from another animal. Fifty-three mice were tested in this manner with the following results:

Twenty-four mice were immune to both transplants.
Seventeen mice were not immune to either transplant.
Twelve mice were immune to the heterotransplant but not immune to the autotransplant.

Until more conclusive evidence is obtained, it seems probable that the mice were equally resistant to both transplants. The fact that 12 mice grew tumors following autotransplantation of their own tumors but were resistant to the transplant from another mouse may be accounted for by a difference in the respective growth energies of the grafts. Apparently, an animal immune to sarcoma 180 is incapable of furnishing a stroma upon which even the cells of the tumor causing the immunity can multiply.

### ATTEMPTS TO MODIFY THE PRODUCTION OF IMMUNITY DUE TO CAUDAL IMPLANTATION OF SARCOMA 180

In conformity with the projected lines of experimentation already mentioned as desirable, provided it were found that mouse sarcoma 180 elicited immunity in mice, attempts were made to influence by change in the experimental animals the production of the immunity brought about by the growth of this tumor in the host tissues. That variations, both in the tumor and in the different strains of mice, have an influence on the production of immunity has already been recorded. Efforts were made through modification of the host both to inhibit and to enhance the production of immunity. However,

positive results were obtained only in connection with the attempts to inhibit the production of immunity.

Investigators of the problems of tumor immunity have often suggested that damage to the reticulo-endothelial system plays a rôle in lowering the resistance of animals to transplantable growths. The experiment to be described was conducted for the purpose of investigating the possibility of india ink's inhibiting the appearance of acquired immunity.

*Experiment 8*

In this experiment 40 female stock mice received intravenous injections of india ink suspensions following caudal inoculation of sarcoma 180. A 10 per cent suspension of india ink was made in distilled water and filtered in order to remove any gross particles. After boiling to insure sterility, the suspension was slowly injected into a caudal vein of mice as follows:

On the first, second, and third day following caudal inoculation, each animal received 0.2 cc and on the fourth, sixth, seventh, and ninth day each received 0.3 cc. On the tenth day following tail inoculation the mice all had caudal growths. No difference was noted in the size of tumors either in the injected or the control mice. At this time all were given an implantation of tumor in the groin. The results were clear cut. Of 30 surviving mice receiving the india ink suspensions, only 1 was immune, while of 34 controls, 20 were resistant.

In order to provide a check upon the outcome of experiment 8, it was deemed advisable to use other substances which affect the reticulo-endothelial cells. Trypan blue, pontamine sky blue, and Chicago blue were employed, since these dyestuffs are known to stain these cells.

*Experiment 9*

One hundred and thirty female stock mice were inoculated caudally with sarcoma 180. Seven days later all these animals had definite tail tumors. They were divided into 4 groups, viz, 3 groups of 30 mice each for receiving injections and the 1 group of 40 to serve as controls. The dye suspensions were prepared by making a 0.5 per cent solution in sterile distilled water. Seven days after caudal inoculation, each animal was injected subcutaneously, on the back, with 0.5 cc of a dye solution. Group 1 received the trypan blue, Group 2 the Chicago blue, and Group 3 the pontamine sky blue. The injections were repeated on the ninth day succeeding tail inoculation. Two days later, Groups 1 and 3 received a third injection. In the case of Group 2, the third injection was omitted, because the mice were intensely stained and did not appear to be as well as those of the other two groups. All four groups were inoculated in the groin

two weeks after caudal inoculation. The tails of these animals were not amputated, but no difference in the size of their tumors was observed. The outcome of the single test for immunity is presented below.

Group 1: Of 24 mice vitally stained with trypan blue, 3 were immune.
Group 2: Of 22 mice vitally stained with Chicago blue, none was immune.
Group 3: Of 26 mice vitally stained with pontamine sky blue, none was immune.
Group 4: Of 31 control mice, 19 were immune.

These findings show that vital staining with these dyestuffs inhibits the production of concomitant immunity in mice bearing tail tumors. Chicago blue and pontamine sky blue in the amounts used proved to be deleterious to the health of the mice, so trypan blue alone was employed in all subsequent experiments. The effect of vital staining with trypan blue upon the ability of mice to acquire resistance to the tumor has been observed during three other experiments in which the technique of administering the dye was identical with that just described. The only difference in the method of carrying out these investigations consisted in amputation of the tails of all mice two weeks after caudal inoculation in order to subject the mice to two tests for immunity. A summary of the findings in these three experiments is given below.

Of 81 mice vitally stained with trypan blue, 16, or 20 per cent, were immune.
Of 79 control mice, 49, or 62 per cent, were immune.

Since it was evident that vital staining with trypan blue reduces the percentage of mice developing immunity consequent upon caudal inoculation, the next step was to determine whether the dye could "break" acquired immunity. In dealing with this problem, mice were selected that had withstood two tests for immunity and for controls, immune mice from the same batch as those receiving the injections. Each immune mouse received three subcutaneous injections on alternate days of 0.5 cc of a 0.5 per cent solution in distilled water of trypan blue. Both the injected and the control mice were inoculated in the groin the day following the last injection. The results of six such experiments are summarized as follows:

Of 81 vitally stained mice, 48, or 68 per cent, developed tumors.
Of 75 control mice, 7, or 9 per cent, developed tumors.

Some of the vitally stained mice developed small tumors which receded, but only animals with progressively growing tumors are included in the figures presented above. The results show that vital staining with trypan blue has a surprising effect upon established immunity.

Ludford (11) (12) has recently found that vital staining with trypan blue inhibits the immunity elicited by embryo skin to mouse adenocarcinoma 63 and also lowers the natural resistance of mice to the

growth of transplantable tumors. His experiments on induced resistance to adenocarcinoma 63 were repeated by the writer with similar results. These findings may be regarded as confirming his observations in this respect, and, in addition, show that by vital staining with large doses of trypan blue, it is likewise possible not only to inhibit the production but also to destroy acquired resistance to mouse sarcoma 180.

ACQUIRED RESISTANCE TO SARCOMA 180 AND SPECIFICITY

Acquired immunity induced by some propagable growths is often effective against other transplantable tumors. Studies pertaining to the specificity of immunity elicited by sarcoma 180 have thus far been confined to but one other strain of tumor. This was the well-known mouse adenocarcinoma 63.[2] In this laboratory the tumor has grown progressively in about 70 per cent of inoculated mice. Young mice are more susceptible than adults. While Russell (5) found this tumor incapable of inducing resistance to reinoculation, the writer's observations in this respect have corresponded to those of Bullock and Rohdenburg (8) and, more recently, to those of Foulds (13), who have shown that substrains of this tumor were able to elicit immunity.

Acquired immunity produced by sarcoma 180 was quite effective against the growth of this carcinoma. The protocol of but one typical experiment will be presented at this time, as identical results were obtained in all the others.

*Experiment 10*

Thirteen mice immune to sarcoma 180 were each inoculated in one groin with a transplant of adenocarcinoma 63 and in the other groin with a transplant of the sarcoma. All control mice (10) inoculated with the sarcoma developed tumors and succumbed within six weeks. Of 55 controls for the adenocarcinoma, 42 grew tumors which ultimately brought about their deaths. None of the 13 test animals developed a tumor.

On the other hand, mice bearing adenocarcinoma 63 or possessing natural resistance to its growth were not immune to sarcoma 180, as shown by the following experiment:

*Experiment 11*

Seven mice negative to 2 previous inoculations of adenocarcinoma 63 and 7 mice bearing 1-month old tumors of the same strain were inoculated in the groin with sarcoma 180. The sarcoma grew in all the 14 test mice.

[2] This tumor was obtained through the courtesy of Dr. F. C. Wood, of the Crocker Institute for Cancer Research.

In 4 other similar experiments 30 mice immune to adenocarcinoma 63 were tested for resistance to transplants of sarcoma 180. None possessed any demonstrable immunity. The experiments recorded above demonstrate that immunity induced by sarcoma 180 is not specific and, in addition, that mice resistant to adenocarcinoma 63 are not resistant to sarcoma 180. Further investigations on the specificity of immunity induced by sarcoma 180 are now in progress.

Apparently, mice refractory to inoculation of sarcoma 180 possess a high degree of immunity. There are several reasons for this statement. In the first place the tumor is very malignant, since it grows in practically 100 per cent of all strains of mice and regresses in a very small percentage of the animals. Secondly, it is exceedingly difficult, if not impracticable, to immunize mice against an active strain of sarcoma 180 by the inoculation of embryo-skin emulsion, a procedure which produces a fair degree of resistance to adenocarcinoma 63. Finally, mice immune to adenocarcinoma 63 are not immune to sarcoma 180, while mice resistant to sarcoma 180 are also resistant to adenocarcinoma 63.

From the results of experiments presented in this communication, it is evident that caudal inoculation of mice with sarcoma 180 furnishes a considerable number of mice which possess a high degree of resistance to reimplantation of this tumor. The procedure is being employed for carrying out further studies on tumor immunity.

## SUMMARY

It is advisable to omit any generalizations based upon the experiments recorded in this paper, since but one strain of tumor has been used. However, the results attending the use of mouse sarcoma 180 may be summarized as follows:

1. The tumor grows when implanted in the tails of mice, but the tail is not so favorable a site as the groin for the progressive growth of the tumor.

2. The rate of growth of caudal tumors is influenced by the natural resistance of the inoculated animals and the growth energy of the tumor employed as inoculum.

3. Low temperatures have a pronounced effect upon caudal tumors by inhibiting their rate of growth.

4. A single caudal inoculation of the tumor induces concomitant immunity in about 60 per cent of adult female mice. This resistance reaches its peak in about two weeks after tail inoculation. It appears as though immunity is induced more readily in female than in male mice.

5. Reinoculation of the tail increases the yield of immune animals.

6. Several factors influence fluctuations in immunity induced in mice by the growth of tail tumors. The first is an unknown inherent

property of the tumor itself; the second is the rate of growth of the tumor—a slow-growing tumor does not induce immunity to the same degree as one which undergoes normal development; the third is the natural resistance of the inoculated animals—highly susceptible mice are unable to acquire resistance to the same extent as animals which possess some degree of natural resistance.

7. Reinoculation with the tumor in some instances affects the activity of tumor cells already present within the body of the mouse.

8. It appears as though growth of the tumor cells is essential for the production of acquired resistance.

9. Mice immunized by a caudal tumor are resistant to an autograft from the tumor inducing the resistance.

10. Intravenous injections of india ink inhibit the production of acquired immunity to the tumor.

11. Subcutaneous injections of trypan blue also inhibit the production of immunity and, in addition, destroy an established resistance to the tumor.

12. Immunity induced by the tumor is also effective against mouse adenocarcinoma 63. Hence the immunity is not specific to mouse sarcoma 180.

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## BIOLOGICAL PRODUCTS

### ESTABLISHMENTS LICENSED FOR THE PROPAGATION AND SALE OF VIRUSES, SERUMS, TOXIN , AND ANALOGOUS PRODUCTS

There is presented herewith a list of the establishments holding licenses issued by the Treasury Department in accordance with the act of Congress approved July 1, 1902, entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the

District of Columbia, to regulate interstate traffic in said articles, and for other purposes."

The licenses granted to these establishments for the products mentioned do not imply an indorsement of the claims made by the manufacturers for their respective preparations. The granting of a license means that inspection of the establishment concerned and laboratory examinations of samples of its products are made regularly to insure the observance of safe methods of manufacture, to ascertain freedom from contamination, and to determine the potency, or safety, or both, of diphtheria antitoxin, scarlet fever streptococcus antitoxin, tetanus antitoxin, botulinus antitoxin, antidysenteric serum, antimeningococcic serum, antipneumococcic serum, bacterial vaccines made from typhoid bacillus, paratyphoid bacillus A, and paratyphoid bacillus B, diphtheria toxin-antitoxin mixture, diphtheria toxoid, diphtheria toxin for Schick test, scarlet fever streptococcus toxin for Dick test, scarlet fever streptococcus toxin for immunization, and the arsphenamines, the only products for which potency standards or tests have been established.

The enumeration of the products is as follows: Serums are placed first, the antitoxins, being more important, heading the list. The other products are arranged generally in the order of their origin. The items in each class are arranged alphabetically.

**Establishments Licensed and Products for Which Licenses Have Been Issued**

AMERICAN ESTABLISHMENTS

Parke, Davis & Co., Detroit, Mich.—License No. 1:

Diphtheria antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin-vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; hemostatic serum (Lapenta); normal horse serum; thyroidectomized horse serum; vaccine virus; rabies vaccine (Cumming); tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, acne diplococcus, Brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, prodigiosus bacillus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; animal epidermal extracts; animal food extracts; vegetable food extracts; pollen extracts; modified bacterial derivatives made from colon bacillus, gonococcus, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigen made from colon bacillus, gonococcus, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Mulford Biological Laboratories, Sharp & Dohme, Broad and Wallace Streets, Philadelphia, Pa.—License No. 2:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; B. histolyticus antitoxin; B. odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; B. sordelli antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimelitensis serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum, antivenin (Nearctic crotalidae); antivenin Bothropic; antivenin (crotalus terrificus); normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, micrococcus melitensis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; sensitized bac-

terial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diyhtheria toxin-antixin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts; poison ivy extracts; poison oak extract; pneumococcus antibody solution; bacterial antigen made from streptococci.

The Cutter Laboratory, Berkeley, Calif.—License No. 8:

Diphtheria antitoxin; B. odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; B. Sordelli antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin B. F.; bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhlis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; pollen extracts; poison ivy extract; poison oak extract.

Bureau of Laboratories, Department of Health, Foot East Sixteenth Street, New York City.—License No. 14:

Vaccine virus.

Lederle Laboratories (Inc.), Pearl River, N. Y.—License No. 17:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; B. histolyticus antitoxin; B. odematiens antitoxin; perfringens antitoxin; B. sordelli antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; measles immune serum; normal horse serum; vaccine virus; rabies vaccine (killed virus); tuberculin old; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, brucella melitensis, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; pollen extracts; poison ivy extract; poison oak extract; animal epidermal extracts; animal food extracts; vegetable food extracts.

Bacterio-Therapeutic Laboratory, Asheville, N. C.—License No. 23:

Watery extract of tubercle bacilli (von Ruck); modified tubercle bacillus derivative (von Ruck),

G. H. Sherman, M. D., Inc., 14600 East Jefferson Avenue, Detroit, Mich.—License No. 30:

Bacterial vaccines made from acne bacillus, brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, nonvirulent tubercle bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, penumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxoid; pollen extracts; bacterial antigens made from colon bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

The Abbott Laboratories, Fourteenth Street and C.-W. Interurban Railroad tracks, North Chicago, Ill.—License No. 43.

Bacterial vaccines made from acne bacillus, brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, micrococcus tetragenus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigen made from acne bacillus, B. coli, Friedländer bacillus, gonococcus, micrococcus catarrhalis, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts.

The Upjohn Co., Kalamazoo, Mich.—License No. 51:

Bacterial vaccines made from colon bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; pollen extracts.

E. R. Squibb & Sons' Research and Biological Laboratories, New Brunswick, N. J.—License No. 52:

Diphtheria antitoxin, erysipelas streptococcus antitoxin, scarlet fever streptococcus antitoxin, tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus; bacterial antigen made from staphylococcus aureus; leucocytic extract from the horse; diphtheria toxin-antitoxin mixture; diphtheria toxoid: diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; poison ivy extract; poison oak extract; arsphenamine, neoarsphenamine, sulpharsphenamine.

Eli Lilly & Co., Indianapolis, Ind.—License No. 56:
Diphtheria antitoxin; erysipelas streptococcus antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; antistreptococcic serum; normal horse serum; hemostatic serum (Lilly), vaccine virus; rabies vaccine (Harris); tuberculin old; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial vaccine made from partially autolized pneumococci; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; bacterial antigen made from acne bacillus, colon bacillus, gonococcus, pneumococcus, staphylococcus albus and staphylococcus aureus, and streptococcocus.

Gilliland Laboratories, Marietta, Pa.—License No. 63:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, gonococcus, influenza bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

Antitoxin and Vaccine Laboratory, Department of Public Health, Commonwealth of Massachusetts, 375 South Street, Jamaica Plain, Boston 30, Mass.—License No. 64:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; antimeningococcic serum; antipneumococcic serum; vaccine virus; tuberculin old; bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid, diphtheria toxin for Schick test.

United States Standard Products Co., Woodworth, Wis.—License No. 65:
Diphtheria antitoxin; tetanus antitoxin; antimeningococcic serum; normal horse serum; vaccine virus; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus; and typhoid bacillus; bacterial antigens made from staphylcoccus albus, staphylococcus aureus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test.

D. L. Harris Laboratories, Metropolitan Building, St. Louis, Mo.—License No. 66:
Rabies vaccine (Harris).

The Arlington Chemical Co., Yonkers, N. Y.—License No. 67:
Bacterial vaccines made from colon bacillus, micrococcus catarrhalis, micrococcus tetragenus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts.

Dermatological Research Laboratories, 1720 Lombard Street, Philadelphia, Pa. (branch of Abbott Laboratories, Chicago, Ill.)—License No. 68:
Arsphenamine; neoarsphenamine; sulpharsphenamine; bismuth arsphenamine sulphonate; neosilver arsphenamine.

H. A. Metz Laboratories, 33 Riverside Avenue, Rensselaer, N. Y.—License No. 69:
Arsphenamine; arsphenamine diglucoside; neoarsphenamine; sodium arsphenamine; silver arsphenamine; neosilver arsphenamine; sulpharsphenamine.

Diarsenol Co. (Inc.), 771 Ellicott Square, Buffalo, N. Y.—License No. 70:
Arsphenamine; neoarsphenamine; sodium arsphenamine; sulpharsphenamine.

Mallinckrodt Chemical Works, St. Louis, Mo.—License No. 77:
Arsphenamine; neoarsphenamine; sulpharsphenamine.

Merck & Co. (Inc.), 916 Parrish Street, Philadelphia, Pa.—License No. 82:
Arsphenamine; neoarsphenamine; sulpharsphenamine; a compound of glucose with arsphenamine base.

Terrell Laboratories, Texas National Bank Building, Fort Worth, Tex. License No. 84:
Rabies vaccine (killed virus).

Jensen-Salsbery Laboratories, Twenty-first and Penn Street, Kansas City, Mo.—License No. 85:
Botulinus antitoxin; antianthrax serum; rabies vaccine (killed virus); bacterial vaccine made from brucella melitensis.

The Neosol Co., 72 Kingsley Street, Buffalo, N. Y.—License No. 90:
Solution of neoarsphenamine; solution of sulpharsphenamine.

Hollister Stier Laboratories, Paulson Medical and Dental Building, Spokane, Wash.—License No. 91:
Bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and xerosis bacillus; pollen extracts.

Medical Arts Laboratory, Medical Arts Building, Oklahoma City, Okla.—License No. 98:
Rabies vaccine (killed virus).

Bureau of Laboratories, Michigan State Department of Health, Lansing, Mich.—License No. 99:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vaccine virus; rabies vaccine (Cumming); bacterial vaccine made from paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

G. D. Searle & Co., 4735 Ravenswood Avenue, Chicago, Ill.—License No. 100:
Arsphenamine; neoarsphenamine; sulpharsphenamine.

National Drug Co., 5109 Germantown Avenue, Philadelphia, Pa.—License No. 101:
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American Chemical Laboratories, 5109 Germantown Avenue, Philadelphia, Pa.—License No. 102:
Poison ivy extract; poison oak extract.

Allergy Laboratories, 1200 North Walker Street, Oklahoma City, Okla.—License No. 103:
Pollen extracts; vegetable food extracts; animal epidermal extracts.

Hixson Laboratories (Inc.), Johnstown, Ohio.—License No. 104:
Diphtheria antitoxin; tetanus antitoxin; rabies vaccine (killed virus); diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test.

C. F. Kirk Co., Bloomfield, N. J.—License No. 105:
Bacterial vaccines made from acne bacillus, colon bacillus, Friedlander bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus.

The Porro Biological Laboratories, Rhodes Medical Arts Building, Tacoma, Wash.—License No. 107:
Pollen extracts.

Knapp & Knapp, North Hollywood, Calif.—License No. 106:
Pollen extracts.

Allen-Sandlin Laboratories, 225 Breslin Building, Louisville, Ky.—License No. 109:
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Diphtheria antitoxin; tetanus antitoxin; antianthrax serum; antidysenteric serum; antiplague serum; antistreptococcic serum; bacterial vaccines made from cholera vibrio, plague bacillus, staphylococcus albus and staphylococcus aureus.

Interessen Gesellschaft Farbenindustrie Aktiengesellschaft, Hoechst am Main, Germany.—License No. 24. Selling agents for the United States: The Winthrop Chemical Company, 170, Varick Street, New York City:
Diphtheria antitoxin; tetanus antitoxin; antistreptococcic serum; normal horse serum; tuberculin old tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from cholera vibrio; gonococcus, staphylococcus albus, staphylococcus aureus, and staphylococcus citreus; typhoid bacillus; sensitized bacterial vaccine made from typhoid bacillus; trichophyton extract; arsphenamine; neoarsphenamine; sodium arsphenamine; silver arsphenamine; neosilver arsphenamine; sulpharsphenamine; sulphoxylarsphenamine.

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Boots Pure Drug Co., Ltd., Nottingham, England.—License No. 92. Selling agents for the United States: The United Drug Co., 43 Leon Street, Boston, Mass.: Arsphenamine diglucoside.

Etablissements Mouneyrat, Villaneuve-la-Garenne, Seine, France.—License No. 94. Selling agents for the United States: G. J. Wallau, 153 Waverly Place, New York City: Phospharsphenamine.

Sero-Bacteriological Department, Bayer-Meister-Lucius, Behringswerke, I. G. Farbenindustrie, A. G. Section, Marburg-Lahn, Germany.—License No. 97: Selling agents for the United States: The Winthrop Chemical Co., 170 Varick Street, New York City.

Bacterial vaccines made from colon bacillus, gonococcus, pneumococcus, pyocyaneus bacillus, staphylococcus albus, and staphylococcus aureus, streptococcus.

Laboratoire de Bacteriophage, 75 rue Olivier de Serres, Paris, France.—License No. 108:

Bacterial antigens made from colon bacillus, dysentery bacillus, enterococcus, Frieldlander bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, proteus bacillus, pyocyaneous bacillus, staphylococcus, streptococcus and typhoid bacillus.

## DEATHS DURING WEEK ENDED AUGUST 20, 1932

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

| | Week ended Aug. 20, 1932 | Corresponding week, 1931 |
|---|---|---|
| Data from industrial-insurance companies | | |
| Policies in force | 71,207,172 | 74,973,572 |
| Number of death claims | 11,355 | 12,270 |
| Death claims per 1,000 policies in force, annual rate | 8.3 | 8.5 |
| Death claims per 1,000 policies, first 33 weeks of year, annual rate | 9.9 | 10.1 |
| Data from 85 large cities of the United States: | | |
| Total deaths | 6,567 | 6,929 |
| Deaths per 1,000 population, annual basis | 9.4 | 10.0 |
| Deaths under 1 year of age | 605 | 620 |
| Deaths under 1 year of age per 1,000 estimated live births [1] | 50 | 48 |
| Deaths per 1,000 population, annual basis, first 33 weeks of year | 11.5 | 12.4 |

[1] 1932, 81 cities; 1931, 77 cities.

# 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 27, 1932, and August 29, 1931

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 27, 1932, and August 29, 1931*

| Division and State | Diphtheria | | Influenza | | Measles | | Meningococcus meningitis | |
|---|---|---|---|---|---|---|---|---|
| | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 |
| New England States: | | | | | | | | |
| Maine | 1 | | | 1 | | 3 | 0 | 0 |
| New Hampshire | | 1 | | | | | 0 | 0 |
| Vermont | | | | | 2 | 1 | 0 | 0 |
| Massachusetts | 14 | 29 | 1 | 4 | 27 | 18 | 2 | 2 |
| Rhode Island | 2 | | | | 1 | 18 | 0 | 2 |
| Connecticut | 5 | 3 | 1 | | 14 | 3 | 0 | 1 |
| Middle Atlantic States: | | | | | | | | |
| New York | 42 | 53 | [1]3 | [1]4 | 106 | 96 | 5 | 5 |
| New Jersey | 11 | 17 | 1 | 1 | 59 | 18 | 0 | 2 |
| Pennsylvania | 30 | 35 | | | 40 | 69 | 7 | 13 |
| East North Central States: | | | | | | | | |
| Ohio | 24 | 32 | 1 | 12 | 8 | 37 | 1 | 4 |
| Indiana | 35 | 10 | 17 | 12 | 5 | 17 | 4 | 5 |
| Illinois [2] | 37 | 52 | 2 | | 33 | 25 | 0 | 3 |
| Michigan | 3 | 14 | 8 | | 39 | 12 | 2 | 2 |
| Wisconsin | 7 | 10 | 20 | 10 | 27 | 18 | 3 | 2 |
| West North Central States: | | | | | | | | |
| Minnesota | 4 | 5 | 1 | 1 | 5 | 3 | 0 | 2 |
| Iowa | 4 | 1 | | | 1 | 2 | 0 | 1 |
| Missouri | 9 | 22 | 2 | 3 | 5 | 3 | 1 | 3 |
| North Dakota | 2 | 2 | | | 7 | 2 | 1 | 0 |
| South Dakota | 3 | 4 | | | | 1 | 1 | 1 |
| Nebraska | 8 | 5 | | | 3 | 3 | 0 | 1 |
| Kansas | 9 | 6 | 3 | | 89 | 1 | 0 | 0 |
| South Atlantic States: | | | | | | | | |
| Delaware | | | | | | | 0 | |
| Maryland [2] [3] | 16 | 13 | 13 | 1 | 3 | 5 | 0 | 2 |
| District of Columbia | 5 | 9 | | 2 | 2 | 1 | 0 | 0 |
| Virginia | 19 | | | | 25 | | 0 | |
| West Virginia | 15 | 7 | 11 | | 23 | 31 | 0 | 3 |
| North Carolina | 35 | 42 | 2 | 3 | 23 | 10 | 1 | 0 |
| South Carolina [2] | 10 | 14 | 99 | 144 | 22 | 5 | 1 | 0 |
| Georgia [2] | 15 | 23 | 18 | 2 | 7 | 31 | 0 | 0 |
| Florida | 14 | 6 | 1 | 1 | 2 | | 0 | 0 |
| East South Central States: | | | | | | | | |
| Kentucky | 43 | 24 | | | | 20 | 2 | 2 |
| Tennessee | 38 | 16 | 8 | 9 | 2 | 3 | 1 | 2 |
| Alabama [2] | 39 | 57 | 7 | 6 | 1 | 4 | 1 | 0 |
| Mississippi | 27 | 50 | | | | | 0 | 1 |

See footnotes at end of table.

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 27, 1932, and August 29, 1931*—Continued

| Division and State | Diphtheria | | Influenza | | Measles | | Meningococcus meningitis | |
|---|---|---|---|---|---|---|---|---|
| | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 |
| West South Central States: | | | | | | | | |
| Arkansas | 10 | 22 | 7 | 5 | ------- | 2 | 0 | 1 |
| Louisiana [3] | 17 | 24 | 6 | 1 | 2 | 5 | 1 | 0 |
| Oklahoma [4] | 26 | 23 | 13 | 18 | ------- | ------- | 0 | 2 |
| Texas [2] | 43 | 16 | 5 | 3 | 8 | 3 | 0 | 0 |
| Mountain States: | | | | | | | | |
| Montana | ------- | 5 | ------- | ------- | 106 | 13 | 1 | 0 |
| Idaho | ------- | 1 | ------- | ------- | ------- | 1 | 0 | 1 |
| Wyoming | ------- | ------- | ------- | ------- | ------- | 1 | 0 | 0 |
| Colorado | 8 | 3 | ------- | ------- | 4 | 5 | 0 | 0 |
| New Mexico | 6 | ------- | ------- | ------- | ------- | ------- | 0 | 0 |
| Arizona | 2 | ------- | 2 | ------- | 1 | ------- | 0 | 2 |
| Utah | ------- | 1 | ------- | 3 | 1 | ------- | 1 | 0 |
| Pacific States: | | | | | | | | |
| Washington | 2 | 3 | ------- | ------- | 4 | 4 | 0 | 0 |
| Oregon | 6 | 5 | 7 | 10 | 15 | 2 | 0 | 0 |
| California [3] | 38 | 30 | 160 | 15 | 28 | 49 | 2 | 2 |
| Total | 684 | 695 | 419 | 271 | 750 | 545 | 38 | 67 |

| Division and State | Poliomyelitis | | Scarlet fever | | Smallpox | | Typhoid fever | |
|---|---|---|---|---|---|---|---|---|
| | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 |
| New England States: | | | | | | | | |
| Maine | 0 | 6 | 8 | 7 | 0 | 0 | 4 | 1 |
| New Hampshire | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 |
| Vermont | 0 | 5 | 8 | 2 | 0 | 4 | 0 | 0 |
| Massachusetts | 1 | 135 | 78 | 65 | 0 | 0 | 8 | 10 |
| Rhode Island | 2 | 20 | 9 | 6 | 0 | 0 | 1 | 6 |
| Connecticut | 1 | 134 | 7 | 9 | 0 | 0 | 0 | 9 |
| Middle Atlantic States: | | | | | | | | |
| New York | 22 | 612 | 109 | 93 | 8 | 2 | 11 | 62 |
| New Jersey | 33 | 103 | 38 | 26 | 0 | 0 | 12 | 11 |
| Pennsylvania | 136 | 9 | 77 | 51 | 0 | 0 | 68 | 41 |
| East North Central States: | | | | | | | | |
| Ohio | 0 | 18 | 62 | 103 | 1 | 3 | 70 | 29 |
| Indiana | 0 | 3 | 33 | 16 | 1 | 9 | 29 | 17 |
| Illinois [3] | 6 | 38 | 60 | 63 | 0 | 11 | 42 | 43 |
| Michigan | 5 | 76 | 51 | 67 | 0 | 7 | 14 | 14 |
| Wisconsin | 1 | 61 | 12 | 14 | 0 | 0 | 0 | 3 |
| West North Central States: | | | | | | | | |
| Minnesota | 7 | 39 | 14 | 16 | 0 | 1 | 6 | 4 |
| Iowa | 1 | 8 | 8 | 8 | 4 | 8 | 7 | 3 |
| Missouri | 0 | 4 | 10 | 16 | 0 | 2 | 48 | 14 |
| North Dakota | 4 | 0 | 9 | 1 | 0 | 3 | 2 | 10 |
| South Dakota | 2 | 0 | 1 | 1 | 0 | 1 | 5 | 4 |
| Nebraska | 1 | 1 | 12 | 6 | 1 | 1 | 7 | 5 |
| Kansas | 2 | 1 | 17 | 18 | 0 | 0 | 15 | 7 |
| South Atlantic States: | | | | | | | | |
| Delaware | 0 | ------- | 4 | 3 | 0 | ------- | 3 | 3 |
| Maryland [2] [3] | 2 | 1 | 23 | 12 | 0 | 0 | 31 | 32 |
| District of Columbia | 1 | 0 | 6 | 3 | 0 | 0 | 2 | 2 |
| Virginia | 2 | 2 | 32 | ------- | 0 | ------- | 47 | ------- |
| West Virginia | 4 | 10 | 14 | 13 | 0 | 0 | 73 | 38 |
| North Carolina | 1 | 4 | 32 | 33 | 0 | 0 | 22 | 32 |
| South Carolina [2] | 4 | 2 | 6 | 11 | 0 | 0 | 36 | 69 |
| Georgia [2] | 0 | 7 | 19 | 40 | 0 | 7 | 64 | 65 |
| Florida | 0 | 0 | 2 | 1 | 0 | 0 | 4 | 1 |
| East South Central States: | | | | | | | | |
| Kentucky | 0 | 1 | 33 | 19 | 0 | 5 | 98 | 47 |
| Tennessee | 3 | 1 | 18 | 27 | 1 | 5 | 94 | 79 |
| Alabama [2] | 1 | 0 | 28 | 23 | 0 | 0 | 43 | 39 |
| Mississippi | 1 | 2 | 7 | 14 | 4 | 3 | 26 | 46 |

See footnotes at end of table.

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 27, 1932, and August 29, 1931*—Continued

| Division and State | Poliomyelitis | | Scarlet fever | | Smallpox | | Typhoid fever | |
|---|---|---|---|---|---|---|---|---|
| | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 | Week ended Aug. 27, 1932 | Week ended Aug. 29, 1931 |
| West South Central States: | | | | | | | | |
| Arkansas | 1 | 1 | 8 | 3 | 1 | 9 | 20 | 65 |
| Louisiana [1] | 1 | 0 | 6 | 16 | 0 | 2 | 36 | 55 |
| Oklahoma [4] | 0 | 0 | 12 | 12 | 1 | 5 | 55 | 34 |
| Texas [2] | 0 | 1 | 16 | 8 | 3 | 1 | 33 | 14 |
| Mountain States: | | | | | | | | |
| Montana | 0 | 3 | 4 | 10 | 2 | 2 | 7 | 0 |
| Idaho | 0 | 0 | 1 | 7 | 0 | 0 | 7 | 3 |
| Wyoming | 0 | 1 | 4 | 0 | 8 | 0 | 0 | 1 |
| Colorado | 1 | 0 | 11 | 15 | 0 | 6 | 9 | 2 |
| New Mexico | 0 | 1 | 6 | 4 | 0 | 0 | 2 | 6 |
| Arizona | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 5 |
| Utah | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 |
| Pacific States: | | | | | | | | |
| Washington | 2 | 0 | 8 | 11 | 5 | 25 | 7 | 7 |
| Oregon | 2 | 1 | 7 | 9 | 1 | 11 | 4 | 6 |
| California [3] | 2 | 6 | 34 | 54 | 4 | 5 | 11 | 19 |
| Total | 253 | 1,321 | 965 | 939 | 45 | 138 | 1,090 | 964 |

[1] New York City only.
[2] Typhus fever, week ended Aug. 27, 1932, 38 cases: 1 case in Illinois, 1 case in Maryland, 1 case in South Carolina, 19 cases in Georgia, 8 cases in Alabama, 3 cases in Louisiana, 4 cases in Texas, and 1 case in California.
[3] Week ended Friday.
[4] Figures for 1932 are exclusive of Oklahoma City and Tulsa, and for 1931 are exclusive of Tulsa only.

## 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 | Cerebrospinal meningitis | Diphtheria | Influenza | Malaria | Measles | Pellagra | Poliomyelitis | Scarlet fever | Smallpox | Typhoid fever |
|---|---|---|---|---|---|---|---|---|---|---|
| *May, 1932* | | | | | | | | | | |
| Hawaii Territory | 3 | 28 | 2 | ---- | 75 | ---- | 1 | 6 | 0 | 1 |
| *June, 1932* | | | | | | | | | | |
| Hawaii Territory | 2 | 24 | 914 | ---- | 23 | ---- | 2 | 3 | 0 | 5 |
| Puerto Rico | ---- | 42 | 6 | 2,064 | 165 | 1 | 3 | ---- | 0 | 42 |
| *July, 1932* | | | | | | | | | | |
| Colorado | ---- | 34 | ---- | ---- | 75 | ---- | 0 | 42 | 21 | 29 |
| Delaware | ---- | ---- | ---- | ---- | ---- | ---- | 0 | 17 | 0 | 2 |
| Idaho | 2 | 11 | ---- | ---- | 8 | ---- | 0 | 25 | 14 | 24 |
| Kansas | 2 | 29 | 1 | 3 | 137 | ---- | 5 | 57 | 8 | 55 |
| Louisiana | 1 | 51 | 22 | 93 | 34 | 90 | 0 | 18 | 0 | 219 |
| Montana | 2 | 6 | 3 | ---- | 85 | ---- | 0 | 27 | 20 | 12 |
| New Hampshire | ---- | 4 | ---- | ---- | ---- | ---- | ---- | 48 | ---- | 2 |
| Oklahoma [1] | 2 | 39 | 46 | 194 | 37 | 25 | 1 | 44 | 28 | 178 |
| Oregon | 1 | 5 | 32 | 1 | 138 | ---- | 1 | 29 | 19 | 14 |
| Pennsylvania | 19 | 166 | ---- | ---- | 1,421 | 1 | 32 | 726 | 0 | 108 |
| Washington | 1 | 14 | 32 | ---- | 170 | ---- | 4 | 52 | 46 | 13 |

[1] Exclusive of Oklahoma City and Tulsa.

*May, 1932*

| Hawaii Territory: | Cases |
|---|---|
| Chicken pox | 58 |
| Conjunctivitis, follicular | 43 |
| Hookworm disease | 38 |
| Leprosy | 6 |
| Lethargic encephalitis | 1 |
| Mumps | 3 |
| Streptococcic sore throat | 3 |
| Trachoma | 1 |
| Whooping cough | 1 |

*June, 1932*

| | |
|---|---|
| Chicken pox: | |
| Hawaii Territory | 38 |
| Puerto Rico | 27 |
| Colibacillosis: | |
| Puerto Rico | 1 |
| Conjunctivitis, follicular: | |
| Hawaii Territory | 5 |
| Dysentery: | |
| Puerto Rico | 23 |
| Filariasis: | |
| Puerto Rico | 1 |
| Hookworm disease: | |
| Hawaii Territory | 42 |
| Impetigo contagiosa: | |
| Hawaii Territory | 1 |
| Leprosy: | |
| Hawaii Territory | 6 |
| Puerto Rico | 2 |
| Mumps: | |
| Hawaii Territory | 8 |
| Puerto Rico | 14 |
| Opthalmia neonatorum: | |
| Puerto Rico | 4 |
| Paratyphoid septicemia: | |
| Puerto Rico | 5 |
| Puerperal septicemia: | |
| Puerto Rico | 16 |
| Tetanus: | |
| Hawaii Territory | 3 |
| Puerto Rico | 4 |
| Tetanus, infantile: | |
| Puerto Rico | 33 |
| Trachoma: | |
| Hawaii Territory | 1 |
| Puerto Rico | 2 |
| Whooping cough: | |
| Puerto Rico | 91 |
| Yaws: | |
| Puerto Rico | 2 |

*July, 1932*

| | |
|---|---|
| Anthrax: | |
| Louisiana | 1 |
| Chicken pox: | |
| Colorado | 89 |
| Delaware | 1 |
| Idaho | 39 |
| Kansas | 35 |
| Montana | 30 |
| Oklahoma [1] | 5 |
| Oregon | 38 |
| Pennsylvania | 635 |
| Washington | 74 |
| Dysentery: | |
| Louisiana | 5 |
| Montana | 1 |
| Oklahoma [1] | 40 |
| Oregon | 1 |
| Food poisoning: | |
| Kansas | 2 |
| German measles: | |
| Colorado | 1 |
| Kansas | 3 |
| Montana | 2 |
| Pennsylvania | 28 |
| Washington | 4 |
| Hookworm disease: | |
| Louisiana | 12 |
| Impetigo contagiosa: | |
| Kansas | 2 |
| Montana | 27 |
| Oregon | 21 |
| Jaundice, epidemic: | |
| Colorado | 3 |
| Leprosy: | |
| Louisiana | 2 |
| Lethargic encephalitis: | |
| Louisiana | 2 |
| Oregon | 2 |
| Pennsylvania | 4 |
| Washington | 6 |
| Mumps: | |
| Colorado | 83 |
| Delaware | 2 |
| Idaho | 17 |
| Kansas | 38 |
| Montana | 22 |
| Oklahoma [1] | 9 |
| Oregon | 26 |
| Pennsylvania | 697 |
| Washington | 30 |
| Ophthalmia neonatorum: | |
| Louisiana | 1 |
| Oklahoma [1] | 2 |
| Pennsylvania | 7 |
| Paratyphoid fever: | |
| Colorado | 2 |
| Kansas | 6 |
| Louisiana | 3 |
| Oregon | 1 |
| Puerperal septicemia: | |
| Pennsylvania | 13 |
| Washington | 3 |
| Rabies in animals: | |
| Delaware | 1 |
| Louisiana | 9 |
| Washington | 1 |
| Rocky Mountain spotted or tick fever: | |
| Colorado | 1 |
| Delaware | 1 |
| Idaho | 3 |
| Montana | 11 |
| Oregon | 6 |
| Scabies: | |
| Montana | 1 |
| Oklahoma [1] | 1 |
| Oregon | 5 |

[1] Exclusive of Oklahoma City and Tulsa.

| Septic sore throat: | Cases |
|---|---|
| Colorado | 1 |
| Louisiana | 2 |
| Montana | 2 |
| Oklahoma [1] | 16 |
| Oregon | 2 |
| Silicosis: | |
| Montana | 2 |
| Tetanus: | |
| Kansas | 2 |
| Louisiana | 7 |
| Pennsylvania | 6 |
| Trachoma: | |
| Kansas | 1 |
| Montana | 2 |
| Oklahoma [1] | 7 |
| Pennsylvania | 1 |
| Trench mouth: | |
| Oklahoma [1] | 2 |
| Oregon | 2 |
| Tularaemia: | |
| Colorado | 1 |
| Louisiana | 1 |
| Oregon | 1 |
| Typhus fever: | |
| Delaware | 1 |
| Louisiana | 1 |

| Undulant fever: | Cases |
|---|---|
| Idaho | 1 |
| Kansas | 3 |
| Louisiana | 8 |
| Montana | 3 |
| Pennsylvania | 5 |
| Washington | 3 |
| Vincent's angina: | |
| Colorado | 11 |
| Kansas | 8 |
| Oklahoma [1] | 5 |
| Oregon | 5 |
| Vincent's infection: | |
| Washington | 1 |
| Whooping cough: | |
| Colorado | 160 |
| Delaware | 21 |
| Idaho | 12 |
| Kansas | 356 |
| Louisiana | 14 |
| Montana | 216 |
| Oklahoma [1] | 72 |
| Oregon | 101 |
| Pennsylvania | 1,961 |
| Washington | 69 |

[1] Exclusive of Oklahoma City and Tulsa.

## GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 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 33,735,000. The estimated population of the 87 cities reporting deaths is more than 32,175,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

*Weeks ended August 20, 1932, and August 22, 1931*

| | 1932 | 1931 | Estimated expectancy |
|---|---|---|---|
| *Cases reported* | | | |
| Diphtheria: | | | |
| 46 States | 571 | 559 | |
| 94 cities | 149 | 192 | 338 |
| Measles: | | | |
| 45 States | 737 | 574 | |
| 94 cities | 231 | 179 | |
| Meningococcus meningitis: | | | |
| 46 States | 45 | 88 | |
| 94 cities | 19 | 31 | |
| Poliomyelitis: | | | |
| 46 States | 184 | 1,135 | |
| Scarlet fever: | | | |
| 46 States | 845 | 821 | |
| 94 cities | 275 | 275 | 225 |
| Smallpox: | | | |
| 46 States | 45 | 103 | |
| 94 cities | 10 | 7 | 12 |
| Typhoid fever: | | | |
| 46 States | 1,112 | 958 | |
| 94 cities | 161 | 133 | 150 |
| *Deaths reported* | | | |
| Influenza and pneumonia: | | | |
| 87 cities | 263 | 306 | |
| Smallpox: | | | |
| 87 cities | 0 | 0 | |

## *City reports for week ended August 20, 1932*

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 non-epidemic 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 1923 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 | 2 | 1 | 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 | 0 |
| Burlington | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| Massachusetts: | | | | | | | | |
| Boston | 7 | 12 | 5 | | 0 | 16 | 9 | 7 |
| Fall River | 0 | 1 | 0 | | 0 | 4 | 1 | 1 |
| Springfield | 3 | 1 | 0 | | 0 | 1 | 0 | 1 |
| Worcester | 0 | 2 | 1 | | 0 | 2 | 1 | 1 |
| Rhode Island: | | | | | | | | |
| Pawtucket | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| Providence | 1 | 2 | 1 | | 0 | 0 | 0 | 2 |
| Connecticut: | | | | | | | | |
| Bridgeport | 0 | 2 | 0 | | 0 | 1 | 0 | 0 |
| Hartford | | 1 | | | | | | |
| New Haven | 3 | 0 | 1 | | 0 | 0 | 0 | 0 |
| **MIDDLE ATLANTIC** | | | | | | | | |
| New York: | | | | | | | | |
| Buffalo | 0 | 5 | 2 | | 0 | 4 | 0 | 4 |
| New York | 13 | 78 | 21 | 4 | 4 | 41 | 48 | 75 |
| Rochester | 1 | 2 | 0 | | 0 | 1 | 1 | 0 |
| Syracuse | 8 | 1 | 0 | | 0 | 2 | 1 | 2 |
| New Jersey: | | | | | | | | |
| Camden | 2 | 1 | 4 | | 0 | 0 | 0 | 1 |
| Newark | 1 | 6 | 0 | 2 | 0 | 17 | 10 | 2 |
| Trenton | 0 | 0 | 0 | | 0 | 2 | 0 | 0 |
| Pennsylvania: | | | | | | | | |
| Philadelphia | 4 | 24 | 2 | 2 | 2 | 3 | 10 | 11 |
| Pittsburgh | 2 | 8 | 2 | | 0 | 3 | 1 | 8 |
| Reading | 0 | 0 | 0 | | 0 | 3 | 0 | 1 |
| Scranton | 0 | | 1 | | | 0 | 0 | |
| **EAST NORTH CENTRAL** | | | | | | | | |
| Ohio: | | | | | | | | |
| Cincinnati | 0 | 2 | 1 | | 1 | 0 | 0 | 6 |
| Cleveland | 5 | 14 | 2 | 2 | 2 | 2 | 7 | 5 |
| Columbus | 2 | 2 | 2 | | 0 | 2 | 0 | 1 |
| Toledo | 2 | 2 | 3 | 1 | 0 | 2 | 0 | 0 |
| Indiana: | | | | | | | | |
| Fort Wayne | 0 | 1 | 2 | | 1 | 0 | 0 | 1 |
| Indianapolis | 1 | 2 | 0 | | 0 | 0 | 8 | 2 |
| South Bend | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| Terre Haute | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| Illinois: | | | | | | | | |
| Chicago | 15 | 46 | 17 | | 3 | 10 | 2 | 15 |
| Springfield | 0 | 0 | 2 | | 0 | 0 | 0 | 0 |
| Michigan: | | | | | | | | |
| Detroit | 5 | 21 | 4 | 1 | 0 | 53 | 4 | 10 |
| Flint | 1 | 1 | 0 | | 0 | 1 | 0 | 0 |
| Grand Rapids | 0 | 0 | 1 | | 0 | 0 | 2 | 2 |

*City reports for week ended August 20, 1932*—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 | | | |
| EAST NORTH CENTRAL—continued | | | | | | | | |
| Wisconsin: | | | | | | | | |
| Kenosha | 3 | 0 | 0 | | 0 | 2 | 0 | 0 |
| Madison | 0 | 0 | 0 | | | 2 | 0 | |
| Milwaukee | 7 | 6 | 1 | | 0 | 5 | 0 | 3 |
| Racine | 4 | 0 | 2 | | 0 | 0 | 1 | 1 |
| Superior | 1 | 0 | 0 | | 0 | 0 | 0 | 0 |
| WEST NORTH CENTRAL | | | | | | | | |
| Minnesota: | | | | | | | | |
| Duluth | 0 | 0 | 0 | | 0 | 0 | 0 | 2 |
| Minneapolis | 1 | 7 | 0 | | 0 | 4 | 1 | 0 |
| St. Paul | 2 | 3 | 1 | 1 | 1 | 0 | 0 | 2 |
| Iowa: | | | | | | | | |
| Des Moines | 0 | 0 | 0 | | | 0 | 0 | |
| Sioux City | 0 | 0 | 1 | | | 0 | 0 | |
| Waterloo | 0 | 0 | 0 | | | 0 | 0 | |
| Missouri: | | | | | | | | |
| Kansas City | 1 | 1 | 0 | | 0 | 1 | 4 | 8 |
| St. Joseph | 0 | 0 | 2 | | 0 | 0 | 0 | 0 |
| St. Louis | 1 | 11 | 6 | | | 0 | 3 | 1 |
| North Dakota: | | | | | | | | |
| Fargo | 0 | 1 | 0 | | 0 | 0 | 0 | 0 |
| Grand Forks | 0 | 0 | 0 | | | 0 | 0 | |
| Nebraska: | | | | | | | | |
| Omaha | 0 | 2 | 5 | | 0 | 0 | 0 | 0 |
| Kansas: | | | | | | | | |
| Topeka | 0 | 0 | 0 | | 0 | 6 | 0 | 0 |
| Wichita | 0 | 0 | 0 | | 0 | 0 | 0 | 1 |
| SOUTH ATLANTIC | | | | | | | | |
| Delaware: | | | | | | | | |
| Wilmington | 0 | 0 | 0 | | 0 | 1 | 0 | 2 |
| Maryland: | | | | | | | | |
| Baltimore | 3 | 8 | 3 | 2 | 0 | 4 | 7 | 6 |
| Cumberland | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| Frederick | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| District of Columbia: | | | | | | | | |
| Washington | 4 | 5 | 0 | 1 | 1 | 0 | 0 | 3 |
| Virginia: | | | | | | | | |
| Lynchburg | 0 | 1 | 0 | | 0 | 0 | 0 | 0 |
| Norfolk | 0 | 1 | 1 | | 0 | 0 | 0 | 0 |
| Richmond | 0 | 4 | 0 | | 0 | 0 | 0 | 1 |
| Roanoke | 2 | 1 | 0 | | 0 | 0 | 0 | 0 |
| West Virginia: | | | | | | | | |
| Charleston | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Huntington | 0 | | 0 | | 0 | 0 | 0 | 0 |
| Wheeling | 0 | 0 | 0 | | 0 | 2 | 0 | 1 |
| North Carolina: | | | | | | | | |
| Raleigh | 0 | 0 | 0 | | 0 | 1 | 0 | 1 |
| Wilmington | 0 | 0 | 1 | | 0 | 0 | 0 | 1 |
| Winston-Salem | 0 | 1 | 1 | | 0 | 11 | 0 | 1 |
| South Carolina: | | | | | | | | |
| Charleston | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Columbia | 0 | 1 | 0 | | 0 | 0 | 0 | 0 |
| Georgia: | | | | | | | | |
| Atlanta | 0 | 1 | 2 | | 0 | 0 | 0 | 4 |
| Brunswick | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| Savannah | 0 | 0 | 2 | | 0 | 4 | 1 | 0 |
| Florida: | | | | | | | | |
| Miami | 0 | 1 | 0 | | 0 | 0 | 0 | 0 |
| Tampa | 0 | 0 | 1 | | 0 | 0 | 1 | 1 |
| EAST SOUTH CENTRAL | | | | | | | | |
| Kentucky: | | | | | | | | |
| Covington | | 0 | | | | | | |
| Lexington | 0 | | 0 | 1 | 0 | 0 | 0 | 0 |
| Louisville | 0 | | 2 | 1 | 0 | 0 | 1 | 0 |

*City reports for week ended August 20, 1932*—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 | | | |
| EAST SOUTH CENTRAL—continued | | | | | | | | |
| Tennessee: | | | | | | | | |
| Memphis | 0 | 1 | 0 | ---------- | 1 | 0 | 0 | 4 |
| Nashville | 0 | 1 | 0 | ---------- | 0 | 1 | 0 | 3 |
| Alabama: | | | | | | | | |
| Birmingham | 0 | 2 | 2 | ---------- | 1 | 0 | 0 | 2 |
| Mobile | 0 | 0 | 1 | ---------- | 0 | 0 | 0 | 2 |
| Montgomery | 0 | 0 | 1 | ---------- | ---------- | 0 | 0 | ---------- |
| WEST SOUTH CENTRAL | | | | | | | | |
| Arkansas: | | | | | | | | |
| Fort Smith | 0 | 0 | 0 | ---------- | ---------- | 0 | 0 | ---------- |
| Little Rock | 0 | 0 | 0 | ---------- | 0 | 0 | 0 | 0 |
| Louisiana: | | | | | | | | |
| New Orleans | 0 | 5 | 5 | ---------- | 0 | 0 | 0 | 7 |
| Shreveport | 0 | 0 | 0 | ---------- | 0 | 0 | 0 | 2 |
| Oklahoma: | | | | | | | | |
| Muskogee | 0 | ---------- | 0 | ---------- | 0 | 0 | 2 | 0 |
| Oklahoma City | 0 | 0 | 4 | ---------- | 0 | 0 | 0 | 4 |
| Texas: | | | | | | | | |
| Dallas | 0 | 4 | 14 | ---------- | 0 | 0 | 0 | 4 |
| Fort Worth | 0 | 0 | 3 | ---------- | 0 | 0 | 0 | 1 |
| Galveston | 0 | 0 | 0 | ---------- | 0 | 0 | 0 | 0 |
| Houston | 0 | 3 | 3 | ---------- | 1 | 0 | 0 | 2 |
| San Antonio | 0 | 2 | 1 | ---------- | 0 | 0 | 0 | 3 |
| MOUNTAIN | | | | | | | | |
| Montana: | | | | | | | | |
| Billings | ---------- | 0 | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- |
| Great Falls | 2 | 0 | 0 | ---------- | 0 | 2 | 0 | 0 |
| Helena | 0 | 0 | 0 | ---------- | 0 | 0 | 0 | 0 |
| Missoula | 0 | 0 | 0 | ---------- | 0 | 0 | 0 | 0 |
| Idaho: | | | | | | | | |
| Boise | 0 | 1 | 0 | ---------- | 0 | 2 | 0 | 0 |
| Colorado: | | | | | | | | |
| Denver | 3 | 5 | 5 | ---------- | 0 | 3 | 5 | 4 |
| Pueblo | 0 | 0 | 0 | ---------- | 0 | 0 | 0 | 0 |
| New Mexico: | | | | | | | | |
| Albuquerque | 0 | 0 | 0 | ---------- | 0 | 0 | 0 | 0 |
| Utah: | | | | | | | | |
| Salt Lake City | 2 | 1 | 0 | ---------- | 0 | 2 | 2 | 2 |
| Nevada: | | | | | | | | |
| Reno | 0 | 0 | 0 | ---------- | 0 | 0 | 0 | 0 |
| PACIFIC | | | | | | | | |
| Washington: | | | | | | | | |
| Seattle | 1 | 1 | 2 | ---------- | ---------- | 0 | 0 | ---------- |
| Spokane | 2 | 1 | 0 | ---------- | ---------- | 0 | 0 | ---------- |
| Tacoma | 0 | 2 | 0 | ---------- | 0 | 0 | 0 | 2 |
| Oregon: | | | | | | | | |
| Portland | 1 | 2 | 0 | ---------- | 1 | 0 | 1 | 1 |
| California: | | | | | | | | |
| Los Angeles | 7 | 16 | 14 | 49 | 1 | 10 | 7 | 9 |
| Sacramento | 0 | 0 | 1 | ---------- | 0 | 0 | 0 | 0 |
| San Francisco | 8 | 5 | 2 | 1 | 0 | 2 | 3 | 1 |

*City reports for week ended August 20, 1932*—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 | | |
| **NEW ENGLAND** | | | | | | | | | | | |
| Maine: | | | | | | | | | | | |
| Portland | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 5 | 16 |
| New Hampshire: | | | | | | | | | | | |
| Concord | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| Nashua | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- |
| Vermont: | | | | | | | | | | | |
| Barre | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Burlington | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 |
| Massachusetts: | | | | | | | | | | | |
| Boston | 14 | 20 | 0 | 0 | 0 | 9 | 2 | 2 | 0 | 48 | 168 |
| Fall River | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 22 |
| Springfield | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 24 |
| Worcester | 2 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 34 |
| Rhode Island: | | | | | | | | | | | |
| Pawtucket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| Providence | 3 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 15 | 45 |
| Connecticut: | | | | | | | | | | | |
| Bridgeport | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 2 |
| Hartford | 1 | ---- | 0 | ---- | ---- | ---- | 1 | ---- | ---- | ---- | ---- |
| New Haven | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 7 | 27 |
| **MIDDLE ATLANTIC** | | | | | | | | | | | |
| New York: | | | | | | | | | | | |
| Buffalo | 5 | 9 | 0 | 0 | 0 | 5 | 1 | 1 | 0 | 27 | 114 |
| New York | 22 | 39 | 0 | 0 | 0 | 70 | 30 | 39 | 4 | 141 | 1,101 |
| Rochester | 2 | 7 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 56 |
| Syracuse | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 29 | 33 |
| New Jersey: | | | | | | | | | | | |
| Camden | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 4 | 1 | 3 | 29 |
| Newark | 3 | 5 | 0 | 0 | 0 | 5 | 1 | 0 | 1 | 32 | 86 |
| Trenton | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 10 | 31 |
| Pennsylvania: | | | | | | | | | | | |
| Philadelphia | 14 | 12 | 0 | 0 | 0 | 18 | 7 | 14 | 0 | 28 | 354 |
| Pittsburgh | 6 | 13 | 0 | 0 | 0 | 11 | 3 | 0 | 0 | 22 | 138 |
| Reading | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 18 |
| Scranton | ---- | 2 | ---- | 0 | ---- | ---- | ---- | 2 | ---- | 6 | ---- |
| **EAST NORTH CENTRAL** | | | | | | | | | | | |
| Ohio: | | | | | | | | | | | |
| Cincinnati | 4 | 4 | 0 | 0 | 0 | 9 | 4 | 0 | 0 | 5 | 110 |
| Cleveland | 9 | 22 | 0 | 0 | 0 | 15 | 3 | 3 | 0 | 39 | 162 |
| Columbus | 2 | 5 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 2 | 63 |
| Toledo | 2 | 4 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 17 | 49 |
| Indiana: | | | | | | | | | | | |
| Fort Wayne | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 17 |
| Indianapolis | 2 | 1 | 1 | 0 | 0 | 2 | 1 | 3 | 0 | 15 | ---- |
| South Bend | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 11 |
| Terre Haute | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Illinois: | | | | | | | | | | | |
| Chicago | 24 | 29 | 0 | 0 | 0 | 37 | 6 | 3 | 0 | 41 | 596 |
| Springfield | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | ---- |
| Michigan: | | | | | | | | | | | |
| Detroit | 19 | 18 | 0 | 0 | 0 | 12 | 4 | 1 | 0 | 93 | 207 |
| Flint | 3 | 4 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 24 |
| Grand Rapids | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 15 | 20 |
| Wisconsin: | | | | | | | | | | | |
| Kenosha | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| Madison | 1 | 0 | 0 | 0 | ---- | ---- | 1 | 0 | ---- | 8 | ---- |
| Milwaukee | 5 | 3 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 65 | 77 |
| Racine | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 9 |
| Superior | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| **WEST NORTH CENTRAL** | | | | | | | | | | | |
| Minnesota: | | | | | | | | | | | |
| Duluth | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 20 |
| Minneapolis | 8 | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 8 | 77 |
| St. Paul | 6 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 23 | 47 |

*City reports for week ended August 20, 1932*—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 | | |
| **WEST NORTH CENTRAL—contd.** | | | | | | | | | | | |
| Iowa: | | | | | | | | | | | |
| Des Moines | 2 | 1 | 1 | 0 | ---- | ---- | 0 | 0 | ---- | 0 | 25 |
| Sioux City | 0 | 0 | 0 | 1 | ---- | ---- | 0 | 0 | ---- | 2 | ---- |
| Waterloo | 0 | 0 | 0 | 0 | ---- | ---- | 0 | 1 | ---- | 0 | ---- |
| Missouri: | | | | | | | | | | | |
| Kansas City | 2 | 3 | 0 | 0 | 0 | 4 | 1 | 2 | 1 | 3 | 85 |
| St. Joseph | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 16 |
| St. Louis | 8 | 3 | 1 | 0 | 0 | 13 | 5 | 5 | 0 | 4 | 172 |
| North Dakota: | | | | | | | | | | | |
| Fargo | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Grand Forks | 1 | 0 | 0 | 0 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| Nebraska: | | | | | | | | | | | |
| Omaha | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 53 |
| Kansas: | | | | | | | | | | | |
| Topeka | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 14 |
| Wichita | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 5 | 22 |
| **SOUTH ATLANTIC** | | | | | | | | | | | |
| Delaware: | | | | | | | | | | | |
| Wilmington | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 27 |
| Maryland: | | | | | | | | | | | |
| Baltimore | 4 | 5 | 0 | 0 | 0 | 9 | 7 | 3 | 0 | 29 | 139 |
| Cumberland | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 11 |
| Frederick | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| District of Col.: | | | | | | | | | | | |
| Washington | 4 | 2 | 0 | 0 | 0 | 14 | 3 | 1 | 0 | 6 | 148 |
| Virginia: | | | | | | | | | | | |
| Lynchburg | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 9 | 10 |
| Norfolk | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 20 |
| Richmond | 2 | 2 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 29 |
| Roanoke | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 13 |
| West Virginia: | | | | | | | | | | | |
| Charleston | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 3 | 0 | 3 | 25 |
| Huntington | ---- | 0 | ---- | ---- | 0 | 0 | 0 | ---- | 0 | 0 | ---- |
| Wheeling | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 22 |
| North Carolina: | | | | | | | | | | | |
| Raleigh | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 16 |
| Wilmington | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 9 |
| Winston-Salem | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 6 | 11 |
| South Carolina: | | | | | | | | | | | |
| Charleston | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 5 | 1 | 0 | 15 |
| Columbia | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | ---- |
| Georgia: | | | | | | | | | | | |
| Atlanta | 3 | 2 | 1 | 0 | 0 | 4 | 4 | 2 | 0 | 4 | 58 |
| Brunswick | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 |
| Savannah | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 32 |
| Florida: | | | | | | | | | | | |
| Miami | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 22 |
| Tampa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| **EAST SOUTH CENTRAL** | | | | | | | | | | | |
| Kentucky: | | | | | | | | | | | |
| Covington | 0 | ---- | 0 | ---- | ---- | ---- | 0 | ---- | ---- | ---- | ---- |
| Lexington | ---- | 0 | ---- | 0 | 0 | 2 | ---- | 9 | 0 | 0 | 19 |
| Louisville | ---- | 2 | ---- | 0 | 0 | 0 | ---- | 3 | 0 | 0 | ---- |
| Tennessee: | | | | | | | | | | | |
| Memphis | 1 | 0 | 1 | 0 | 0 | 9 | 10 | 13 | 4 | 2 | 94 |
| Nashville | 0 | 2 | 0 | 0 | 0 | 3 | 6 | 4 | 2 | 2 | 36 |
| Alabama: | | | | | | | | | | | |
| Birmingham | 2 | 3 | 1 | 0 | 0 | 4 | 4 | 5 | 0 | 0 | 71 |
| Mobile | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 17 |
| Montgomery | 1 | 0 | 0 | 0 | ---- | ---- | 2 | 1 | ---- | 0 | ---- |
| **WEST SOUTH CENTRAL** | | | | | | | | | | | |
| Arkansas: | | | | | | | | | | | |
| Fort Smith | 0 | 0 | 0 | 0 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| Little Rock | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | ---- |
| Louisiana: | | | | | | | | | | | |
| New Orleans | 3 | 4 | 0 | 0 | 0 | 8 | 5 | 9 | 0 | 2 | 139 |
| Shreveport | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 | 33 |

*City reports for week ended August 20, 1932*—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 | | |
| **WEST SOUTH CENTRAL—con.** | | | | | | | | | | | |
| Oklahoma: | | | | | | | | | | | |
| Muskogee | 0 | 0 | ------- | 0 | 0 | 0 | ------- | 0 | 0 | 0 | -------- |
| Oklahoma City | 1 | 4 | 0 | 0 | 0 | 3 | ------- | 5 | 1 | 0 | 37 |
| Tulsa | ------- | ------- | ------- | ------- | ------- | ------- | ------- | ------- | ------- | ------- | -------- |
| Texas: | | | | | | | | | | | |
| Dallas | 3 | 2 | 0 | 0 | 0 | 2 | 3 | 6 | 2 | 2 | 48 |
| Fort Worth | 1 | 2 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 24 |
| Galveston | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 12 |
| Houston | 1 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 1 | 0 | 65 |
| San Antonio | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 60 |
| **MOUNTAIN** | | | | | | | | | | | |
| Montana: | | | | | | | | | | | |
| Billings | 0 | ------- | 0 | ------- | ------- | ------- | 0 | ------- | ------- | ------- | -------- |
| Great Falls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| Helena | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| Missoula | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Idaho: | | | | | | | | | | | |
| Boise | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 7 |
| Colorado: | | | | | | | | | | | |
| Denver | 2 | 3 | 0 | 0 | 0 | 6 | 1 | 0 | 1 | 18 | 77 |
| Pueblo | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 8 |
| New Mexico: | | | | | | | | | | | |
| Albuquerque | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 7 |
| Utah: | | | | | | | | | | | |
| Salt Lake City | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 12 | 32 |
| Nevada: | | | | | | | | | | | |
| Reno | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 |
| **PACIFIC** | | | | | | | | | | | |
| Washington: | | | | | | | | | | | |
| Seattle | 3 | 1 | 0 | 3 | ------- | ------- | 1 | 0 | ------- | 6 | -------- |
| Spokane | 1 | 0 | 1 | 0 | ------- | ------- | 0 | 0 | ------- | 0 | -------- |
| Tacoma | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 14 |
| Oregon: | | | | | | | | | | | |
| Portland | 2 | 1 | 3 | 6 | 0 | 1 | 1 | 0 | 0 | 0 | 53 |
| California: | | | | | | | | | | | |
| Los Angeles | 8 | 12 | 2 | 4 | 0 | 22 | 3 | 1 | 0 | 63 | 225 |
| Sacramento | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 17 |
| San Francisco | 5 | 4 | 0 | 0 | 0 | 11 | 2 | 2 | 1 | 7 | 130 |

| Division, State, and city | Meningococcus meningitis | | Lethargic encephalitis | | Pellagra | | Poliomyelitis (infantile paralysis) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases, estimated expectancy | Cases | Deaths |
| **NEW ENGLAND** | | | | | | | | | |
| Massachusetts: | | | | | | | | | |
| Boston | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 |
| Fall River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Rhode Island: | | | | | | | | | |
| Providence | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| **MIDDLE ATLANTIC** | | | | | | | | | |
| New York: | | | | | | | | | |
| Buffalo | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| New York | 1 | 0 | 0 | 0 | 0 | 0 | 17 | 13 | 4 |
| New Jersey: | | | | | | | | | |
| Camden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Newark | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Trenton | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |

*City reports for week ended August 20, 1932*—Continued

| Division, State, and city | Meningococcus meningitis | | Lethargic encephalitis | | Pellagra | | Poliomyelitis (infantile paralysis) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases, estimated expectancy | Cases | Deaths |
| MIDDLE ATLANTIC—continued | | | | | | | | | |
| Pennsylvania: | | | | | | | | | |
| Philadelphia | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 76 | 12 |
| Reading | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Scranton | 0 | 0 | 0 | 0 | 0 | 0 | ---- | 1 | 0 |
| EAST NORTH CENTRAL | | | | | | | | | |
| Ohio: | | | | | | | | | |
| Cleveland | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| Indiana: | | | | | | | | | |
| Indianapolis | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Illinois: | | | | | | | | | |
| Chicago | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 2 | 0 |
| Michigan: | | | | | | | | | |
| Detroit | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Flint | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| WEST NORTH CENTRAL | | | | | | | | | |
| Minnesota: | | | | | | | | | |
| Minneapolis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| St. Paul | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Missouri: | | | | | | | | | |
| St. Louis | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| North Dakota: | | | | | | | | | |
| Fargo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| Nebraska: | | | | | | | | | |
| Omaha | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| SOUTH ATLANTIC [1] | | | | | | | | | |
| District of Columbia: | | | | | | | | | |
| Washington | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| West Virginia: | | | | | | | | | |
| Huntington | 0 | 0 | 0 | 0 | 0 | 0 | ---- | 0 | 1 |
| South Carolina: | | | | | | | | | |
| Charleston | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 |
| Georgia: | | | | | | | | | |
| Savannah [1] | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| EAST SOUTH CENTRAL | | | | | | | | | |
| Kentucky: | | | | | | | | | |
| Lexington | 0 | 0 | 0 | 0 | 0 | 1 | ---- | 0 | 0 |
| Tennessee: | | | | | | | | | |
| Memphis | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| Alabama: [1] | | | | | | | | | |
| Birmingham | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| WEST SOUTH CENTRAL | | | | | | | | | |
| Louisiana: | | | | | | | | | |
| New Orleans | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 |
| Shreveport | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Oklahoma: | | | | | | | | | |
| Muskogee | 0 | 0 | 0 | 0 | 1 | 0 | ---- | 0 | 0 |
| Oklahoma City | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Texas: | | | | | | | | | |
| Dallas | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| Fort Worth | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| San Antonio | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| PACIFIC | | | | | | | | | |
| Washington: | | | | | | | | | |
| Tacoma | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| California: | | | | | | | | | |
| Los Angeles | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| San Francisco | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

[1] Typhus fever: 12 cases and 1 death: 1 case at Norfolk, Va.; 1 death at Huntington, W. Va.; 10 cases at Savannah, Ga.; and 1 case at Tampa, Fla.

[2] Dengue, 1 case at Mobile, Ala.

# FOREIGN AND INSULAR

## CANADA

*Provinces—Communicable diseases—Week ended August 13, 1932.*—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended August 13, 1932, as shown in the following table. Provinces not given in the table did not report, during the week, any case of any disease included in the table.

| Province | Cerebro-spinal fever | Poliomy-elitis | Ty-phoid fever | Province | Cerebro-spinal fever | Poliomy-elitis | Ty-phoid fever |
|---|---|---|---|---|---|---|---|
| Prince Edward Island | | | 1 | Alberta | | | 3 |
| New Brunswick | | | 5 | British Columbia | | | 1 |
| Quebec | 1 | 26 | 11 | | | | |
| Ontario | 1 | 5 | [1] 12 | Total | 2 | 32 | [1] 33 |
| Saskatchewan | | 1 | | | | | |

[1] Including 3 cases of paratyphoid fever.

*Quebec Province—Communicable diseases—Week ended August 13, 1932.*—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 13, 1932, as follows:

| Disease | Cases | Disease | Cases |
|---|---|---|---|
| Cerebrospinal meningitis | 1 | Puerperal septicemia | 1 |
| Chicken pox | 15 | Scarlet fever | 33 |
| Diphtheria | 18 | Tuberculosis | 34 |
| Erysipelas | 5 | Typhoid fever | 11 |
| Measles | 16 | Whooping cough | 89 |
| Poliomyelitis | 26 | | |

## CUBA

*Habana—Communicable diseases—Four weeks ended August 13, 1932.*—During the four weeks ended August 13, 1932, certain communicable diseases were reported in Habana, Cuba, as follows:

| Disease | Cases | Deaths | Disease | Cases | Deaths |
|---|---|---|---|---|---|
| Diphtheria | 9 | 2 | Scarlet fever | 8 | |
| Leprosy | 1 | | Tuberculosis | 17 | 7 |
| Malaria [1] | 12 | 2 | Typhoid fever [1] | 19 | 3 |
| Measles | 6 | | | | |

[1] Many of these cases are from the island of Cuba, outside of Habana.

## GREAT BRITAIN

*Scotland—Vital statistics—Quarter ended June 30, 1932.*—The Registrar General of Scotland has published the following statistics for the second quarter of the year 1932:

| | |
|---|---|
| Population (provisional) | 4, 880, 000 |
| Births | 24, 250 |
| Birth rate per 1,000 population | 20. 0 |
| Deaths | 16, 410 |
| Death rate per 1,000 population | 13. 5 |
| Marriages | 7, 881 |
| Deaths under 1 year | 1, 975 |
| Deaths under 1 year per 1,000 births | 81 |
| Deaths from— | |
| Bronchitis | 728 |
| Broncho-pneumonia | 670 |
| Cancer | 1, 783 |
| Cerebrospinal fever | 68 |
| Diabetes | 163 |
| Diphtheria | 71 |
| Dysentery | 2 |
| Erysipelas | 51 |
| Heart disease | 2, 438 |
| Influenza | 307 |
| Lethargic encephalitis | 17 |
| Measles | 294 |
| Nephritis, acute | 50 |
| Nephritis, chronic | 327 |
| Paratyphoid fever | 1 |
| Pneumonia (not specified) | 222 |
| Pneumonia, lobar | 350 |
| Poliomyelitis | 5 |
| Puerperal sepsis | 57 |
| Scarlet fever | 53 |
| Syphilis | 29 |
| Tetanus | 3 |
| Tuberculosis | 1, 165 |
| Typhoid fever | 5 |
| Whooping cough | 127 |

## ITALY

*Communicable diseases—Four weeks ended February 7, 1932.*—During the four weeks ended February 7, 1932, cases of certain communicable diseases were reported in Italy as follows:

| Disease | Jan. 11–17 | | Jan. 18–24 | | Jan. 25–31 | | Feb. 1–7 | |
|---|---|---|---|---|---|---|---|---|
| | Cases | Communes affected | Cases | Communes affected | Cases | Communes affected | Cases | Communes affected |
| Anthrax | 17 | 15 | 23 | 20 | 14 | 13 | 4 | 4 |
| Cerebrospinal meningitis | 19 | 15 | 11 | 10 | 16 | 12 | 15 | 13 |
| Chicken pox | 359 | 125 | 310 | 107 | 313 | 103 | 275 | 107 |
| Diphtheria and croup | 509 | 283 | 510 | 300 | 603 | 313 | 486 | 297 |
| Dysentery | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 2 |
| Lethargic encephalitis | | | 4 | 4 | 1 | 1 | 1 | 1 |
| Measles | 1,512 | 207 | 1,781 | 233 | 2,012 | 246 | 2,053 | 252 |
| Poliomyelitis | 6 | 6 | 10 | 10 | 6 | 6 | 12 | 9 |
| Scarlet fever | 378 | 127 | 377 | 139 | 343 | 127 | 311 | 148 |
| Typhoid fever | 269 | 165 | 266 | 151 | 245 | 152 | 244 | 147 |

## YUGOSLAVIA

*Communicable diseases—July, 1932.*—During the month of July, 1932, certain communicable diseases were reported in Yugoslavia as follows:

| Disease | Cases | Deaths | Disease | Cases | Deaths |
|---|---|---|---|---|---|
| Anthrax | 85 | 9 | Poliomyelitis | 5 | |
| Cerebrospinal meningitis | 6 | 7 | Scarlet fever | 229 | 21 |
| Diphtheria and croup | 348 | 22 | Sepsis | 7 | 3 |
| Dysentery | 96 | 11 | Tetanus | 57 | 26 |
| Erysipelas | 148 | 8 | Typhoid fever | 185 | 13 |
| Measles | 223 | 4 | Typhus fever | 10 | |
| Paratyphoid fever | 18 | | | | |

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

(NOTE.—A table giving current information of the world prevalence of the quarantinable diseases appears in the Public Health Reports for August 26, 1932, pages 1798–1811. A similar cumulative table will appear in the Public Health Reports to be issued September 30, 1932, and thereafter, at least for the time being, in the last issue (published on the last Friday) of each month.)

### Cholera

*China.*—Amoy, week ended August 13, 1932, 97 cases, 40 deaths. Canton, week ended August 27, 1932, 7 cases, 2 deaths. Hankow, week ended August 6, 1932, 156 cases, 24 deaths. Hong Kong, week ended August 27, 1932, 8 cases, 5 deaths. Macao, week ended August 13, 1932, 25 cases, 25 deaths. Nanking, week ended August 13, 1932, 138 cases, 17 deaths. Shanghai, week ended August 13, 1932, 343 cases, 31 deaths. Swatow, week ended July 30, 1932, 56 cases, 3 deaths. Tientsin, two weeks ended August 6, 1932, 9 cases.

*Philippine Islands.*—A case of cholera was reported July 29, 1932, in the port of Iloilo, Philippine Islands. This case was reported in the Public Health Reports of August 26, 1932, page 1799, as in Iloilo Province.

### Plague

*Argentina.*—One case of plague was reported in San Luis Province, Argentina, during the week ended August 13, 1932.

*Hawaii Territory.*—A case of plague has been reported at Makawao, Island of Maui, Territory of Hawaii. The onset of the disease occurred August 11, 1932. The patient recovered.

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