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EDITORIAL

WHAT IS EARLY TUBERCULOSIS?

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Since the early days of World War II, millions of people have been examined by means of mass radiography. This new technique is rapidly achieving the long-sought goal of X-ray examinations of the lungs of all adults in the United States. This objective can be reached within 5 years if all resources in the country are mobilized and a national plan is executed with speed and efficiency.

Yet a word of caution must be given to prevent indiscriminate diagnoses of pulmonary tuberculosis on the basis of X-ray examination alone. The films of thousands of persons have shown lesions characteristic of early tuberculosis. Even though a fair percentage of these persons have had no tuberculin tests performed, no sputum examined, and no history of symptoms taken to confirm or deny the suspicious film findings, many of them have been labeled as tuberculous. This is scientifically unsound, and because such a practice tends to become commonplace, and damage is done to people and to control programs, we should now take stock of our diagnostic criteria for the clinical determination of early tuberculosis.

Specialists in tuberculosis rightly insist that, before final diagnosis, every attempt be made to obtain sputum specimens, and that such specimens be submitted to meticulous examination; that is, by direct smear of actual or concentrated sputum and, if this is negative, by culture or guinea pig inoculation. If sputum is not present, a testing sample of gastric contents should be obtained and examined by ap-

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propriate culture methods in laboratories that employ skilled bacteriologists. In cases of pleural effusion, the same procedure should be followed. This is possible only in an accredited laboratory certified by some impartial central laboratory to perform examinations of unquestioned quality.

If, after such diligent search, no tubercle bacilli are found, the diagnosis should be limited to "suspicious tuberculosis." This does not mean that many of the shadows found on the survey films are not the residue of a tuberculosis process that once was active. (This is especially true when the tuberculin test is positive.) Nor does it mean that the person should not be followed for several years to observe new evidences of disease activity. Nevertheless, to be scientific in our practice of medicine and to preclude needless distress, we should refer to such persons as "suspects" until such time as tubercle bacilli can be demonstrated. A firm stand of this sort should do much to clarify confused thinking in mass radiography diagnosis. To put it simply and candidly: do not diagnose pulmonary tuberculosis on the basis of a screening X-ray film alone.

One must study suspicious cases by means of a careful history, including recent or present symptoms which are characteristic of tuberculosis. For differential diagnosis it is essential to apply the tuberculin test, using the intracutaneous method properly applied and interpreted by an experienced person. In the presence of a negative tuberculin test, other reasons than tuberculosis must be found for suspicious shadows, even though their location or configuration be characteristic. Indeed, even for a person whose film shows a cavity, a negative tuberculin test demands that some other etiological factor than tuberculosis be sought as the cause.

The same criteria used in diagnosis must be even more rigidly applied in the treatment of tuberculosis, especially sanatorium care and chest surgery. Persons whose chest films show shadows, discovered by mass radiography, should not be rushed into the sanatorium simply on the evidence of X-ray findings. A 6-week period of follow-up by the physician or clinic will determine the presence or absence of tubercle bacilli in the sputum, gastric contents, or pleural fluid. Because a social stigma unfortunately often attaches to a diagnosis of tuberculosis, and great personal harm through mental anguish can occur, strict restraint should be practiced in naming the disease before its actuality can be proved. Even those persons whose diagnoses are confirmed will profit by a period of waiting, during which they may become accustomed to the idea of having a serious disease. Such a practice will keep expensive sanatorium beds free for patients who are truly ill and will avoid unnecessary exposure of nontuberculous persons sent to sanatoria by mistake.

Persons who have tuberculosis which requires sanatorium care cannot be greatly harmed by short delay of treatment; in many instances the disease has been present for some time. The chest surgeon, too, should wait and watch with patience until tubercle bacilli are demonstrated as present in the lungs. This is particularly true of the too easily performed procedure of pneumothorax. Before the normal physiology of respiration is permanently changed by surgical attack, there must be strong evidence that such change and its attendant loss of function will be compensated for by the patient's future control of active disease.

There is yet no evidence in medical literature that the minimal lesion case with negative sputum, negative gastric lavage, or no sputum is benefited by sanatorium care. Rather it is a more realistic procedure to seek out and hospitalize the original positive sputum case which infected the minimal case so recently discovered.

We have placed emphasis in these remarks on the asymptomatic case with negative sputum or negative gastric contents. We must, however, be aware of and watch for "indolent" early tuberculosis. Caution is called for in the follow-up of early cases of tuberculosis that present vague findings and symptoms that are often difficult to elicit and interpret. This is the type of tuberculosis which British chest specialists call "indolent early tuberculosis," the prognosis of which we know little. Often such patients when placed under sanatorium care recover rapidly without surgical or special aid. Others deteriorate in the sanatorium in spite of the most expert medical skill and the finest facilities. One wonders if both types of cases would not have pursued the same courses undiscovered and unattended. We do not know why the body responds so indolently in these cases. Intensive investigation should help us find the answer, so that our follow-up program can be realistically directed and thereby made more effective.

To sum up, no person should be labeled with the diagnosis of pulmonary tuberculosis on the basis of incomplete evidence. Suspicious film findings must be corroborated by a positive tuberculin test and by positive bacillary findings. Let treatment be delayed and judiciously deliberated until all the facts are in and all the evidence is evaluated. If such a practice is universally followed, chest physicians will gain considerably in accuracy and skill of diagnosis, and limited hospital resources will be conserved. Most important of all, the person suspected of having tuberculosis will be assured thorough and scientific diagnosis and treatment. Judgments based on positive and complete evidence will give a final verdict that protects the individual and the public health.

BCG VACCINATION IN DENMARK [1]

By JOHANNES HOLM, *Chief, Tuberculosis Division, State Serum Institute, Copenhagen, Denmark; Advisory Consultant, Tuberculosis Control Division, United States Public Health Service*

In Denmark BCG vaccination of man has been employed since 1927. In the beginning years, however, it was carried out merely as an experiment of limited extent. It was not until about 1940 that vaccination with the bacillus of Calmette and Guerin was employed there extensively, but in late years it has been adopted as an essential weapon in the fight against tuberculosis.

THE BCG STRAIN EMPLOYED

In 1927 Danish State Serum Institute in Copenhagen received the first BCG strain directly from Calmette, at the Pasteur Institute in Paris. This strain was employed very cautiously: only a few children were vaccinated with it. This was fortunate because the vaccine proved to be far more potent than was expected and gave rise to rather disagreeable complications in the vaccinated children.

The oral method of vaccination was employed at first, and the vaccine was given only to the newborn; Calmette's directions were followed faithfully. Altogether 16 children were vaccinated in this way in 1927, 7 children in 1928, and 22 in 1929. On re-examination of these children in 1930, a considerable number of them were found to be tuberculin-negative, and none showed any sign of tuberculosis.

In September 1930, the intracutaneous method of vaccination, used by Heimbeck, in Norway, and by Wallgren, in Sweden, was begun in Denmark. In the beginning, a dose of 1/100 mg. of BCG vaccine was injected intracutaneously. This was the smallest dose of BCG employed for this form of vaccination in other countries. The dose, however, was found to produce nut-sized local abscesses in the vaccinated children and to leave ulcerations that healed but slowly. In keeping with directions from the Pasteur Institute, the vaccination dose was cut down to 1/1,000 mg., given subcutaneously. This dosage and method resulted in even larger abscesses at the site of vaccination. Intracutaneous injection of 1/1,000 mg. of vaccine also gave rise to large abscesses. It was obvious, then, that the BCG strain employed was too potent, and in 1931 after correspondence with Calmette, the Serum Institute was provided with a new BCG strain from the Pasteur Institute. In comparative experiments with intracutaneous inoculation of guinea pigs, this strain proved to be considerably weaker than the original BCG strain. The first BCG strain gave regular nodules, even when injected in a dose as low as

[1] From the Tuberculosis Control Division.

1/100,000 mg., whereas the new strain gave nodules only in a dose of 1/100 mg. or more. This was the last strain received, and has since been employed exclusively for BCG vaccination in Denmark.

This BCG strain has proved to possess a suitable virulence, so that 0.1 mg. of vaccine culture, injected intracutaneously in man, has not produced too large local reactions at the site of vaccination and, on the whole, has given rise to few complications. At the same time, a very high percentage of the vaccinated individuals have shown a positive tuberculin reaction.

In the course of years the BCG strain has shown some variation in virulence. Originally Calmette stated that BCG was a fixed virus and that he had obtained the attenuation of the initially virulent bovine strain to its present very low virulence by continuous cultivation on bile potato medium. It had been the experience of workers in the Serum Institute in Copenhagen that the BCG strain first received increases in virulence during the period of working with it, even though it was grown continuously on bile potato. As a consequence, the original directions of Calmette for cultivation of the BCG strain were modified.

In Denmark the constancy of virulence of the BCG strain for the production of vaccine has been maintained by growing it on the Sauton medium, with subcultivation about every 2 weeks. Experience has proved this method successful. Periodically, however, the virulence of the strain has weakened slowly under this form of cultivation. When such weakening eventuated, a new increase in virulence was obtained by several passages on bile potato. In more recent years, however, instead of bile-potato passages, a more frequent transfer of the strain on the Sauton medium (every 7 to 10 days) has been employed. This is in keeping with experiments which show that the virulence of the strain depends essentially on the rate of growth of the bacilli on the Sauton medium. With a suitable virulence, the transferred bacilli should cover the entire surface of the medium in the Erlenmeyer flasks employed (capacity of about 180 cc.) in 12 to 14 days. If the surface of the medium is not completely covered by bacterial growth on the fourteenth day, the virulence of the strain is assumed to be weakening, and a higher rate of growth may then be obtained by more frequent transfers.

A low virulence of the strain is evidenced, among other indications, by a relatively large percentage of the vaccinated subjects who show a negative Mantoux reactions in tests performed 6 weeks after vaccination, and by a loss of sensitivity among a relatively high percentage of the vaccinated subjects who gave a positive tuberculin reaction 6 weeks after the vaccination. Table 1 shows these variations after vaccinations performed in 1936–41 (recorded by K. Winge for the Central

TABLE 1.—*Outcome of tuberculin tests, 6 weeks and 1 year after vaccination (after K. Winge)*

Year	Number vaccinated	Tuberculin test administered following vaccination					
		6 weeks			1 year		
		Number tested	Tuberculin negative		Number tested	Tuberculin negative	
			Number	Percent		Number	Percent
1936	82	78	6	8	50	1	2
1937	169	162	12	7	118	19	16
1938	296	280	28	10	203	24	12
1939	432	409	26	6	265	25	9
1940	635	619	54	9	407	70	17
1941	1,243	1,163	29	3	75	1	1

Tuberculosis Dispensary in Copenhagen). Since 1941 we have employed a somewhat more virulent vaccine than previously.

It is of great importance to keep the virulence of the BCG strain exactly at such a level that practically all vaccinated subjects become tuberculin-positive and preserve their sensitiveness to tuberculin as long as possible, and at the same time, to prevent the local reaction at the site of vaccination from becoming too intense and the regional glandular affections too numerous.

PREPARATION OF THE VACCINE

The vaccine is prepared from the bacillary membrane in the flasks containing Sauton medium, on which the bacilli have grown for 14 days, and in which the bacillary membrane covers the surface of the medium completely. The culture mass is freed from adherent medium by means of sterile filter paper; then it is weighed and placed in a flask, together with small balls of stainless steel. A slight amount of diluting fluid is added, and the flask is shaken for about 5 minutes in order to make the bacillary emulsion as homogeneous as possible. The diluting fluid consists of one part Sauton medium and three parts sterile distilled water. Sufficient diluting fluid is added to give a bacillary emulsion containing 1 mg. bacterial culture per cubic centimeter.

The bacillary emulsion is distributed in sterile glass ampules (1 cc., 5 cc., 10 cc.) ready for use. The vaccine should be stored in refrigerators, and in Denmark no vaccine that is more than 8 days old is employed. Before using, the ampules should be shaken energetically for the sake of uniform distribution of the bacillary emulsion.

NORMAL COURSE OF THE VACCINATION

It is important to make sure prior to the vaccination that the individual concerned is tuberculin negative, and this requires a

Mantoux test with 100 T. U.[2] In Denmark the Pirquet test or the Moro test is not regarded as effective in determining whether a given individual is tuberculin negative. Experience has shown that a considerable number of the subjects examined give a negative reaction to the Pirquet or Moro test, and a positive reaction to the Mantoux test with 100 T. U.

If the subject has been exposed to tubercle bacilli within 6 weeks, the vaccination is not performed immediately after a negative tuberculin test, because it is not possible to exclude the possibility that the subject may be in the preallergic phase. Therefore, after 6 weeks, the tuberculin test (Mantoux, 100 T. U.) is repeated; if this test also is negative, only then is the vaccination performed. During the intervening 6 weeks, the subject must not be exposed to a known case of tuberculosis.

The dose of vaccine employed is 0.1 cc., injected intracutaneously in the deltoid region. The intracutaneous injection is given as superficially as possible, and the injection is performed quite slowly. Too deep an injection, or injury to the tissue by rapid injection, often causes excessively large local abscesses and sometimes affection of the regional lymph gland.

Normally, the vaccination is followed after 4 to 5 weeks by the appearance of a small nodule at the site of vaccination. This nodule increases slowly in size, and about 6 weeks after the vaccination, it perforates the surface of the skin and discharges one or two drops of pus. The resulting small ulceration then persists for a few weeks up to a couple of months, whereafter it heals and leaves a tiny scar. Normally, there is no demonstrable enlargement of the regional lymph glands.

The size of the local affection is measured at the same time the tuberculin sensitiveness of the vaccinated subject is tested, usually 6 weeks after the vaccination. For a number of years, the State Serum Institute in Copenhagen has received reports on every instance of BCG vaccination in Denmark; and there is sufficient evidence, therefore, on which to base an estimate of the normal course of vaccination.

The size of the local affection varies rather markedly, even upon employment of the same vaccine. In addition, the size is dependent also upon the virulence of the vaccine employed, the affection increasing in size with increasing virulence of the vaccine.

Table 2 illustrates the size of the local lesion upon employment of a rather potent vaccine. That this vaccine is fairly strong is evidenced principally by the fact that more than 97 percent of the

[2] One T. U. (tuberculin unit) is 1/50,000 mg. standard P. P. D.=1/100 mg. standard old tuberculin. In Denmark the Mantoux test is carried out exclusively with purified tuberculin (P. P. D.).

TABLE 2.—*Course of the BCG vaccination. Vaccinations (strong vaccine) performed in tuberculosis dispensaries and hospitals, January–March 1942*

Age, in years	Number vaccinated	Findings 6–9 weeks after vaccination												
		Tuberculin reactions			Extent of local vaccination reaction (diameter in millimeters)									
			Negative		Infiltration					Ulceration				
		Number tested	Number	Percent	Under 5 mm.	5–9 mm.	10–14 mm.	15 mm. and over	No data	Under 3 mm.	3–4 mm.	5–9 mm.	10 mm. and over	No data
Total	1,839	1,784	48	2.7	436	760	318	69	256	690	398	349	20	382
Under 1	33	31	0	0	10	7	5	6	5	14	6	5	0	8
1–3	37	37	1	.3	8	8	9	6	6	11	11	4	2	9
4–14	200	195	3	1.5	38	73	56	12	21	73	32	62	2	31
15 and over	1,569	1,521	44	2.9	380	672	248	45	224	592	349	278	16	334

vaccinated subjects give a positive tuberculin reaction 6 to 9 weeks after the vaccination. It will be noticed that the infiltration at the site of the vaccination usually has a diameter of 5 to 15 mm., and that only in 5 percent of the cases is the diameter over 15 mm. Most often the ulceration is less than 5 mm. in diameter, and only in about 1 percent of the cases is it over 10 mm. in diameter.

BACKGROUND FOR THE BCG VACCINATION IN DENMARK

A very large part of the young people of Denmark are tuberculin negative. Because it has been known that it is chiefly tuberculin-negative persons who acquire tuberculosis when exposed, BCG vaccination is believed to be a valuable adjunct in the control of tuberculosis.

In Denmark a tuberculin test is invariably performed on every person who is examined for tuberculosis, and everywhere in Denmark this test is carried out with the same technique (Mantoux), the same tuberculin dosage, and even the same tuberculin dilutions. Hence, the results are always directly comparable, and the extensive examinations for tuberculosis carried out in recent years have furnished a large amount of data on the extent of the tuberculous infection in the Danish population.

Great differences of tuberculin reaction percentage are found in various parts of Denmark. This percentage was found to depend to a considerable degree on whether tuberculosis among cattle is prevalent in the district concerned. The tuberculin reaction percentage is considerably higher in districts with a great deal of tuberculosis among the cattle than in districts in which the cattle are nearly or entirely free of the disease. Figures 1 and 2 show some examples of such examinations. In South Jutland, tuberculosis is relatively common among the cattle, whereas in Zealand it has been reduced

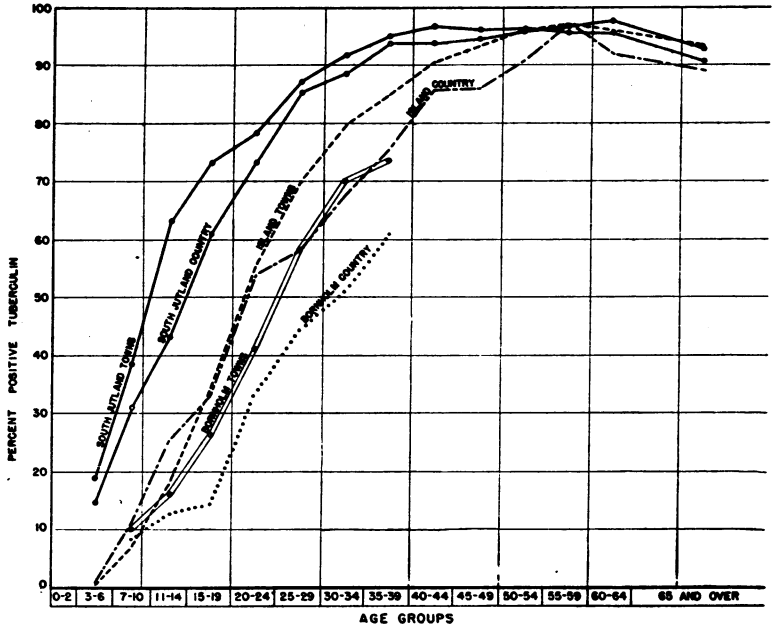


FIGURE 1.—Graphical presentation of tuberculin tests performed by the State Serum Institute, by age groups, 1941–44.

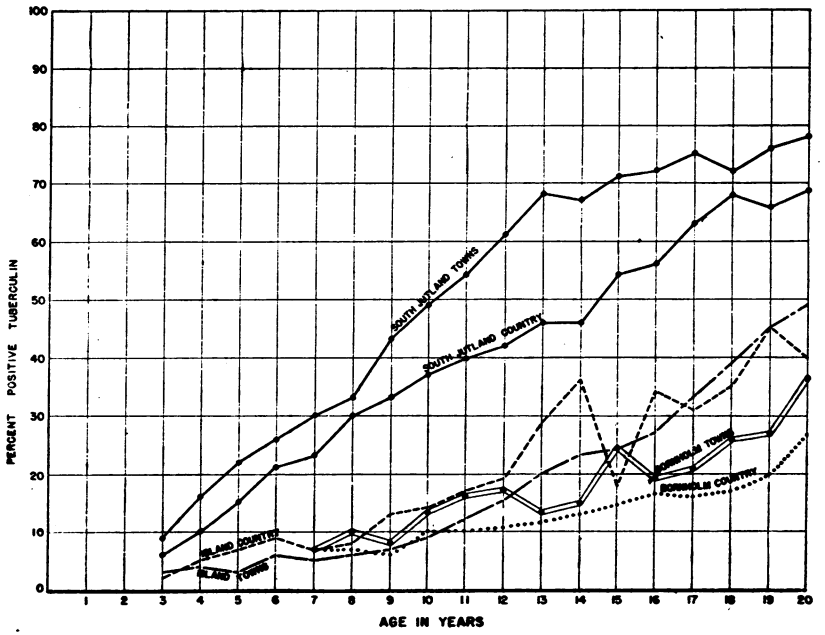


FIGURE 2.—Graphical presentation of tuberculin tests performed by the State Serum Institute, by selected ages, 1941–44.

greatly in recent years and is now almost completely eradicated. On the island of Bornholm, bovine tuberculosis has been eradicated for nearly 20 years.

A reliable conception of the average reaction percentage is obtained from the tuberculin test on the pupils in all the State Schools in Denmark (table 3) performed by the local tuberculosis dispensaries; and on the recruits in the Danish army (table 4), performed by the State Serum Institute and by the Central Tuberculosis Dispensary in Copenhagen.

TABLE 3.—*Tuberculin tests in Danish State schools, by age, 1942–43*

Age, in years	Total			Boys			Girls		
	Tuberculin tests	Positive reactors		Tuberculin tests	Positive reactors		Tuberculin tests	Positive reactors	
		Number	Percent		Number	Percent		Number	Percent
Total	5,333	1,834	34.3	3,756	1,276	33.9	9,089	3,110	34.2
10	102	15	14.7	76	13	17.0	178	28	15.7
11	505	102	20.2	334	62	18.6	839	164	19.5
12	682	178	26.1	534	130	24.3	1,216	308	25.3
13	700	194	27.7	549	177	32.2	1,249	371	29.7
14	709	231	32.6	604	217	35.9	1,313	448	34.1
15	852	321	37.7	551	214	38.8	1,403	535	38.1
16	795	324	40.8	508	188	37.0	1,303	512	39.2
17	642	308	48.0	371	150	40.4	1,013	458	45.2
18	279	123	44.1	186	98	52.7	465	221	47.5
19	67	38	57.0	43	27	63.0	110	65	59.0

TABLE 4.—*Tuberculin tests on Danish recruits, by age, 1945–46*

Age, in years	Tuberculin tests	Positive reactors	
		Number	Percent
19–23	16,998	10,008	58.8
19	462	293	63.4
20	1,180	688	58.3
21	6,267	3,681	58.7
22	8,119	4,752	58.5
23	970	674	69.4

It will be noticed that at the age of 14 years, about two-thirds of the Danish population gives a negative tuberculin reaction, and that even at the age of 20 to 23 years, one-third of the population still gives a negative reaction.

As there are so many young tuberculin-negative adults in Denmark, there has been ample opportunity to investigate the course of tuberculous primary infections in adults also, obtaining thus an impression of how dangerous it is for man, in Denmark at any rate, to acquire a tuberculous primary infection in adulthood.

In the following discussion of the effect of BCG vaccination, comparisons will be made between tuberculin-positives and tuberculin-

negatives exposed to the same degree. From these comparisons it will be evident that the danger of exposure to tubercle bacilli is considerably greater for the tuberculin-negatives than for the tuberculin-positives. For illustration of the studies on the course of primary tuberculous infection, especially in adults, it will be appropriate here to cite an investigation (by Sigrid Holm) of inverters in Copenhagen. Here the possibility of bovine infection can be excluded.

The study included all the inverters diagnosed in the Central Tuberculosis Dispensary of Copenhagen from August 1, 1935, to January 1, 1941, a total of 1,278 adults and 1,020 children. In all these persons an inversion was ascertained from negative to positive tuberculin reaction. All the reactors were then followed up, until July 1944. The average observation period was 2.3 years for adults, 2.5 years for children.

A great part of the inverters were found at once, at the first examination after the infection, to have demonstrable roentgenographic changes in the lungs. In a good many, the presence of tubercle bacilli was demonstrated in the sputum, or more often, on gastric lavage.

On further follow-up (table 5), a considerable number of these persons developed genuine tuberculosis. Only those patients were reckoned as cases of tuberculosis who showed propagation of the process in the lungs or developed genuine extrapulmonary tuberculosis.

Within the observation period mentioned, nine patients died of tuberculosis: namely, one child and eight adults (four men, four women). It was found that pulmonary tuberculosis, as a rule, developed only in persons in whom roentgenographic changes in the lungs were demonstrated shortly after the inversion from negative to positive tuberculin reaction. Of such adult inverters, about

TABLE 5.—*Follow-up study of inverters to tuberculin, Copenhagen, 1936–41 (after Sigrid Holm)*

Inverters	Total	First examination at time of inversion				Subsequent findings after several years' follow-up				
		X-ray changes		Tubercle bacilli demonstrated		X-ray changes		Genuine tuberculosis		
									Percent—	
		Number	Percent of total	Number	Percent of total	Number	Percent of total	Number	Of total	Of X-ray changes
Total	2,298	437	19.0	176	7.7	492	21.4	81	3.5	16.5
Children 1–6 years	288	93	32.3	38	13.2	96	33.3	3	1.0	3.1
Children 7–14 years	732	163	22.3	59	8.1	171	23.4	10	1.4	5.6
Adults, male	695	102	14.7	42	6.0	125	18.0	35	5.0	28.0
Adults, female	583	79	13.6	37	6.3	100	17.2	33	5.7	33.0

30 percent acquired genuine tuberculosis, while the percentage was much smaller for children (7 to 14 years, 6 percent, and 1 to 6 years, 3 percent). The propagation of the tuberculous processes took place nearly always within the first 2 years after the infection. In 20 percent of the adults, the propagation was ascertained in the first year after the inversion. In 10 percent the propagation was ascertained in the second year. Propagation was ascertained after 3 to 4 years in 1 percent. Thus, a relatively short observation period should be sufficient to show in how many inverters genuine tuberculosis subsequently develops.

DURATION OF THE POSITIVE TUBERCULIN REACTION AFTER BCG VACCINATION

A very important question concerning BCG vaccination is how long the positive tuberculin reaction induced by the vaccination will last.

In Denmark it is reckoned that, in order to be effective, the vaccination must induce a positive tuberculin reaction, and that the effect of the vaccination lasts only as long as the positive tuberculin reaction persists.

The vaccination renders by far the greater majority of vaccinated persons tuberculin-positive. As mentioned, the percentage of persons becoming positive in 6 to 8 weeks after the vaccination has varied somewhat in Denmark. Such variation is plainly dependent upon the virulence of the vaccine.

If the vaccinated subject gives a negative tuberculin reaction 6 weeks after the vaccination, it is recommended to wait about 1 month before a new tuberculin test is made, for a not inconsiderable number of vaccinated subjects give a negative reaction 6 weeks after the vaccination and a positive reaction 10 weeks after. If after 10 weeks, reaction to the tuberculin test is still negative, revaccination must be performed. It is to be assumed that such revaccination will be required in 2 to 5 percent of the vaccinated subjects.

In a relatively small number of cases (½ to 1 percent), the tuberculin reaction will remain negative in spite of revaccination. Indeed, these subjects cannot be made to react positively in spite of repeated vaccinations. Occasionally, such persons will have a sensitivity that endures only a very short time.

Ever since the beginning of BCG vaccination in Denmark, it has been a rule to try to perform a tuberculin test on all vaccinated subjects once a year, to see if the effect of the vaccination is preserved. In this way data have been obtained that elucidate the duration of tuberculin sensitiveness in vaccinated persons. Only a small portion

of the data has been analyzed. For many of the vaccinated, the observation period is still rather short.

From table 6 it is evident that as early as 1 year after the vaccination, several of the vaccinated subjects reacted negatively to tuberculin; but the reversion percentage is not as high as was expected. Even 4 years after the vaccination, the great majority of the vaccinated will react positively to tuberculin. This applies not only to persons living in a tuberculous milieu, but also to those outside the tuberculous milieu where the reaction percentage is still high at this juncture.

In Denmark it is now believed justifiable to wait as long as 3 or 4 years before performing tuberculin tests on persons who are not exposed more than normally to tuberculosis. At this time those persons who react negatively can be revaccinated.

COMPLICATIONS IN BCG VACCINATION

In Denmark intracutaneous vaccination has been employed exclusively, and hence all experience with complications is limited to this method. A very great majority of the vaccinations are performed by the tuberculosis dispensaries, and as a consequence the vaccination in general has been carried out by relatively few physicians, who thus have gained a considerable practice in its performance. The performance of the vaccination by a trained vaccinator plays a not inconsiderable role. Complications are far more infrequent among the subjects vaccinated in the tuberculosis dispensaries than among the relatively small number of subjects vaccinated by general practitioners.

Among the vaccinations performed by general practitioners, a rather large percentage have been associated with inconveniencing suppuration at the site of vaccination, often accompanied by swelling of the regional lymph glands and, in a few instances, even by suppuration of this gland. The frequency of complications in the subjects vaccinated and re-examined by the tuberculosis dispensaries is illustrated by table 7.

As seen from table 7, the complications have consisted chiefly in an excessive suppuration at the site of the vaccination. In such cases the suppuration may persist for a few months, but then it heals, without any other reaction. The most inconveniencing complication is suppuration of the regional lymph glands. As a rule, this is located either supraclavicularly or in the axilla. Still, after a single puncture of the glandular abscess, the lesion heals. However, this healing may take a considerable length of time—often about half a year. Not infrequently, the glandular suppuration appears long after the vaccination, but most often it makes its appearance after 2 or 3

TABLE 6.—*Tuberculin sensitivity of BCG-vaccinated persons after specific time lapses (after K. Winge)*

Groups vaccinated	Number vaccinated	Time lapse after vaccination																		
		6 weeks			1 year			2 years			3 years			4 years			5 years		
		Tuberculin tested			Tuberculin tested			Tuberculin tested			Tuberculin tested			Tuberculin tested			Tuberculin tested		
		Number	Negative reactors		Number	Negative reactors		Number	Negative reactors		Number	Negative reactors		Number	Negative reactors		Number	Negative reactors	
			Number	Percent		Number	Percent		Number	Percent		Number	Percent		Number	Percent		Number	Percent
Total	9,511	9,039	207	2.3	3,917	259	6.3	1,869	189	10.1	676	96	14.2	230	40	17.0	116	13	-------
Household contacts	1,055	1,053	24	2.3	711	66	9.3	431	56	13.0	226	29	13.0	142	22	15.0	85	8	-------
General population	5,674	5,488	127	2.3	1,903	99	5.2	690	42	6.1	99	14	14.0	7	1	-------	2	0	-------
Medical students	500	454	19	4.2	259	21	8.1	179	26	14.0	117	22	19.0	42	9	21.0	10	3	-------
Other students	2,282	2,044	37	1.8	1,044	73	7.0	569	65	11.0	234	31	13.0	39	8	21.0	19	2	-------

TABLE 7.—*Complications following BCG vaccination*

Age when vaccinated	Number vaccinated	Complications		
		Total	Local abscess	Glandular suppuration
Total	3,369	26	18	8
Under 1	389	13	6	7
1-6	533	6	6	
7-14	412	4	3	1
15 and over	2,035	3	3	

months. This lesion requires no particular treatment beyond a single puncture.

These complications are found to appear mainly in children under 6 years. Involvement of the regional lymph glands is seen only rarely in older children or adults.

THE PROTECTIVE EFFECT OF BCG VACCINATION

To secure a conclusive estimation of the protective effect of BCG vaccination a long observation period for the vaccinated subjects is required. Because it is only in recent years that the BCG vaccination has been employed to any considerable extent in Denmark, only limited data on this question have been analyzed.

There can be no doubt that vaccination protects against the morbid conditions resulting from a primary tuberculous infection. For elucidation of this point, extensive data are available. But the signal question is whether the vaccination also protects against genuine pulmonary tuberculosis—against phthisis.

In Denmark BCG vaccination has been employed chiefly in tuberculous milieuz. In all the tuberculosis dispensaries where the vaccination has been carried out, it has been the general experience that BCG has offered an essential protection. Experiences with BCG vaccination of children have been quite comprehensive. In the tuberculous milieu all the children giving a negative reaction have been vaccinated, also the newborn; and upon showing a positive reaction, they have been permitted to associate with the source of infection at home. Therefore, BCG vaccination has been submitted to severe test. Yet it has been the experience of the Tuberculosis Dispensary of Copenhagen that tuberculosis morbidity and mortality among the children in the tuberculous milieu have been reduced to almost nothing after systematic vaccination has been carried through. Previously tuberculosis mortality among children was high in this milieu, but in recent years no children so exposed have died of

tuberculosis; and those children who become ill have a much milder form of tuberculosis than that previously observed. This fact is plainly seen in those vaccinated children who acquire pulmonary infiltrations. These infiltrations subside within a very short time.

The most important experiences concerning BCG vaccination were gained on the island of Bornholm, with a population of nearly 50,000. As mentioned before, tuberculosis among cattle has been eradicated on this island for about 20 years. Because of this circumstance the percentage of positive tuberculin reactions on Bornholm has been very low in recent years (cf. figs. 1 and 2).

On Bornholm it was ascertained that observed cases of tuberculosis, particularly in young people, occurred chiefly in the tuberculin-negatives. This was found to apply especially to the tuberculin-negative subjects who left the island for some other part of Denmark: a good many of them returned to the island with tuberculosis. Since 1937 it has been emphatically urged that all tuberculin-negative subjects leaving the island should submit to the vaccination; and since 1940 all the tuberculin-negative young persons residing on the island have been, as far as possible, vaccinated.

Figure 3 illustrates the distribution of new recognized cases of tuberculosis on Bornholm distributed by age groups for the two periods of 1936–40 and 1941–45. For the years 1936–40, the age distribution

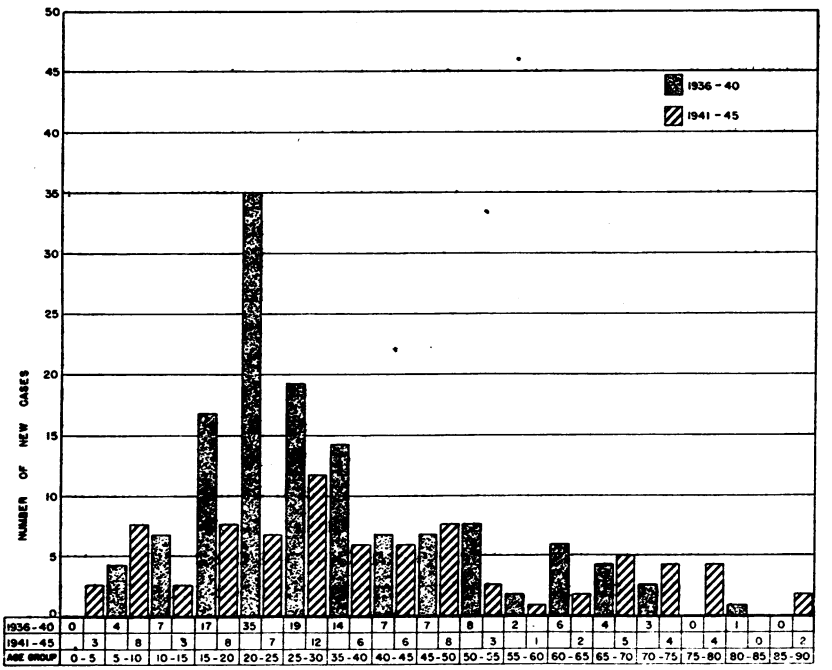


FIGURE 3.—New cases of pulmonary tuberculosis in Bornholm by age groups, 1936–40 and 1941–45.

is similar to that for all of Denmark; that is, most new cases are found in the 15–35 year age group. For the next 5-year period, 1941–45, it will be noticed that there has been a very considerable reduction in the cases of tuberculosis within the age group of 15–35 years—a decrease which must be ascribed to extensive BCG vaccination in these age groups. At the end of 1945, over 10,000 of the population of the island (about 50,000) had been vaccinated, and a majority of the vaccinated subjects belong to the 15–35 year age group.

The most reliable estimation of the protective effect of the vaccination may be reached by observing a group of persons, a part of whom are tuberculin-positive as a result of a natural infection; another part, tuberculin-positive because of vaccination; and another, vaccinated and tuberculin-negative. In Denmark, however, little data of this nature are available.

Still, an example of such research is the examination of the students at the University of Copenhagen. The subjects are divided into two groups, one of which is designated as "particularly exposed". This group comprises medical students, who have reached the clinical part of their studies, under which they are particularly exposed to tubercle bacilli. This is evidenced by the fact that the yearly rate of inversion of this group has been ascertained to amount to 18 percent—in contrast to the yearly rate of inversion of 9 percent for the other students.

From table 8 it will be noticed that the instances of tuberculosis occurrence are far more frequent among the tuberculin-negative students than among the tuberculin-positive, and that no case of tuberculosis is encountered in the group of BCG-vaccinated students.

An epidemic of tuberculosis that occurred in one of the Danish State Schools in 1942 has furnished excellent evidence for elucidating the effect of the BCG vaccination. This school was a secondary girls' school, with pupils aged from 12 to 18 and 19 years. The pupils

TABLE 8.—*Continued control observation of students*

Reaction to tuberculin or vaccinated	Group	Number of persons	Person-years observed	Medical examinations	
				With X-ray changes	With tubercle bacilli
Positive reactors	*Total*	*2,071*	*5,655*	*17*	*10*
	Especially exposed	936	3,249	12	6
	Not especially exposed	1,135	2,406	5	4
Negative reactors	*Total*	*863*	*1,950*	*52*	*21*
	Especially exposed	322	937	38	17
	Not especially exposed	541	1,013	14	4
BCG-vaccinated	*Total*	*175*	*317*	*0*	*0*
	Especially exposed	112	222	0	0
	Not especially exposed	63	95	0	0

and personnel of the school had been examined for tuberculosis several times before the last time, a couple of months before the appearance of the epidemic, and several of the pupils were BCG vaccinated. Immediately after the epidemic, all the pupils and the entire personnel of the school were again examined for tuberculosis; and in the following 3 years, all the persons exposed in the epidemic were under observation by the local tuberculosis dispensary. As a consequence, a detailed and reliable survey of the cases of tuberculosis produced by the epidemic was possible.

Owing to the appearance of tuberculosis in one of the pupils, all the pupils and personnel of the school had been examined for tuberculosis in 1941 and again 3 months later. At the last examination, BCG vaccination of the tuberculin-negative pupils was advised, and 75 percent of them were vaccinated. In December 1942 the school was examined again. Of the 368 pupils, 263 were found to be tuberculin-positive, of whom 133 had been BCG vaccinated. Altogether, 105 pupils were tuberculin-negative (including 1 who had been BCG vaccinated). The tuberculin-negatives were found chiefly among the new pupils who had entered the school since the last examination. At this examination no sign of tuberculosis was revealed among the pupils or the personnel, and on this account the tuberculin-negatives were not advised at this examination to submit to BCG vaccination.

Then, in January and February 1943, an influenza-like epidemic broke out among the pupils of the school almost explosively. As several of the pupils had an eruption of erythema nodosum at the same time, it was realized that this might be an epidemic of tuberculosis, and a thorough examination of the pupils and personnel of the school was at once undertaken. The first tuberculin test showed that of the 105 pupils who were tuberculin-negative in December 1942, 66 now gave a positive tuberculin reaction. So, it was realized at once that a tuberculosis epidemic was the problem.

The source of infection was found to be a female teacher, in whom minimal processes were demonstrated in one apex, together with positive gastric lavage. Shortly before Christmas she had had a bad "cold." She was teaching natural science exclusively, in a classroom situated in the basement, which because of the war conditions had been transformed into an air raid shelter. Artificial light had to be used continually, and ventilation was poor. She did not teach all the classes. The classes which she taught were found to include many inverters and cases of tuberculosis. This was also true of classes that occupied the classroom immediately after her lessons. In the classes that were not taught by her and did not come into this room, no inverters and no instances of tuberculosis were found.

From table 9 it is plain that this was a very strong tuberculous in-

TABLE 9.—*Tuberculosis epidemic in Aurehoej State school, January–February 1943. (No cases were found on routine examination in December 1942)*

Students exposed to teacher with pulmonary tuberculosis[1]	Total	Positive tuberculin, December 1942				Negative tuberculin, December 1942				
		Naturally positive		BCG vaccination[2]			Inverters			
		Total	Cases of genuine pulmonary tuberculosis	Total	Cases of genuine pulmonary tuberculosis	Total	Total	X-ray changes	Tubercle bacilli demonstrated	Cases of genuine pulmonary tuberculosis
Total	368	130	4	133	2	[3] 105	[4] 70	41	37	7
In her class	214	73	4	88	2	53	46	26	22	6
In her classroom only	91	32	0	18	0	41	24	15	15	1
Subtotal	305	105	4	106	2	94	70	41	37	7
Not in her class or classroom	63	25	0	27	0	11	0	0	0	0

[1] Source of infection active in December 1942, January 1943.
[2] BCG vaccination, February 1942.
[3] Includes 1 who had been vaccinated February 1942.
[4] 66 were positive reactors by February 1943.

Examined in October 1941 and again in February 1942, BCG vaccination.
Examined in December 1942: No case of tuberculosis (3 inverters).
Source of infection active in December 1942 to January 1943.
Examined in February 1943: *See* schema (3 years' observation.)

Initial symptoms in 55 inverters (fever, "angina").
Erythema nodosum in 8 (Jan. 21 to Mar. 2, 1943).
Pleurisy in 10 inverters (3 to 11 months after infection).
Tuberculous peritonitis in 1 inverter (16 months after infection).

fection, because among the tuberculin-negative pupils in the classes instructed by this teacher an inversion percentage of no less than 85 was ascertained; and in the classes occupying this room after her lessons and not instructed directly by her, the inversion percentage was 59. Such a high inversion percentage within a period of 3 months has not been observed at any other time in Denmark, and it seems likely that the marked spreading of the infection was due, to a considerable degree, to the circumstance that the infection took place in a blacked-out room.

The primary phenomena of the illness, which must be ascribed to the pulmonary infection, occurred exclusively in the previously tuberculin-negative pupils and in no instance among the BCG-vaccinated. So here is strong proof of the protection given by BCG vaccination against the complications accompanying the primary infection. Observation in the following 3 years has shown that of the originally tuberculin-negative pupils (the inverters), one died of tuberculosis and six acquired genuine pulmonary tuberculosis. Among the pupils who originally, in December 1942, were tuberculin-positive, six cases of genuine pulmonary tuberculosis appeared, two of them among the BCG-vaccinated.

On comparison of the group of BCG-vaccinated with the tuberculin-negative group, it is found that BCG vaccination has offered a considerable degree of protection against the development of genuine pulmonary tuberculosis. On comparison of the BCG-vaccinated group with the group of tuberculin-positive from natural infection, the BCG vaccination is found to have given at least as effective a protection against genuine pulmonary tuberculosis as has the natural infection.

All told, it seems safe to state that BCG vaccination gives an almost complete protection against the morbid conditions accompanying the tuberculous primary infection and also a considerable degree of protection against genuine pulmonary tuberculosis. This protection, however, is not absolute, since in every fairly large study group, there will be a few instances of pulmonary tuberculosis among the BCG-vaccinated subjects.

EMPLOYMENT OF BCG VACCINATION IN DENMARK

In Denmark, in recent years, the employment of BCG vaccination has been increasing greatly—as is evident from table 10, which shows the number of vaccinated persons in Denmark in the various years. Prior to 1940, the vaccination was limited chiefly to persons particularly exposed (medical students, the personnel of tuberculosis hospitals and sanatoria, persons living in a tuberculous milieu). Since then, however, the employment of the vaccination has been extended considerably. In the last few years, several tuberculosis dispensaries have advised vaccination of all tuberculin-negative persons encountered in milieu and serial examinations.

In Denmark the significance of the BCG vaccination has been appreciated widely, so that now such vaccination is rarely refused. In recent years, moreover, the vaccination has been applied to all tuberculin-negative soldiers in the Danish army. Early this spring, in Copenhagen, a general examination of the population for tuberculosis, combined with BCG vaccination, was begun. In the course of about half a year, nearly all the persons of 15 to 35 years will be examined, and the tuberculin-negative will be vaccinated.

TABLE 10.—*Number of BCG vaccinations in Denmark in 1934–45*

Year	Number of persons vaccinated	Year	Number of persons vaccinated
1934	82	1940	3,100
1935	118	1941	7,000
1936	293	1942	20,000
1937	1,000	1943	33,000
1938	1,600	1944	40,000
1939	2,700	1945	40,000

Hitherto we have vaccinated only children living in a tuberculous milieu. Vaccination of school children has not been employed to any great extent, being limited to schools in which infection sources exist. Otherwise the vaccination of the school children has been limited to those who are 14 years or older. But as tuberculosis occurs rather frequently within the age class of 7 to 14 years, there is now a strong tendency in Denmark to adopt vaccination of all school children.

CONCLUSIONS

BCG vaccination is absolutely safe.

When the proper technique of vaccination is employed by experienced vaccinators, the complications after BCG vaccination are relatively few.

It is very important to keep the virulence of the BCG strain at the proper level and to watch closely the variations of its virulence.

The vaccination gives considerable, but not absolute, protection. It protects almost completely against the morbid phenomena accompanying the tuberculous primary infection, and it also affords a considerable protection against genuine tuberculosis of the various organs—in particular, against phthisis.

CONTROL OF BOVINE TUBERCULOSIS IN THE UNITED STATES[1]

A picture of grazing cattle appeared for many years on the cover of Farmers' Bulletin 1069, United States Department of Agriculture. This quiet pastoral, depicting the first herd in the United States officially accredited as free of tuberculosis, symbolizes a great victory over one of the deadliest enemies of man.

This victory was an important step in a Nation-wide program to eradicate bovine tuberculosis from the United States. The history of the program is long; the battle is still being fought. But a record of considerable progress may now be reviewed.

The United States Department of Agriculture undertook the huge task of bovine tuberculosis eradication on July 1, 1917, when it established the Tuberculosis Eradication Division of the Bureau of Animal Industry (*1*). Since the early years of this program, the proportion of cattle tested that have given a positive reaction has decreased from about 4 percent to less than one-quarter of 1 percent (*2*).

[1] From the Office of the Chief, Tuberculosis Control Division, U. S. Public Health Service, based upon Statistical Tables Showing Progress of the Eradication of Tuberculosis in Livestock and Brucellosis in Cattle in the United States, published Nov. 1, 1945, by the Tuberculosis Eradication Division, Bureau of Animal Industry, U. S. Department of Agriculture.

The groundwork for the eradication of bovine tuberculosis was laid by Robert Koch in 1882, when he discovered the *Mycobacterium tuberculosis*, or tubercle bacillus. The organism may be of human, bovine, or avian type. The bovine tubercle bacillus is clearly differentiated from other forms, and has a wide range of pathogenicity for different animal species. Human beings and swine are particularly susceptible. The type of tubercle bacillus that causes tuberculosis in man can be unquestionably demonstrated by laboratory methods (*3*). In Denmark, examinations of tuberculosis specimens are routinely conducted on a differential basis (*4*).

The bovine tuberculosis eradication program in the United States did not evolve primarily as an altruistic plan to protect humans from infection, but as a sound approach to increasing the value of herds. As far back as 1890, tuberculin was used in the United States for testing cattle. In 1896 Pennsylvania established its Bureau of Animal Industry, and tested 5,430 animals with tuberculin, finding 21.9 percent positive reactors. The test was not given to those that were suspected of having tuberculosis (*5*).

Nation-wide tuberculosis eradication in cattle and other animals did not gain momentum until the Federal program was established in 1917. Various States passed legislation in accordance with the Federal plan, and Federal veterinarians, under Civil Service, developed a testing program that is still in effect. The plan was that of "cleaning up" one area at a time. The goal was to rid every county in the United States of bovine tuberculosis and to keep every county free of the disease.

There may be a choice of testing method, but usually two methods are employed, so that one may be checked against the other. Tuberculin may be injected intradermally, and when this method is used, the injection is generally made near the base of the tail. The reaction is positive if there is a red swollen area 72 to 120 hours after injection. The ophthalmic test consists of introducing tuberculin into one eye, the other serving as a "control." A positive reaction is obtained when there is characteristic swelling and discharge 3 to 10 hours after application. A third method is the subcutaneous injection of a sufficient quantity of tuberculin to cause a rise in the temperature of infected animals. There must be a series of temperature readings before the injection, and up to 24 hours afterward.

Since it is not practicable to X-ray cattle as human beings are X-rayed, there is no means of learning what type of lesion the animal may have. Those with positive reactions must therefore be slaughtered, in order to determine the extent of disease and to protect both well cattle and humans. Thus, infected animals are constantly eliminated from herds.

The testing program has been conducted by veterinarians, under Federal and State jurisdictions. Indemnities from State and Federal funds are paid to owners who have suffered losses through the slaughter of tuberculous cattle, but on the whole the losses are balanced by various gains. The owner of an "accredited free herd" gains by a bonus in selling price for grade and breeding cattle, by freedom to ship, for a period of 1 year, to out-of-State markets without inspection, by increased milk production, and healthier animals. Some of the slaughtered cattle, moreover, show no further evidence of tuberculosis. Often only portions of the carcasses are condemned. There has been a considerable amount of salvage in the program. Standards are followed that have been established by the Federal Meat Inspection Division, which determines how the infected meat may be used, and how much of it must be sterilized.

Two hundred and eighty-nine thousand head of cattle, the positive reactors among 9,700,176 tested, were slaughtered in 1927. Upon examination, veterinarians determined that only 9.5 percent of this number must be condemned as unsuitable for human consumption, and even of those condemned, some were sterilized and made fit to eat. By 1945 this total decreased to approximately 19,000 reactors for slaughter, of which only 959 were condemned (see table 1).

Each State cooperated with the Department of Agriculture in this program. The separation of the diseased animals from the healthy was the basic objective. An "accredited herd" is one that has passed two annual tuberculin tests without reactors. The second annual test must be a combination of at least two methods of applying tuberculin. Under these conditions the accredited herd is one that is almost certain to be free of tuberculosis. In 1923 the concept of "modified accredited areas" developed, and time has proved it to be of value. Before an area can qualify as such, all the cattle must have been tuberculin tested. The positive reactors are slaughtered, and the herd is later retested. Areas are considered "tuberculosis free" if less than 0.5 percent of the cattle react.

The bovine-testing program has been conducted in county after county, in State after State. It required 10 years for North Carolina to become the first State in which every county showed testing results of less than 0.5 percent positive reactors among its cattle. The remaining States and Territories gradually become free of tuberculosis. In November 1940, after 23 years of concerted effort, every one of the 3,071 counties in the United States, including the District of Columbia, was a modified accredited free area (see table 2).

Reports of the Meat Inspection Division of the Department of

TABLE 1.—*Losses of cattle, excepting reactors, due to retensions for tuberculosis (not including parts of carcasses), fiscal years 1916–45*

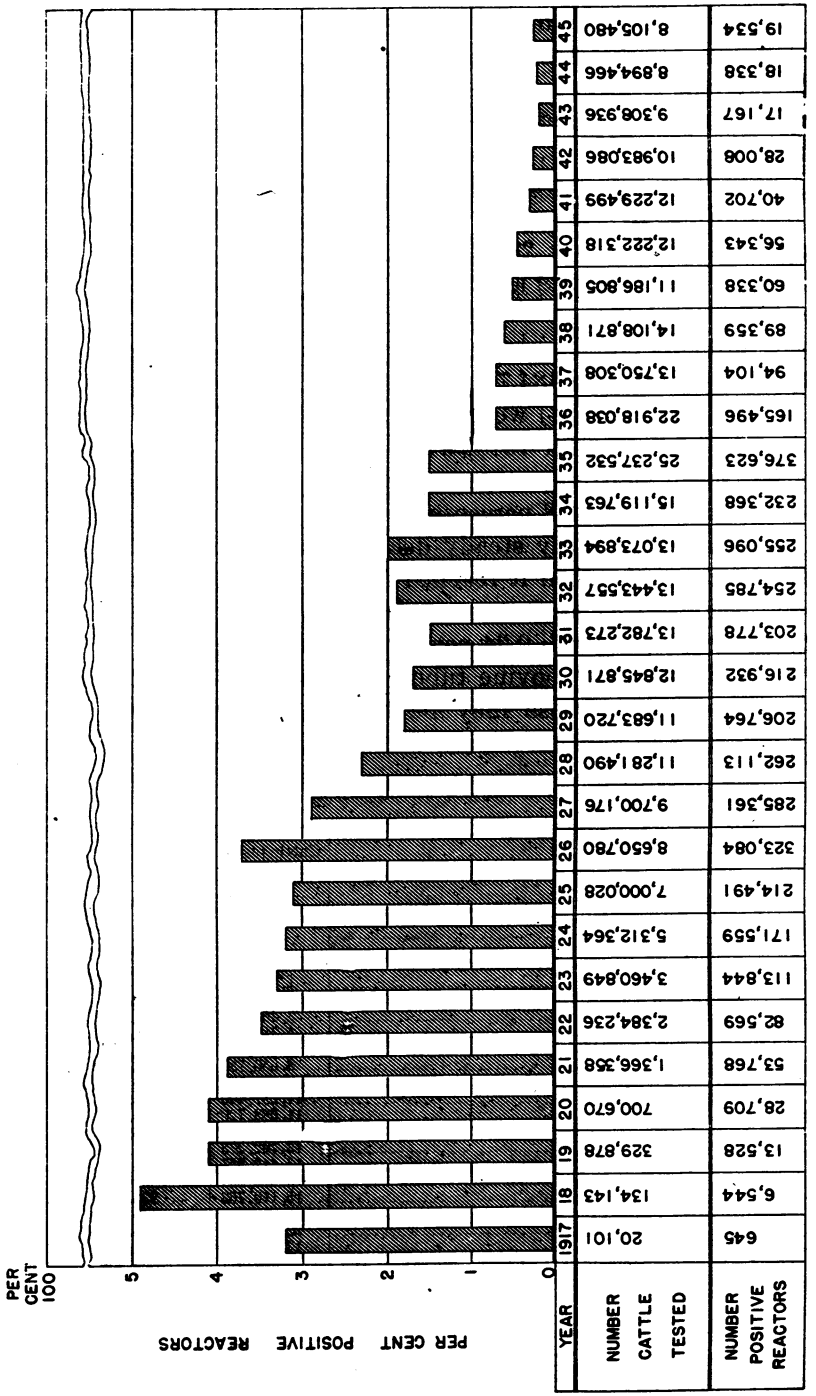
[From Federal meat-inspection records]

Fiscal year	Cattle slaughtered minus reactors	Carcasses retained minus reactors		Carcasses condemned and sterilized minus reactors, and percent of slaughter	
	Number	*Number*	*Percent*	*Number*	*Percent*
1916	7,387,051	173,754	2.35	39,218	0.53
1917	9,276,049	195,488	2.11	49,214	.53
1918	10,912,417	196,917	1.8	46,335	.42
1919	11,212,543	176,250	1.57	42,729	.38
1920	9,666,188	157,016	1.62	39,305	.41
1921	8,137,982	132,068	1.62	33,312	.41
1922	7,795,323	146,945	1.87	34,712	.45
1923	8,934,975	156,738	1.75	41,113	.46
1924	9,049,342	141,595	1.56	39,333	.43
1925	9,595,969	145,012	1.51	40,374	.42
1926	9,817,599	138,506	1.41	41,125	.42
1927	9,810,797	112,924	1.15	31,755	.32
1928	8,837,882	91,856	1.04	25,664	.29
1929	8,120,992	81,276	1.0	21,265	.26
1930	8,119,760	61,192	.75	15,487	.19
1931	8,061,749	50,725	.63	12,430	.15
1932	7,793,878	38,446	.5	9,307	.12
1933	7,554,258	31,971	.42	7,993	.11
1934	9,476,141	34,509	.36	9,329	.10
1935	12,563,474	30,569	.24	8,273	.07
1936	10,215,227	19,076	.19	4,856	.05
1937	10,858,778	15,816	.15	4,003	.04
1938	9,934,984	11,668	.12	2,828	.03
1939	9,515,754	10,090	.11	2,395	.03
1940	9,530,642	8,384	.09	1,998	.02
1941	10,102,594	8,029	.07	1,868	.02
1942	11,743,465	7,255	.06	1,865	.015
1943	11,559,167	5,630	.04	1,440	.012
1944	12,900,844	5,778	.04	1,628	.012
1945	14,504,806	5,830	.04	1,539	.01

TABLE 2.—*Tuberculosis-free accredited herds and cattle, fiscal years 1918–45*

End of fiscal year—	Herds	Cattle	End of fiscal year—	Herds	Cattle
1918	204	6,945	1932	174,648	2,863,434
1919	782	19,021	1933	194,349	3,172,575
1920	3,370	82,986	1934	225,809	3,396,553
1921	8,201	193,620	1935	238,937	3,514,242
1922	16,216	363,902	1936	256,056	3,746,955
1923	28,526	615,156	1937	275,744	3,912,652
1924	48,273	920,370	1938	269,095	3,807,142
1925	72,383	1,275,063	1939	262,972	3,829,941
1926	96,392	1,577,087	1940	284,757	3,743,951
1927	130,476	1,885,072	1941	263,405	3,925,112
1928	169,356	2,265,938	1942	259,775	3,913,405
1929	170,995	2,280,043	1943	246,611	3,837,412
1930	182,858	2,646,686	1944	243,551	3,828,856
1931	156,599	2,619,261	1945	237,991	3,751,942

Agriculture provide a measure of the progress made by the Tuberculosis Eradication Division. Animals slaughtered under Federal supervision are inspected for disease of all kinds. Farmers' Bulletin 1069, revision of 1939, contains a table showing the losses from tuberculosis among cattle slaughtered for general purposes, excluding the positive reactors to the tuberculin test. In 1920, 1.62 percent of all animals slaughtered were condemned for tuberculosis; whereas in 1938, only 0.03 percent were condemned. As those infected were eliminated from the herds, fewer cattle going to market were condemned because of tuberculous infection.



YEAR	NUMBER CATTLE TESTED	NUMBER POSITIVE REACTORS
1917	20,101	645
18	134,143	6,544
19	329,878	13,528
20	700,670	28,709
21	1,366,358	53,768
22	2,384,236	82,569
23	3,460,849	113,844
24	5,312,364	171,559
25	7,000,028	214,491
26	8,650,780	323,084
27	9,700,176	285,361
28	11,281,490	262,113
29	11,683,720	206,764
30	12,845,871	216,932
31	13,782,273	203,778
32	13,443,557	254,785
33	13,073,894	255,096
34	15,119,763	232,368
35	25,237,532	376,623
36	22,918,038	165,496
37	13,750,308	94,104
38	14,108,871	89,359
39	11,186,805	60,338
40	12,222,318	56,343
41	12,229,499	40,702
42	10,983,086	28,008
43	9,308,936	17,167
44	8,894,466	18,338
45	8,105,480	19,534

FIGURE 1.—Annual results of tuberculin testing of cattle, United State 1917–45.

In a recent publication, the Tuberculosis Eradication Division of the Department of Agriculture has included tables from which the whole campaign against bovine tuberculosis can be reviewed (*2*). Figure 1 shows the annual results of bovine tuberculin testing. The program started in 1917, with the examination of 20,101 head of cattle. The peak year was 1935, when the Division tested 25,237,532 head. Addition of the yearly totals reveals that the number tested through 1945 was about 280 million, with about 4 million positive reactors. This represents an average of 1.4 percent positive reactors since 1917.

Eight million, one hundred and five thousand, four hundred and eighty head of cattle, in 484,749 herds, were tested in 1945. Of these, only 19,534 (0.24 percent) were positive reactors. This may be compared with the figures for 1918, when 134,143 head were tested, with 6,544 positive reactors (4.9 percent). The 1945 percentage is only one-twentieth of the 1918 percentage (4.9 as compared with 0.24).

Figure 1 shows a fairly steady decrease in the percent of positive reactors until 1943, when it reached the low of 0.18. The following two war years reveal an increase. In 1944, there were 0.20 percent positive reactors; in 1945, 0.24 percent (see also table 4).

It is significant that bovine tuberculosis has been on the increase since 1943. The increase may be largely attributed to the war. The dislocation of personnel trained in keeping herds free of tubercu-

TABLE 4.—*Annual results of tuberculin testing of cattle, fiscal years 1917–45*

Fiscal year	Cattle tested	Reactors	
		Number	*Percent*
1917	20,101	645	3.2
1918	134,143	6,544	4.9
1919	329,878	13,528	4.1
1920	700,670	28,709	4.1
1921	1,366,358	53,768	3.9
1922	2,384,236	82,569	3.5
1923	3,460,849	113,844	3.3
1924	5,312,364	171,559	3.2
1925	7,000,028	214,491	3.1
1926	8,650,780	323,084	3.7
1927	9,700,176	285,361	2.9
1928	11,281,490	262,113	2.3
1929	11,683,720	206,764	1.8
1930	12,845,871	216,932	1.7
1931	13,782,273	203,778	1.5
1932	13,443,557	254,785	1.9
1933	13,073,894	255,096	2.0
1934	15,119,763	232,368	1.5
1935	25,237,532	376,623	1.5
1936	22,918,038	165,496	.7
1937	13,750,308	94,104	.7
1938	14,108,871	89,359	.6
1939	11,186,805	60,338	.5
1940	12,222,318	56,343	.46
1941	12,229,499	40,702	.3
1942	10,983,086	28,008	.26
1943	9,308,936	17,167	.18
1944	8,894,466	18,338	.2
1945	8,105,480	19,534	.24
Total	279,235,490	3,891,950	1.4

losis resulted in the influx of many workers with no knowledge of protective measures; infected herds that had been more or less isolated within their own farm boundaries were sold to owners of apparently well herds; owner dislocation occurred; fewer veterinarians were available; and tuberculosis infection spread.

In 1945, there were 0.24 percent positive reactors in the States and Territories. The following table gives the data by States for that year. In all, 8,105,480 head of cattle were tested, of which 19,534 were positive. Hawaii and New Jersey, with, respectively, 1.3 and 1.26 percent positive, showed the most infection, while the District of Columbia, Nevada, and the Virgin Islands showed no positive reactors (see table 5).

TABLE 5.—*Tuberculin testing of cattle, by States, fiscal year 1945*

	Herd tested	Cattle tested	Reactors found	Percent reactors	Infected premises
Total	484,749	8,105,480	19,534	0.24	7,743
Alabama	957	22,112	18	.08	11
Arizona	2,716	46,776	118	.25	67
Arkansas	1,584	17,052	9	.05	8
California	28,746	673,247	1,126	.16	328
Colorado	1,968	23,919	77	.32	56
Connecticut	12,653	184,893	534	.29	179
Delaware	2,219	41,096	63	.15	27
District of Columbia	1	199	0	0	0
Florida	1,908	51,400	17	.03	9
Georgia	1,158	15,794	87	.55	4
Idaho	2,140	31,309	46	.14	12
Illinois	51,571	755,119	1,758	.23	867
Indiana	11,867	158,212	301	.19	207
Iowa	22,578	445,421	1,702	.38	1,033
Kansas	2,153	39,241	153	.39	109
Kentucky	1,679	27,607	84	.3	26
Louisiana	1,240	29,269	46	.16	18
Maine	1,306	15,410	15	.1	9
Maryland	11,716	209,748	250	.12	114
Massachusetts	14,682	206,783	400	.19	191
Michigan	22,183	271,806	622	.23	379
Minnesota	28,005	566,538	593	.1	377
Mississippi	2,132	24,209	13	.05	5
Missouri	2,398	40,483	2	.005	2
Montana	831	21,645	16	.07	8
Nebraska	1,896	37,979	124	.33	46
Nevada	108	1,557	0	0	0
New Hampshire	10,161	119,548	81	.67	52
New Jersey	16,231	245,006	3,088	1.26	712
New Mexico	1,045	12,894	12	.9	11
New York	72,170	1,416,401	2,697	.19	952
North Carolina	1,862	42,123	8	.02	5
North Dakota	1,171	27,336	56	.13	26
Ohio	26,022	283,858	352	.12	178
Oklahoma	2,255	52,658	102	.19	31
Oregon	13,347	118,092	412	.35	200
Pennsylvania	29,132	370,151	1,834	.5	586
Rhode Island	2,125	30,909	209	.68	83
South Carolina	642	14,321	8	.06	2
South Dakota	1,607	41,223	110	.27	48
Tennessee	466	11,997	48	.4	8
Texas	7,318	149,597	169	.11	51
Utah	5,108	22,865	72	.31	69
Vermont	8,883	206,803	296	.14	116
Virginia	3,910	91,935	128	.14	62
Washington	17,755	140,861	243	.17	89
West Virginia	2,891	37,615	8	.21	8
Wisconsin	23,530	574,739	868	.15	217
Wyoming	2,042	28,758	39	.14	28
Hawaii	224	17,746	231	1.3	20
Puerto Rico	2,451	88,535	289	.33	97
Virgin Islands	6	685	0	0	0

Any discussion of bovine tuberculin testing programs should include the information that the United States Department of Agriculture has cooperated with various States in eradicating tuberculosis among fowl and swine. Since 1925 the Department has been working with avian tuberculosis eradication (see table 6). Flocks have been under the supervision of veterinarians assigned to avian projects, and the percent found to be infected has been reduced from 6.2 in 1925 to 3.0 in 1945. Tuberculosis infection in birds is characterized pathologically by intestinal ulceration and by tubercle formations in the viscera. Infection of fowl by way of the alimentary tract is readily accomplished experimentally, and it is believed that this is the usual route of entry.

TABLE 6.—*Avian tuberculosis eradication work in cooperation with various States, fiscal year 1945. Results of inspections of poultry by veterinarians assigned to the avian project*

	Tested		Reactors to tuberculin tests		Inspections		Clinically affected		Total flocks under supervision
	Flocks	Fowls	Flocks	Fowls	Flocks	Fowls	Flocks	Fowls [1]	
Illinois	455	63,947	276	4,300	2,038	309,019	109	18,198	9,279
Indiana	32	7,063	12	116	1,862	202,088	139	35,538	1,250
Kansas	32	5,558	16	53	923	167,537	2	231	2,639
Michigan	347	83,379	45	207	0	0	0	0	347
Minnesota	198	25,035	73	813	962	114,926	0	0	1,833
Nebraska	324	3,651	110	393	1,220	209,008	108	19,110	3,085
Ohio	5	934	3	21	939	197,233	3	8	17,543
South Dakota	336	80,519	86	1,848	1,381	264,252	152	29,294	5,309
Totals	1,729	270,086	621	7,751	9,325	1,464,063	513	102,379	41,285

[1] Represents all birds in flocks, both infected and healthy.

It is known that infection occurs by this route in other susceptible animals, particularly swine, that feed on the same ground. Because swine frequent barnyards and readily contract tuberculosis of both the avian and bovine types, tuberculin testing followed by the slaughter of swine with positive reactions has been conducted since 1921. Almost a million swine were slaughtered in 1945 because of tuberculous infection. Last year alone, 12,445 carcasses (0.025 percent) were condemned, eliminating the possibility of spreading the infection to other animals, or to persons who might have eaten the meat (see table 7).

The Tuberculosis Eradication Division has the specific objective of "completely eradicating bovine tuberculosis in the future." During the war, about 200 veterinarians left the Division to join the armed forces, but many are returning to complete the task. Recent figures show a slight decrease in the percentage of positive reactors among cattle tested. In 1946 the percent of reactors was 0.23, decreasing 0.01 percent from the previous year. Funds for 1947 will be sufficient to carry on the program. The Federal Government has

budgeted about $500,000 for indemnities, and the States, $1,375,000 for indemnities and $2,750,000 for operating expenses.

TABLE 7.—*Losses of swine due to retentions for tuberculosis, fiscal years 1921–45*

[From Federal meat-inspection records]

Fiscal year	Swine slaughtered	Carcasses retained		Carcasses sterilized and percent of slaughter		Carcasses condemned and percent of slaughter	
		Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*
1921	37,702,866	4,693,305	12.4	96,234	0.26	64,830	0.17
1922	39,416,439	5,640,081	14.3	95,809	.24	70,304	.18
1923	48,600,069	7,139,925	14.7	113,802	.23	88,688	.18
1924	54,416,481	8,293,965	15.2	125,000	.23	100,110	.18
1925	48,459,608	7,039,724	14.5	106,328	.22	86,282	.18
1926	40,442,730	5,667,093	14.0	81,646	.2	63,748	.16
1927	42,650,443	5,778,009	13.5	73,232	.17	59,656	.14
1928	48,347,393	5,872,503	12.1	69,756	.14	55,749	.12
1929	47,163,573	5,408,910	11.5	58,030	.12	46,624	.1
1930	46,688,860	5,321,352	11.4	53,783	.12	42,381	.09
1931	44,020,633	5,174,343	11.8	49,549	.11	38,805	.09
1932	45,852,422	5,222,420	11.4	45,651	.1	37,509	.08
1933	45,698,053	4,820,152	10.5	40,769	.09	35,680	.08
1934	45,773,196	5,102,636	11.1	37,686	.08	40,038	.09
1935	34,413,317	3,714,828	10.8	36,554	.08	26,133	.08
1936	28,506,019	2,925,593	10.3	16,389	.06	15,195	.05
1937	36,226,309	3,435,433	9.5	17,666	.05	15,854	.04
1938	32,543,905	2,964,201	9.1	13,665	.04	12,423	.04
1939	38,656,537	3,418,805	8.8	15,160	.04	13,190	.03
1940	46,673,925	4,076,996	8.7	18,148	.04	16,015	.03
1941	48,710,059	4,014,021	8.2	15,907	.03	15,317	.03
1942	50,133,871	3,991,333	8.0	14,413	.03	13,357	.03
1943	56,867,080	4,056,918	7.1	13,660	.02	13,051	.02
1944	74,946,117	5,185,294	6.9	15,744	.02	15,910	.02
1945	49,468,458	3,556,582	7.2	10,396	.02	12,445	.025

With the return of personnel, and with sufficient Federal and State funds for fiscal 1947, the goal may yet be attained. In the future, our cattle, fowl, and swine may be entirely free of bovine tuberculosis.

SUMMARY

The Tuberculosis Eradication Division, Bureau of Animal Industry, United States Department of Agriculture, first tested cattle for tuberculosis in 1917, finding 3.2 percent positive reactors.

The percent of positive reactors to the tuberculin test decreased almost continuously until 1943, when it was 0.18. In 1945, there were 0.24 percent positive reactors. The percentage for 1946 is 0.23.

After 23 years of control work, all counties and Territories of the United States were modified accredited free areas.

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(*4*) Holm, J.: Tuberculosis in Denmark. (To be published in PUBLIC HEALTH REPORTS, **61**: (40): (Oct. 4, 1946)).

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CHARACTERISTICS OF COMMERCIAL X-RAY INTENSIFYING SCREENS

Resolving power constitutes a measure of the ability of X-ray films and screens to record detail and is determined by radiographing on the film or screen under standard conditions a graduated series of linear patterns. It is expressed as the maximum number of lines per millimeter that can be distinguished on the processed film. The resolving power of radiographic intensifying screens is considerably less than those of films, and therefore measurements of film-screen combinations are essentially the resolving power of the screens alone. Screens with the highest resolving power are capable of recording the greatest detail.

Resolving power of commercial screens

Manufacturer	Type	Resolving power	Use	Note
Buck	Xtra speed	10	Intensifying	1 thick and 1 thin screen.
	do	10	do	2 thin screens.
	Midspeed	12½	do	
	Definition	12½	do	
Eastman	Ultra speed	9½	do	
	Fine grain	10	do	
	Definition	12½	do	
Patterson	Detail	17½	do	
	Parspeed	10	do	
	Type D	[1] 7	Fluorographic	Regular.
	do	[1] 7	do	Cleanable.
	Type B	[1] 6	Fluorographic and fluoroscopic.	Regular.
	do	[1] 6	do	Cleanable.

[1] These figures are for screens alone. When used in photofluorography, the additional effect of the lens must be taken into consideration.

Basic specifications for 70-mm. photofluorographic equipment recommended by the Tuberculosis Control Division, United States Public Health Service

1. Photofluorographic film: Blue sensitive type.
2. Photofluorographic screen: Blue emitting type (Patterson type D or equivalent).
3. Width of photofluorographic screen: 15 inches.
4. Target-screen distance: 40 inches.
5. Distance between centers of successive frames on film roll: 3¼ inches.
6. Stereoscopic tube shift: 2½ inches.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

July 14–August 10, 1946

The accompanying table (table 1) summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State for each week are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended August 10, 1946, the number reported for the corresponding period in 1945, and the median number for the years 1941–45.

TABLE 1.—*Number of reported cases of 9 communicable diseases in the United States during the 4-week period July 14–August 10, 1946, the number for the corresponding period in 1945, and the median number of cases reported for the corresponding period, 1941–45*

Division	Current period	1945	5-year median	Current period	1945	5-year median	Current period	1945	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	871	950	613	1,979	2,512	2,268	10,869	4,990	7,098
New England	47	19	17	2	1	3	1,762	522	1,047
Middle Atlantic	102	56	58	19	10	14	3,032	758	1,181
East North Central	111	105	86	56	69	73	2,439	1,005	1,246
West North Central	59	86	51	36	18	18	295	191	387
South Atlantic	153	211	136	726	564	564	1,048	129	528
East South Central	70	94	62	52	99	99	299	55	195
West South Central	135	210	132	961	1,574	842	654	332	341
Mountain	73	41	41	110	155	159	455	509	492
Pacific	121	128	77	17	22	83	885	1,489	1,489
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	288	428	428	4,453	1,907	1,685	2,403	3,625	2,888
New England	10	24	28	86	146	82	224	261	274
Middle Atlantic	58	81	81	252	638	130	492	812	564
East North Central	44	81	81	747	210	158	578	850	779
West North Central	30	38	38	1,800	66	66	168	333	289
South Atlantic	29	52	52	183	247	247	238	356	313
East South Central	24	52	41	238	131	131	104	194	169
West South Central	40	46	38	462	272	90	125	181	135
Mountain	8	4	5	352	76	17	157	130	130
Pacific	45	50	50	333	121	106	317	508	422
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	11	11	21	558	625	930	9,375	11,802	13,584
New England	0	0	0	29	13	24	919	1,054	1,054
Middle Atlantic	0	0	0	45	89	87	1,611	3,148	2,614
East North Central	3	3	5	82	45	95	2,722	2,274	4,155
West North Central	3	3	6	25	25	47	427	378	682
South Atlantic	0	0	0	108	140	186	1,356	1,964	2,195
East South Central	0	1	1	61	100	154	711	464	519
West South Central	4	2	2	138	158	171	842	918	918
Mountain	1	1	3	37	26	35	257	493	584
Pacific	0	1	1	33	29	29	530	1,109	1,109

[1] Mississippi and New York excluded; New York City included. [2] Mississippi excluded.

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DISEASES ABOVE MEDIAN PREVALENCE-

Poliomyelitis.—The number of cases of poliomyelitis rose from 1,214 during the preceding 4 weeks to 4,453 during the 4 weeks ended August 10. For the country as a whole the number of cases was 2.3 times that for the corresponding period in 1945 and 2.6 times the 1941–45 median. While each section of the country except the South Atlantic reported some excess over the 5-year median, about 75 percent of the cases were reported from 15 States, viz., Minnesota 902, Illinois 356, California 265, Missouri 229, Kansas 225, Colorado 207, Texas, 190, New York 165, Michigan 140, Nebraska 138, Iowa 128, Ohio 120, South Dakota 109, Alabama 108, and Oklahoma 107. In Florida, where the current epidemic first made its appearance in April, the weekly incidence dropped from 34 cases during the week ended June 22 to 9 cases during the week ended August 10, while in Texas and Colorado, where the disease became epidemic a few weeks later, the number of cases still remained at an unusually high level during the 4 weeks under consideration. About the first of July an increase in cases was reported from Minnesota and Missouri and by the end of the current period practically every State in the North Central area had reported a relatively high incidence, the total for the entire section being approximately 1,900 cases as compared with a 5-year median of 66 cases. In some States only the normal seasonal increase has occurred and in many others the reports were not greatly above the usual expectancy. So far the North Atlantic sections have been little affected by the epidemic.

Table 2 shows the total reported cases in geographic areas since the beginning of the year and the incidence by weeks since the first of June, with corresponding data for the three preceding years. The year 1943 shows an epidemic increase of poliomyelitis in the West South Central, Mountain and Pacific sections, while in 1944 and 1945 the highest incidence was reported from the South Central and Atlantic Coast regions. While the current epidemic started in the South Atlantic section, the largest numbers of cases so far have been reported from States in the North Central sections. For the country as a whole more cases have been reported during the current outbreak than during any previous epidemic. Except for a few cities, no information is yet available as to the proportion of cases that are paralytic.

Diphtheria.—The number of cases of diphtheria (871) reported for the current 4 weeks was about 90 percent of the 1945 incidence for the corresponding 4-week period, but it was 1.4 times the 1941–45 median. In the West North Central, South Atlantic, and the East and West South Central sections the increases over the preceding 5-year medians were slight, but in other sections the increases ranged

from 1.3 times the median in the East North Central section to 2.8 in the New England section.

TABLE 2.—*Number of cases of poliomyelitis reported in each geographic area during 1946, 1945, 1944 and 1943*

Geographic area	Total Jan. 1–Aug. 10	Week ended—										
		June					July				Aug.	
		1	8	15	22	29	6	13	20	27	3	10
All regions:												
1946	7,040	144	161	185	204	273	309	428	670	913	1,286	1,584
1945	3,584	71	92	96	116	155	154	253	369	391	476	671
1944	5,051	46	41	111	126	222	290	462	568	738	932	1,015
1943	3,311	52	60	99	136	190	245	297	329	361	450	545
New England:												
1946	102	0	1	0	2	1	4	8	20	18	25	23
1945	206	0	2	3	3	3	11	8	26	34	33	53
1944	130	4	0	1	1	1	4	8	9	12	36	37
1943	120	1	3	3	3	0	1	6	3	11	32	36
Middle Atlantic:												
1946	342	5	9	9	12	19	14	22	40	46	66	100
1945	984	10	12	14	19	22	31	56	95	120	196	227
1944	1,674	11	4	4	12	33	62	125	216	304	413	449
1943	167	0	5	4	8	5	6	14	12	13	20	38
East North Central:												
1946	903	8	9	13	17	31	24	54	71	146	248	282
1945	344	2	3	5	13	10	10	17	19	27	51	113
1944	652	5	4	3	15	10	21	58	63	111	143	178
1943	229	0	3	2	1	1	8	4	12	21	46	79
West North Central:												
1946	2,014	6	13	9	13	30	45	98	213	328	556	703
1945	128	0	0	0	4	5	5	7	14	8	15	29
1944	191	1	0	2	5	7	9	8	25	22	28	54
1943	305	2	0	2	1	5	9	15	12	40	61	117
South Atlantic:												
1946	469	38	40	37	44	34	54	39	42	54	55	32
1945	497	19	10	16	13	27	23	42	68	55	46	78
1944	1,125	6	3	28	50	103	123	126	128	136	167	107
1943	95	6	0	2	2	2	1	6	9	7	5	8
East South Central:												
1946	431	32	19	35	22	19	40	26	59	52	36	91
1945	317	5	4	11	11	16	25	35	26	42	28	35
1944	584	5	9	10	22	34	37	91	90	101	84	67
1943	101	0	4	0	4	0	6	5	6	14	11	5
West South Central:												
1946	925	33	48	54	58	83	80	107	109	121	122	110
1945	691	26	45	39	42	59	30	56	78	58	58	78
1944	303	8	10	12	15	15	17	26	18	22	27	23
1943	1,124	8	11	35	51	107	137	148	148	141	122	119
Mountain:												
1946	494	10	6	12	15	31	29	39	75	76	100	101
1945	114	5	1	2	2	0	1	3	13	16	18	29
1944	62	0	1	3	3	1	6	2	1	4	4	9
1943	158	2	4	3	8	10	2	9	11	4	29	23
Pacific:												
1946	477	12	16	16	21	25	19	35	41	72	78	142
1945	300	4	15	6	9	13	18	29	30	31	31	29
1944	330	6	10	9	3	18	11	18	18	26	30	31
1943	1,012	33	30	48	58	60	75	90	116	110	124	120

The current period is the first in the past twenty-four 4-week periods in which the current incidence was less than for its corresponding period of the preceding year. Prior to that time (approximately November 1, 1944) the incidence for the given 4-week period was usually less than for its corresponding 4-week period of the preceding year. It is too soon, however, to say whether the small drop

for the current period represents any real turning point in the recent upward trend of diphtheria.

Measles.—The number of cases of measles dropped from approximately 40,000 during the preceding 4 weeks to 10,869 during the 4 weeks ended August 10. The number was, however, 2.2 times the 1945 incidence during the same weeks and 1.5 times the 1941–45 median. Each section of the country except the West North Central, Mountain, and Pacific contributed to the relatively high incidence of this disease, but the North Atlantic and East North Central sections reported the largest numbers of cases. For the country as a whole the current incidence was the highest since 1943 when approximately 12,000 cases were reported for these same weeks.

DISEASES BELOW MEDIAN PREVALENCE

Influenza.—For the 4 weeks ended August 10 there were 1,979 cases of influenza reported, as compared with 2,512 for the corresponding period in 1945 and a 1941–45 median of 2,268 cases. The incidence was slightly above the normal seasonal level in the South Atlantic and West South Central sections, but in other sections the number of cases either closely approximated the preceding 5-year median or fell considerably below it.

Meningococcus meningitis.—The number of cases (288) of meningococcus meningitis reported for the current 4-week period was less than 70 percent of the 1941–45 median for the same weeks, which was represented by the 1945 figure (428 cases). The incidence was about normal in the West South Central, Mountain, and Pacific sections, but in all other sections the incidence was relatively low. For the country as a whole the current incidence was the lowest since 1942 when 211 cases were reported for the corresponding 4 weeks.

Scarlet fever.—For scarlet fever the current incidence was the lowest reported during this period since 1941 when 2,714 cases were reported for the same weeks. The number of cases (2,403) was less than 70 percent of the 1945 figure and 85 percent of the 1941–45 median. In the Mountain section the number of cases was higher than the 1941–45 median, but in all other sections the incidence was considerably below the seasonal expectancy.

Smallpox.—The number of cases of smallpox (11) stood at the 1945 level, but it was only about 50 percent of the preceding 5-year median. During 1945 and 1946 the incidence of this disease has been the lowest on record.

Typhoid and paratyphoid fever.—The incidence of this disease was also relatively low, the number of cases (558) being about 90 percent of the number reported in 1945 and 60 percent of the preceding 5-year median. In the New England, Mountain, and Pacific sections the

incidence was about normal, but in all other sections the numbers of cases were considerably below the normal seasonal median.

Whooping cough.—The number of cases (9,375) of whooping cough was the lowest reported for this period in the 9 years for which these data are available. For the country as a whole the current incidence was less than 70 percent of the 1941–45 median; the situation was favorable in all sections of the country except the East South Central where the number of cases was slightly higher than the median.

MORTALITY, ALL CAUSES

For the 4 weeks ended August 10 there were 32,201 deaths from all causes reported to the Bureau of the Census by 93 large cities. The preceding 3-year average for the corresponding weeks was 32,422 deaths. The number of deaths was higher than the preceding 3-year average in each of the first 2 weeks of the 4-week period but during the third and fourth weeks the numbers were 2.5 percent less than the averages.

DEATHS DURING WEEK ENDED AUGUST 10, 1946

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

	Week ended Aug. 10, 1946	Corresponding week, 1945
Data for 93 large cities of the United States:		
Total deaths	7,866	7,919
Average for 3 prior years	8,064	
Total deaths, first 32 weeks of year	297,437	292,237
Deaths under 1 year of age	663	576
Average for 3 prior years	598	
Deaths under 1 year of age, first 32 weeks of year	20,102	19,422
Data from industrial insurance companies:		
Policies in force	67,249,618	67,375,499
Number of death claims	10,499	11,988
Death claims per 1,000 policies in force, annual rate	8.1	9.3
Death claims per 1,000 policies first 32 weeks of year, annual rate	9.9	10.6

PREVALENCE OF DISEASE

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

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 17, 1946

Summary

A total of 1,815 cases of poliomyelitis was reported for the current week, as compared with 1,579 last week, 1,254 for the corresponding week in 1944, and a 5-year (1941–45) median of 694. Slight net decreases were recorded in the Middle Atlantic, West North Central, and East South Central areas. Of 40 States reporting 5 or more cases, 12 showed a combined decline of 123 cases. The 28 States reporting currently more than 14 cases are as follows (last week's figures in parentheses): *Increases*—New Hampshire 16 (8), New Jersey 19 (18), Pennsylvania 19 (12), Ohio 48 (25), Illinois 204 (131), Wisconsin 48 (31), Minnesota 366 (360), Missouri 105 (80), North Dakota 48 (24), Florida 18 (9), Mississippi 31 (22), Arkansas 23 (17), Louisiana 22 (17), Texas 49 (34), Colorado 82 (53), New Mexico 16 (9), Arizona 16 (5), Washington 27 (17), California 152 (115); *decreases*—New York 57 (70), Indiana 18 (21), Michigan 70 (74), Iowa 40 (48), South Dakota 28 (70), Nebraska 36 (45), Kansas 73 (74), Alabama 23 (44), Oklahoma 35 (40).

The total for the year to date is 8,842, as compared with 6,262 for the corresponding period in 1944, and a 5-year median of 4,058. Four times in the past 19 years the peak of weekly incidence of the disease was reached in the last week of August, 12 times between September 3 and September 24, twice (1930 and 1936) later than September 24 and once (1934) in the week ended June 23.

A total of 206 cases of diphtheria was reported currently, as compared with 234 last week, 214 for the corresponding week last year, and a 5-year median of 203. The cumulative figure is 9,902, as compared with 8,292 for the same period last year and a 5-year median of 7,426.

Of the total of 28 new cases of Rocky Mountain spotted fever reported (as compared with 29 last week), 5 occurred in Virginia and 4 in Maryland. The total to date is 416, as compared with 348 last year and a 5-year median of 365.

Deaths recorded for the week in 93 large cities of the United States totaled 7,673, as compared with 7,866 last week, 7,642 and 8,641, respectively, in the corresponding weeks of 1945 and 1944, and a 3-year (1943–45) average of 8,023. The total for the year to date is 305,057, as compared with 299,879 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended Aug. 17, 1946, and comparison with corresponding week of 1945 and 5-year median

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

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45
	Aug. 17, 1946	Aug. 18, 1945		Aug. 17, 1946	Aug. 18, 1945		Aug. 17, 1946	Aug. 18, 1945		Aug. 17, 1946	Aug. 18, 1945	
NEW ENGLAND												
Maine	8	0	0	------	------	------	7	1	24	0	0	0
New Hampshire	0	0	0	------	------	------	21	------	------	1	1	1
Vermont	0	0	0	------	------	------	25	2	11	0	0	0
Massachusetts	2	1	1	------	------	------	106	45	55	2	0	2
Rhode Island	0	0	0	------	1	------	6	------	4	0	0	0
Connecticut	1	0	0	1	------	------	15	2	10	1	0	0
MIDDLE ATLANTIC												
New York	14	4	5	[1] 4	(1)	[1] 2	114	21	67	6	11	11
New Jersey	5	2	2	1	------	1	60	9	36	1	2	2
Pennsylvania	3	3	3	1	1	------	72	38	35	2	3	3
EAST NORTH CENTRAL												
Ohio	3	5	5	------	1	2	161	14	16	5	3	3
Indiana	2	2	3	------	3	3	------	5	5	0	1	1
Illinois	4	5	7	1	------	1	26	59	27	1	7	7
Michigan [2]	0	5	4	------	1	1	25	36	37	1	4	4
Wisconsin	0	2	2	10	8	11	71	35	101	7	3	3
WEST NORTH CENTRAL												
Minnesota	1	4	4	------	------	------	12	2	2	1	3	0
Iowa	0	0	1	------	------	------	7	3	3	0	1	1
Missouri	8	1	1	1	------	------	3	6	17	0	1	1
North Dakota	5	6	0	------	3	3	3	------	7	0	0	0
South Dakota	1	4	0	------	------	------	2	2	2	0	1	0
Nebraska	1	0	0	------	------	1	4	1	4	0	0	0
Kansas	10	6	2	3	------	------	6	7	7	1	0	1
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	------	------	------	0	0	0
Maryland [2]	6	8	4	------	1	1	21	3	9	1	2	3
District of Columbia	0	0	0	------	------	------	4	------	4	3	1	1
Virginia	5	5	5	117	54	43	22	6	13	3	3	3
West Virginia	3	2	2	1	1	1	------	------	4	0	0	0
North Carolina	14	16	13	------	------	------	7	2	8	1	2	2
South Carolina	3	20	14	138	101	102	5	1	5	0	0	0
Georgia	3	11	11	------	7	7	7	2	3	1	1	1
Florida	7	3	2	3	1	2	4	------	3	2	2	3
EAST SOUTH CENTRAL												
Kentucky	2	5	3	------	------	------	1	9	9	1	2	1
Tennessee	2	11	5	3	3	3	9	1	7	1	5	2
Alabama	7	2	9	18	35	11	5	------	7	1	1	1
Mississippi [2]	4	13	8	------	------	------	------	------	------	0	1	1
WEST SOUTH CENTRAL												
Arkansas	9	4	4	------	13	5	8	------	2	3	1	1
Louisiana	3	2	7	3	3	4	1	3	3	1	2	2
Oklahoma	4	1	1	7	17	15	3	6	2	2	1	0
Texas	16	33	25	264	221	221	64	31	43	2	2	2
MOUNTAIN												
Montana	1	0	1	3	------	------	32	3	5	0	0	0
Idaho	0	1	0	------	3	------	------	19	7	0	0	0
Wyoming	0	0	0	------	------	------	4	3	5	0	0	0
Colorado	4	3	3	2	4	11	13	2	8	1	1	1
New Mexico	3	2	1	1	------	------	6	------	------	0	0	0
Arizona	4	3	2	15	12	20	6	2	12	0	0	0
Utah [2]	0	0	0	------	------	------	9	25	23	0	0	0
Nevada	0	0	0	------	------	------	------	------	------	0	0	0
PACIFIC												
Washington	16	1	1	------	------	------	9	37	19	0	2	2
Oregon	1	7	1	5	------	1	12	13	13	0	1	2
California	21	11	10	3	9	15	83	189	110	7	8	8
Total	206	214	203	605	503	506	1,081	645	804	59	79	79
33 weeks	9,902	8,292	7,426	191,822	70,732	81,667	638,642	101,247	537,131	4,457	6,176	6,176

[1] New York City only.

[2] Period ended earlier than Saturday.

Telegraphic morbidity reports from State health officers for the week ended Aug. 17, 1946, and comparison with corresponding week of 1945 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [2]		
	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45
	Aug. 17, 1946	Aug. 18, 1945		Aug. 17, 1946	Aug. 18, 1945		Aug. 17, 1946	Aug. 18, 1945		Aug. 17, 1946	Aug. 18, 1945	
NEW ENGLAND												
Maine	3	0	0	6	8	2	0	0	0	1	0	0
New Hampshire	16	1	1	2	2	2	0	0	0	0	1	0
Vermont	3	2	2	0	0	0	0	0	0	0	0	0
Massachusetts	14	22	11	26	28	46	0	0	0	3	2	6
Rhode Island	7	0	0	2	1	1	0	0	0	1	0	0
Connecticut	4	13	13	4	3	3	0	0	0	0	1	1
MIDDLE ATLANTIC												
New York	57	110	49	59	80	58	0	0	0	8	4	12
New Jersey	19	72	17	17	14	14	0	0	0	5	7	6
Pennsylvania	19	50	45	25	39	38	0	0	0	7	5	8
EAST NORTH CENTRAL												
Ohio	48	15	15	64	52	44	2	0	0	6	7	8
Indiana	18	16	5	17	8	8	0	0	0	4	1	2
Illinois	204	77	34	22	26	31	0	0	0	4	1	4
Michigan [3]	70	10	12	22	40	32	0	0	0	7	1	4
Wisconsin	48	3	3	26	32	32	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	366	9	14	9	11	11	0	0	0	0	0	0
Iowa	40	7	7	6	15	9	0	0	0	1	0	1
Missouri	105	10	8	3	12	8	0	0	0	1	1	5
North Dakota	48	2	1	1	2	2	0	0	0	0	0	0
South Dakota	28	0	0	1	4	2	0	0	0	3	0	0
Nebraska	36	4	4	5	5	2	0	0	0	1	0	0
Kansas	73	1	3	7	19	19	0	0	0	4	3	3
SOUTH ATLANTIC												
Delaware	0	2	2	2	1	0	0	0	0	2	1	0
Maryland [3]	6	8	8	2	13	8	0	0	0	3	1	1
District of Columbia	2	12	8	4	3	4	0	0	0	1	0	0
Virginia	9	25	7	18	14	13	0	0	0	3	6	8
West Virginia	9	6	5	16	17	18	0	0	0	4	3	3
North Carolina	6	6	8	14	26	26	0	0	0	0	3	3
South Carolina	1	11	1	3	5	5	0	0	0	2	4	7
Georgia	4	3	3	14	18	6	0	0	0	2	6	11
Florida	18	3	3	4	2	2	0	0	0	2	1	4
EAST SOUTH CENTRAL												
Kentucky	6	3	15	3	8	7	0	0	0	3	2	17
Tennessee	10	36	5	12	8	8	0	0	0	5	4	6
Alabama	23	7	7	7	10	10	0	0	0	3	2	2
Mississippi [3]	31	3	3	9	7	8	0	0	0	3	2	6
WEST SOUTH CENTRAL												
Arkansas	23	0	4	0	4	5	0	0	0	3	4	8
Louisiana	22	6	4	2	7	3	0	0	0	7	6	8
Oklahoma	35	18	6	4	7	3	0	0	0	3	3	3
Texas	49	55	4	16	31	22	0	0	0	20	10	18
MOUNTAIN												
Montana	7	0	0	4	2	4	0	0	0	2	0	0
Idaho	3	1	0	1	2	3	1	0	0	2	2	0
Wyoming	11	0	0	0	4	2	0	0	0	0	0	0
Colorado	82	7	3	13	8	8	0	0	0	1	1	2
New Mexico	16	0	0	0	6	2	0	0	0	2	1	1
Arizona	16	0	0	1	2	2	0	0	0	1	2	2
Utah [3]	9	8	3	5	2	2	0	0	0	0	1	0
Nevada	0	1	0	1	0	0	0	0	0	0	0	0
PACIFIC												
Washington	27	22	12	9	10	16	0	0	0	1	2	2
Oregon	12	2	3	6	4	4	0	0	0	5	0	2
California	152	25	16	50	108	52	0	0	0	4	8	8
Total	1,815	694	694	544	730	650	3	0	2	140	109	196
33 weeks	[4] 8,842	4,308	4,058	86,839	134,548	97,729	278	265	609	2,519	2,734	3,286

[2] Period ended earlier than Saturday.

[3] Including paratyphoid fever reported separately as follows: Massachusetts, 3 (salmonella); Rhode Island 1; New York 1; New Jersey 3; Ohio 3; Illinois 1; Florida 1; Arkansas 1; Louisiana 1; Texas 1; Colorado 1; Arizona 1.

[4] Corrected reports: Poliomyelitis—Massachusetts, week ended March 2, 0 cases; Maine, week ended July 20, 0 cases, New Mexico, 11 cases; Arkansas, week ended March 30, 0 cases, week ended June 15, 1 case, week ended August 3, 29 cases.

Telegraphic morbidity reports from State health officers for the week ended Aug. 17, 1946, and comparison with corresponding week of 1945 and 5-year median—Con.

Division and State	Whooping cough			Week ended Aug. 17, 1946							
	Week ended—		Median 1941–45	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
	Aug. 17, 1946	Aug. 18, 1945		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	9	24	18								
New Hampshire	7										
Vermont	7		12								2
Massachusetts	101	94	94								1
Rhode Island	21	7	12								
Connecticut	35	24	24								5
MIDDLE ATLANTIC											
New York	146	269	241	2	7		1	1		1	8
New Jersey	135	155	132	4		1		1			
Pennsylvania	126	156	178	1				3		1	2
EAST NORTH CENTRAL											
Ohio	178	149	158								1
Indiana	31	18	18								9
Illinois	181	97	181		1			3			7
Michigan [3]	184	53	242	1							
Wisconsin	216	73	214				1				5
WEST NORTH CENTRAL											
Minnesota	15	2	50	3							
Iowa	26	9	26	1							
Missouri	18	33	33			5	1				2
North Dakota		2	9				1				1
South Dakota	1	2	4								2
Nebraska	3		6								
Kansas	29	19	24				2				1
SOUTH ATLANTIC											
Delaware	3	5	4					1			
Maryland [3]	18	41	56			2	1	4			2
District of Columbia	9	8	9								
Virginia	63	39	39	1		132		5			
West Virginia	41	8	27								1
North Carolina	91	93	107					3	2	1	
South Carolina	50	55	74		19				1	1	
Georgia	3	14	13	1				3		14	3
Florida	22		3				1			8	
EAST SOUTH CENTRAL											
Kentucky	24	29	42		5						
Tennessee	35	38	38		3			2	2		2
Alabama	7	14	14					1		10	5
Mississippi [3]										5	
WEST SOUTH CENTRAL											
Arkansas	10	8	22	3	1				6		1
Louisiana	2	5	6							24	1
Oklahoma	3	15	15			1	1	1			
Texas	139	122	126	23	197	20	2		2	42	15
MOUNTAIN											
Montana	1		22				1				
Idaho	7	7	4			2			1		1
Wyoming	4	3	3	1					1		
Colorado	22	39	39				2				1
New Mexico	6	6	6	1	2	2					1
Arizona	4	1	9			36					
Utah [3]	11	18	30		1				2		1
Nevada							1				
PACIFIC											
Washington	16	22	24				3				2
Oregon	21	13	22								2
California	48	248	170	8	11		8			1	1
Total	2,129	2,045	3,052	50	247	201	26	28	17	108	85
Same week, 1945	2,045			25	387	462	19	19	11	176	81
Average, 1943–45	2,311			38	502	368	20	[5] 18	9	[5] 166	
33 weeks: 1946	64,543			1,832	11,289	4,536	387	[6] 416	629	[7] 2,086	3,215
1945	84,194			1,183	15,995	6,135	279	348	519	2,677	3,110
Average, 1943–45	93,087		[5] 122,382	1,215	13,415	5,315	360	[5] 365	496	[5] 2,202	

[3] Period ended earlier than Saturday.
[5] 5-year median, 1941–45.
[6] Includes delayed reports, Virginia, 6 cases.
[7] Delayed reports, Virginia, deducts 6 cases from cumulative total.

Leprosy: Louisiana 1 case.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 10, 1946

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	-------	0	2	1	1	0	0	------
New Hampshire:												
Concord	0	0	------	0	-------	0	1	0	0	0	0	------
Massachusetts:												
Boston	6	0	------	1	20	1	5	3	8	0	3	22
Fall River	0	0	------	0	1	0	0	0	0	0	0	4
Springfield	0	0	------	0	9	0	0	0	1	0	0	4
Worcester	0	0	------	0	10	0	2	2	0	0	0	26
Rhode Island:												
Providence	0	0	------	0	7	0	2	1	2	0	0	22
Connecticut:												
Bridgeport	0	0	------	0	1	0	1	0	0	0	0	1
Hartford	0	0	------	0	1	0	0	0	0	0	1	3
New Haven	0	0	------	0	2	0	0	0	0	0	0	2
MIDDLE ATLANTIC												
New York:												
Buffalo	3	0	------	0	------	0	10	1	0	0	0	6
New York	11	1	------	0	33	3	43	40	18	0	3	46
Rochester	0	0	------	0	-------	0	1	3	2	0	0	1
Syracuse	0	0	------	0	-------	0	1	1	0	0	0	------
New Jersey:												
Camden	1	0	------	0	1	0	1	0	0	0	0	------
Newark	0	0	------	0	6	0	4	2	2	0	1	35
Trenton	0	0	------	0	-------	0	2	0	1	0	0	9
Pennsylvania:												
Philadelphia	4	0	1	0	6	0	5	3	3	0	2	22
Pittsburgh	1	0	1	1	1	0	1	4	3	0	0	12
Reading	1	0	------	0	-------	0	1	0	1	0	0	5
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	2	0	2	5	7	0	0	6
Cleveland	0	0	------	0	57	1	4	20	6	0	0	11
Columbus	0	1	------	0	5	0	2	0	1	0	0	8
Indiana:												
Fort Wayne	0	0	------	0	-------	0	1	1	0	0	0	5
Indianapolis	1	0	------	0	1	0	4	3	2	0	0	4
South Bend	0	0	------	0	-------	0	0	1	0	0	0	------
Terre Haute	0	0	------	0	-------	0	1	0	0	0	1	------
Illinois:												
Chicago	0	0	2	0	8	0	10	40	12	0	1	90
Springfield	0	0	------	0	-------	0	0	0	0	0	0	------
Michigan:												
Detroit	3	1	------	0	3	0	7	32	9	0	1	68
Flint	0	0	------	0	-------	0	2	1	1	0	0	1
Grand Rapids	0	0	------	0	2	0	1	3	1	0	0	13
Wisconsin:												
Kenosha	0	0	------	0	-------	0	0	10	1	0	0	2
Milwaukee	0	0	------	0	7	0	1	5	3	0	0	89
Racine	0	0	------	0	9	0	0	1	0	0	0	2
Superior	0	0	------	0	1	0	1	9	0	0	0	17
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	-------	1	0	7	0	0	0	2
Minneapolis	0	0	------	0	5	0	5	125	2	0	0	------
St. Paul	1	0	------	0	-------	1	1	31	1		0	7
Missouri:												
Kansas City	0	0	------	0	2	0	3	19	1	0	1	10
St. Joseph	0	0	------	0	-------	0	0	0	0	0	0	------
St. Louis	2	0	------	0	5	1	6	23	0	0	1	1

City reports for week ended Aug. 10, 1946—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	-------	0	1	7	0	0	0	------
Nebraska:												
Omaha	0	0	------	0	2	1	0	18	2	0	0	1
Kansas:												
Topeka	1	0	------	0	-------	0	0	1	0	0	0	12
Wichita	0	1	------	0	-------	0	1	3	0	0	0	------
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	-------	0	1	0	1	0	0	------
Maryland:												
Baltimore	3	0	------	0	20	1	7	0	2	0	0	27
Cumberland	0	0	------	0	-------	0	0	0	0	0	0	------
Frederick	0	0	------	0	-------	0	0	0	0	0	0	------
District of Columbia:												
Washington	0	0	------	0	4	2	1	0	3	0	0	3
Virginia:												
Lynchburg	0	0	------	0	2	0	0	0	1	0	0	------
Richmond	0	0	------	0	7	0	2	3	1	0	1	10
Roanoke	0	0	------	0	-------	0	0	0	2	0	0	------
West Virginia:												
Wheeling	0	0	------	0	-------	0	0	0	0	0	0	6
North Carolina:												
Raleigh	0	0	------	0	-------	0	3	0	0	0	0	8
Wilmington	1	0	------	0	1	0	0	1	0	0	0	1
South Carolina:												
Charleston	0	0	3	0	3	0	0	0	0	0	0	------
Georgia:												
Atlanta	1	0	------	0	-------	0	1	0	2	0	0	------
Brunswick	0	0	------	0	-------	0	0	0	0	0	0	------
Savannah	0	0	------	0	3	0	0	0	0	0	0	------
Florida:												
Tampa	3	0	------	0	3	0	1	0	0	0	0	3
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	1	0	------	0	4	0	7	6	2	0	0	9
Nashville	0	0	------	0	-------	0	0	1	0	0	0	3
Alabama:												
Birmingham	1	0	------	0	1	0	2	*25	0	0	0	------
Mobile	1	0	1	0	-------	0	1	2	0	0	0	------
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	-------	0	5	2	0	0	0	1
Louisiana:												
New Orleans	0	0	------	0	3	0	7	10	0	0	0	4
Shreveport	0	0	------	2	-------	0	4	3	0	0	0	------
Texas:												
Dallas	1	0	------	0	-------	0	3	3	3	0	0	------
Galveston	0	0	------	0	-------	0	3	1	0	0	0	------
Houston	0	0	------	0	1	0	5	2	0	0	0	1
San Antonio	0	0	2	0	-------	0	0	3	2	0	0	------
MOUNTAIN												
Montana:												
Billings	0	0	------	0	3	0	2	1	0	0	0	1
Great Falls	0	0	------	0	2	0	1	1	0	0	0	------
Helena	0	0	------	0	-------	0	0	0	0	0	0	------
Missoula	0	0	------	0	-------	0	1	1	0	0	0	------
Idaho:												
Boise	0	0	------	0	-------	0	0	0	0	0	0	------
Colorado:												
Denver	7	0	1	0	9	0	3	12	12	0	0	3
Pueblo	0	0	------	0	2	0	1	5	1	0	0	------
Utah:												
Salt Lake City	1	0	------	0	2	0	2	2	2	0	0	------

*Delayed reports; not included in computing rates.

City reports for week ended Aug. 10, 1946—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	0	0	------	0	3	0	2	4	1	0	0	20
Spokane	0	0	------	0	-------	0	2	6	1	0	0	4
Tacoma	0	0	------	0	-------	0	0	0	0	0	0	------
California:												
Los Angeles	0	0	1	0	29	1	4	52	10	0	0	10
Sacramento	0	0	------	0	-------	0	1	1	2	0	0	1
San Francisco	0	0	------	1	1	0	1	3	4	0	2	------
Total	55	4	12	5	310	13	208	551	143	0	18	684
Corresponding week, 1945	45	------	13	3	328	------	192	------	243	0	22	937
Average, 1941–45	40	------	21	[1] 5	[2] 323	------	[1] 225	------	196	0	31	1,016

[1] 3-year average, 1943–45.
[2] 5-year median, 1941–45.

Dysentery, amebic.—Cases: New York 7; Chicago 2; St. Louis 1; Memphis 1; Los Angeles 2.
Dysentery, bacillary.—Cases: New York 1; Chicago 2; St. Louis 1; Charleston, S. C., 6; Memphis 1; Salt Lake City 1; Los Angeles 6.
Dysentery, unspecified.—Cases: Baltimore 1; San Antonio 1.
Tularemia.—Cases: Memphis 1.
Typhus fever, endemic.—Cases: Atlanta 1; Tampa 4; New Orleans 6; Houston 1; San Antonio 1.

***Rates** (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1943, 34,240,900)*

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	15.8	0.0	0.0	2.6	134	2.6	34.1	18.4	32	0.0	10.5	221
Middle Atlantic	9.7	0.5	0.9	0.5	22	1.4	31.9	25.0	14	0.0	2.8	63
East North Central	2.4	1.2	1.2	0.0	58	0.6	21.9	79.7	26	0.0	1.8	192
West North Central	8.0	2.0	0.0	0.0	28	8.0	33.8	465.5	12	0.0	4.0	66
South Atlantic	13.7	0.0	5.1	0.0	74	5.1	27.4	6.8	21	0.0	1.7	99
East South Central	17.7	0.0	5.9	0.0	30	0.0	59.0	77.1	12	0.0	0.0	71
West South Central	2.9	0.0	5.7	5.7	11	0.0	77.5	68.9	14	0.0	0.0	17
Mountain	63.5	0.0	7.9	0.0	143	0.0	79.4	174.7	119	0.0	0.0	32
Pacific	0.0	0.0	1.6	1.6	52	1.6	15.8	104.4	28	0.0	3.2	55
Total	8.4	0.6	1.8	0.8	47	2.0	31.8	84.8	22	0.0	2.7	104

PLAGUE INFECTION IN KERN COUNTY, CALIF.

Under date of August 14, 1946, plague infection was reported proved, on August 13, in a pool of 200 fleas and 98 lice from 25 ground squirrels, *C. beecheyi*, and another pool of 200 fleas and 191 lice from 15 ground squirrels, same species, taken, respectively, 9 miles and 6 miles west of Cummings Valley School.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Weeks ended July 20, and July 27, 1946.—During the weeks ended July 20, and July 27, 1946, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Week ended July 20, 1946

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		9		67	198	19	27	37	27	384
Diphtheria		4		19	1	1				25
Dysentery, amebic								2		2
Encephalitis, infectious							1			1
German measles				4	10	4		5	3	26
Measles		2	3	84	200	88	44	148	13	582
Meningitis, meningococcus		1						1		2
Mumps		2		2	127	22	40	15	54	262
Poliomyelitis			1	2	5					8
Scarlet fever		3	3	46	17	6		5	7	87
Tuberculosis (all forms)		7	12	149	47	28	5	21	34	303
Typhoid and paratyphoid fever		3	2	9	1		2	1	9	27
Undulant fever				1						1
Venereal diseases:										
Gonorrhea	8	17	14	81	145	44	48	61	79	497
Syphilis	2	26	18	60	85	11	14	13	31	260
Whooping cough				20	44	1		4	2	71

Week ended July 27, 1946

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		28		7	142	19	27	36	34	293
Diphtheria		7		19	14	4	2			46
Dysentery, bacillary				4						4
German measles				1	17		1	3	9	31
Influenza		6			4				2	12
Measles		21	1	18	254	62	29	115	25	525
Meningitis, meningococcus		2	1	1	1				1	6
Mumps			1	1	135	12	48	25	34	256
Poliomyelitis	5		2	21	15			2		45
Scarlet fever	6	10	2	8	27	7		6	2	68
Tuberculosis (all forms)		24	3	28	73	15	17		43	203
Typhoid and paratyphoid fever				6	1			1	4	12
Undulant fever				1	2			1		4
Venereal diseases:										
Gonorrhea		17	16	50	139	52	64	42	74	454
Syphilis		9	3	88	90	11	11	7	35	254
Whooping cough		7	1	12	46			7	1	74

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

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

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

Plague

Belgian Congo.—Under date of August 16, 1946, 4 fatal cases of pneumonic plague were reported at Regetsi Lubero, Costermansville Province, 1 case of bubonic plague was reported at Linga, and 1 case of septicemic plague each at Dendro and Yiru, Stanleyville Province, Belgian Congo.

Typhus Fever

Morocco (French).—For the period July 21–31, 1946, 50 cases of typhus fever were reported in French Morocco, by regions as follows: Agadir and frontier districts, 21; Casablanca, 20; Fez, 5; Marrakech, 1; Meknes, 2; Rabat, 1.

Yellow Fever

Colombia—Santander Department—La Girona—Lebrija.—For the period June 10 to July 28, 1946, 1 death from yellow fever was reported in Lebrija, La Girona, Santander Department, Colombia.

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