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CONTROL OF RABIES ¹

REPORT BY THE COMMITTEE ON PUBLIC HEALTH RELATIONS OF
THE NEW YORK ACADEMY OF MEDICINE

SOURCES OF INFORMATION

The present report has been assembled from information from many sources. A questionnaire was distributed to State health departments and to the Provincial health authorities of Canada. In addition, information was sought from the Bureau of Animal Industry of the United States Department of Agriculture, the United States Public Health Service, and the Veterinary Division of the Office of the Surgeon General of the United States Army. The work of organizations that have given special attention to rabies control, including the United States Livestock Sanitary Association, the American Veterinary Medical Association, and the National Research Council, as well as the research project sponsored by the Rockefeller Foundation, was reviewed. In addition, recent scientific literature has been consulted to ascertain the advances made within the past few years.

INCIDENCE IN THE UNITED STATES

Statistics collected by the Bureau of Animal Industry since 1938, (table 1) show that after a downward trend from 1939 through 1942 the incidence of rabies in man and in animals increased in 1943, and reached a peak in 1944. A slight decrease occurred in 1945; the total was 9,963, with increases only in horses, cats, and "miscellaneous" animals (¹). The 373 "miscellaneous" animals included 134 foxes, of which the largest number, 49, was reported from New York State.

¹ This is an abridged version of a report on the whole problem of rabies control. The full review is on file at The New York Academy of Medicine. The report was prepared by E. H. L. Corwin, Ph. D., and Lois Stice under the guidance of a subcommittee consisting of: Shepard Krech, M. D., chairman, Thomas D. Dublin, M. D., Henry E. Meloney, M. D., Dickinson W. Richards, M. D., E. H. L. Corwin, Ph. D., secretary.

TABLE 1¹

Year	Dogs	Cattle	Horses	Sheep	Swine	Cats	Goats	Miscellaneous	Man	Total
1938.....	8,452	413	32	164	42	207	11	44	47	9,412
1939.....	7,386	358	36	17	38	269	10	172	30	8,314
1940.....	6,194	326	25	53	71	260	4	277	28	7,238
1941.....	6,648	418	39	68	159	294	9	212	30	7,877
1942.....	6,332	288	15	48	32	250	12	160	28	7,165
1943.....	8,515	349	35	45	60	316	19	310	41	9,690
1944.....	9,067	561	32	40	43	419	14	311	53	10,540
1945.....	8,505	487	46	11	30	466	10	373	35	9,963

¹ Figures from the Bureau of Animal Industry of the U. S. Department of Agriculture.

It should be emphasized that the reported figures represent only a fraction of the actual cases, since many animals suspected of having rabies are disposed of without laboratory examination. The 1944 report (2) of the Committee on Rabies of the United States Livestock Sanitary Association stated that the situation is serious and will probably continue to be so unless more vigorous steps are taken toward control of the disease. Not only is there ever-present danger that an invariably fatal disease may be transmitted from animals to human beings, but considerable economic losses may be involved, as is indicated by the figures on rabies in livestock (table 1).

Dr. H. W. Schoening, in charge of the Pathological Division of the Bureau of Animal Industry, United States Department of Agriculture, has pointed out (10): "Rabies is an outstanding example of a dangerous disease which could be controlled or eventually eradicated in this country, but which is not under control because of failure to impose and thoroughly carry out uniform regulations."

ROCKEFELLER FOUNDATION RESEARCH PROGRAM

A major contribution to rabies control in the United States is the intensive investigation carried on from November 1936 to December 1945 by the International Health Division of the Rockefeller Foundation in cooperation with the Alabama State Board of Health for the purpose of establishing a scientific basis for adequate control measures (3). The interest of the foundation was stimulated by the work of Webster and Dawson at the Rockefeller Institute for Medical Research and by a request from the Alabama authorities for aid in checking an alarming increase of rabies among dogs in that State. Increased incidence in other parts of the country emphasized the need for a method of vaccination that would be practical for use in mass immunization programs.

During the 9-year investigation, field and laboratory studies of the disease and of the existing methods of control were made under the direction of Dr. Harald N. Johnson. Using modern virus research

methods, the group studied the epidemiology, symptomatology, and pathology of the disease and thus strengthened the foundation for the development of sound immunization procedures.

The Alabama studies have shown that a single injection of 5 cc. of a potent vaccine will produce a high degree of immunity that is satisfactory for 1 year. In addition to the development of a practical method of vaccination, the Rabies Research Laboratory in Alabama added considerably to the sum of knowledge concerning the disease. The investigations were concerned with such matters as the relative potency and stability of the phenol-treated and chloroform-treated vaccines, comparison of the subcutaneous and intraperitoneal routes for injection of vaccine, effective vaccination following exposure, new methods of diagnosis by the mouse inoculation technic, the significance of Negri bodies in paralytic and furious rabies, the relation of the incubation period to the amount of virus given, the significance of the age of the experimental animals, the relative infectivity of virus found in saliva and in brain tissue, the distribution of the virus in human victims of rabies, the rate at which virus-neutralizing substances are formed in human blood serum, and attenuation of the virus through tissue culture and chick passage.

The annual reports of the project emphasized that the primary requirement in rabies control is the elimination of wandering and stray dogs and that vaccination is needed as a supplementary measure because it has been impossible to obtain legislation to control dogs. The reports also stressed the need for an educational program to enlist the cooperation of the public.

The Rabies Research Laboratory at Montgomery has now been taken over by the United States Public Health Service which is continuing the studies inaugurated by Dr. Johnson on the efficacy of new canine rabies vaccines. In addition, the unit will distribute educational material, and will undertake to stimulate establishment of rabies control units in all States.

STATE CONTROL MEASURES

The Committee received excellent cooperation from all those from whom information was sought. A questionnaire distributed to State and provincial health officers in the United States and Canada requested information as to (1) incidence, (2) State control measures, (3) requirements relating to vaccination, (4) local provision for vaccination in the event there was no State law, and (5) interstate quarantine measures. Replies were received from all the 48 States, the District of Columbia, and from 7 of the 9 provinces of Canada (4). The situation which they disclosed may well be called chaotic.

Incidence

Fourteen States reported to the United States Department of Agriculture in 1945 (1) that they had no rabies in either animals or human beings; this group comprises all the 6 New England States and 8 Western States. Louisiana had the highest number of cases in animals, 997. Other high figures were as follows: Texas 903; Pennsylvania 846; Ohio 812; Georgia 696; New York State 643; and California 581. Georgia had the largest number of human deaths, 5; six other States had 3 deaths each; 3 had 2 deaths each, and 6 had 1 each.

The preponderance of rabies cases in animals in the United States is found in dogs; the other animals chiefly affected are cattle, horses, swine, goats, sheep, and cats. The disease does occur, however, in a variety of animals. Pennsylvania reported a case in a zebu; Nebraska, one in a civet cat. California listed rats, rabbits, opossums, foxes, and squirrels. Idaho reported an outbreak in one county in 1945, attributed to the presence of the disease in coyotes. According to Johnson, there was a rabies epizootic among coyotes in New Mexico in 1943 (5).

The most serious instance of rabies in wild animals is the epizootic among foxes that has plagued the Southeastern States, especially Georgia and Alabama, for several years. Fox rabies has also been reported from States farther north and in the Middle West. The largest number of cases reported to the Bureau of Animal Industry in 1945 was 49, from the State of New York (1). Johnson has reviewed the history (5) of fox rabies in the United States and described in detail the epizootics in the South and the measures taken to control them. He pointed out that whenever wild canine species, such as the fox and coyote, are allowed to become abundant in areas where rabies is prevalent, there is a constant threat of rabies among them.

Legislative Authority

The diversity in provisions for rabies control is rooted in the varied legislative measures from which the control power is derived and the agencies by which they are enforced in the States. The information submitted to this committee indicates that only a few States have comprehensive laws covering all phases of rabies control. In some States certain provisions, such as those governing vaccination or control of interstate transportation, are written into State law, while in other States these measures are embodied in regulations issued by the State department of health, the State department of agriculture, the State livestock commission or board, or by some combination of these. In still other States some one phase, usually the power to

declare quarantine, is covered by State laws, while all other measures are left to the discretion of local units of government. In a few States, the rabies control measures are included in or administered in conjunction with so-called "dog laws." The report from Florida stated simply that "the State has no laws dealing with control measures"; it should be mentioned, however, that a bill for rabies control was prepared in Florida in 1945, but was not introduced in the legislature.

Enforcement Agencies

Enforcement agencies are as varied as the types of authority under which they operate. On the State level, the responsible officer may be the State health officer or the State veterinarian, or both may have responsibilities. In New Jersey there is a Rabies Control Unit in the State Department of Health; in Connecticut the Commissioner on Domestic Animals is in charge. In Alabama a State Public Health Veterinarian has recently been appointed as a rabies control officer under a joint project of the State Health Department and the State Department of Agriculture. In Delaware the State Game and Fish Commission participates in the control.

Local enforcement officers are even more diverse. The most recent laws provide for rabies inspectors; some States have dog wardens; in some the game wardens assist in rabies control. Local health officers, peace officers (sheriffs, constables, police), humane societies, and county courts are among the agencies concerned in protection of animals and human beings against rabies.

New York City's method of administering control measures is complicated by the fact that a private society has the exclusive right to seize dogs and maintain pounds. Under a State law enacted in 1894, which applies to New York City alone, the American Society for the Prevention of Cruelty to Animals has full charge of collecting and expending fees for the licensing of dogs (6). With these funds the society carries on its activities, which include the collection of stray dogs and the maintenance of shelters. During the recent quarantine the society was authorized as an agent of the city board of health to carry out the control measures. In several other cities (6) animal pounds are maintained by humane societies, some of which receive an allowance from the city governments for the service; in Maryland some counties subsidize humane societies or similar organizations to take charge of the collection of ownerless and unlicensed dogs (4).

Effectiveness of Enforcement

Inadequate enforcement of control measures, with resulting increases in the prevalence of rabies, is apparent in some States. This situation has been sharply defined in Alabama, which has a progressive law with good enforcement in most of the counties. The following report by Johnson (7) contrasts the results in counties where the law is enforced with the results in counties where enforcement is lax:

In 1942 only 3 counties of the 67 in the State had more than isolated cases of rabies and 45 counties reported no rabies. The 3 counties . . . accounted for 181 of the 220 cases of animal rabies reported during the year. None of these three counties appointed a rabies inspector to carry out the vaccination program . . . During the period 1937 to 1943 Mobile County had an average of 108 reported cases of animal rabies a year. In this instance there was active opposition to vaccination and only a small proportion of the dogs were vaccinated on a voluntary basis. During 1942 this county submitted 157 of the 220 animal heads found positive for rabies in the entire State.

In a statement for the present survey, Dr. Johnson reported that in 1944 Mobile again failed to provide for enforcement of the law and that 128 animal heads from that county were found positive; 96 of these were from dogs. Later information (8) indicates that in July 1945, a rabies inspector was finally appointed, and that 20,136 dogs had been vaccinated by November 1, 1945. Dr. Johnson reported that after rabies ceased to be a problem, many counties stopped enforcing vaccination, with the result that rabies recurred in 1944 and 1945; with renewed enforcement, the disease again abated.

Specific Measures

The late Dr. Leslie T. Webster in his monograph "Rabies" (9) described rabies control measures as of two types, involving the same principles used in the control of other infectious diseases. The first method is to reduce opportunities for the infecting agent to pass from one host to another; in the case of rabies this principle is implemented by provisions for reporting the disease, for quarantine, and for the elimination of infected animals and of those for which no protection can be devised. The second means of protection is to build up the resistance of susceptible hosts; that is, to immunize them by inoculation with inactivated or attenuated organisms. Until recently the protection afforded by vaccination in rabies was uncertain, and few officials were willing to recommend it. As will be seen in subsequent pages, vaccination now rests on a firm basis as a result of recent research, and authorities are beginning to recommend it with confidence and even to require it.

Reporting

It appears that in many States rabies in animals is not a reportable disease. In the material submitted in reply to the Committee's questionnaire, reporting was mentioned as a requirement by only a few States, but in many replies this point was not mentioned. In some it was not clear whether the reference was to human or animal rabies.

Licensing

Licensing, or registration, of dogs is generally considered a useful tool in the fight against rabies. It serves two purposes: first, a license identifies a dog for which some person is responsible and thereby facilitates the elimination of strays; and second, license fees provide funds to finance the administration of rabies control laws.

In five States where yearly inoculation of dogs is a legal requirement, but where licensing is not part of the law, metal tags issued at the time of vaccination serve as a means of identifying owned dogs. These States are Alabama, Arkansas, Georgia, Mississippi and North Carolina.

Quarantine

Probably the greatest diversity in practices among the States lies in the quarantine regulations. Specific information on this point was not requested, but a number of States sent copies of their laws and regulations. Most regulations designate several categories of dogs to be quarantined, and different management is prescribed for each. The categories vary slightly in different States, but they are approximately as follows:

- Dogs that have bitten persons or animals;
- Dogs that have been bitten by or exposed to rabid animals or show symptoms of rabies;
- Well dogs, owned;
- Well dogs, strays.

If dogs that have bitten persons or animals are known to be rabid, they are killed immediately in some States; on the other hand, some authorities recommend that the animals be apprehended and if possible allowed to die of the disease, since Negri bodies cannot always be demonstrated during the early stages of the disease (10). Among States for which quarantine regulations were mentioned, dogs that have been bitten by or exposed to rabid animals or show symptoms of rabies are confined for varying periods of time, or they may be killed.

The recommendation of the National Research Council on this point is that "biting dogs and suspected rabid dogs should be impounded for a period of at least 14 days. Dogs known to have been exposed to rabies must be destroyed or kept confined for 6 months."

Vaccination

Prophylactic vaccination of animals is now a practical possibility. As recently as 1942 Webster (9) commented: "Most people believe today that the vaccine treatment is effective in man, but that the value of prophylactic immunization of animal populations is questionable." He stated, however, that the entire question of rabies vaccination and vaccines was being restudied with new tools made available through research on other virus diseases. Meanwhile, until results of the investigations could be established, most health authorities refrained from requiring or recommending prophylactic mass vaccination of dogs.

The results that Webster anticipated have now become available, and successful field experiments are gradually dispelling the lack of confidence in vaccination. With the development of the Habel test for potency, based on early work by Webster, and with new methods of producing better vaccines, a high level of effectiveness can be attained.

Within the past two years, several of the leading organizations concerned with the control of rabies have unequivocally recommended annual vaccination of dogs on the basis of Johnson's work in Alabama and results obtained in field trials. The Special Committee on Rabies of the American Veterinary Medical Association recommended (11) at the annual meeting of the association in 1944, that prophylactic vaccination be endorsed. In December 1945 the United States Livestock Sanitary Association's Committee on Rabies made a strong recommendation (12) that vaccination be adopted in programs of control and eradication as an adjunct to other measures. The committee's opinion was emphasized by the following statement:

It is important that the status of vaccination be clearly defined, since some health officers and others engaged in the control of rabies, including some veterinarians, as well as dog owners and others, still have doubts as to the efficacy of canine rabies vaccines. Many of these individuals are not cognizant of the progress made in the improvement of canine rabies vaccines. In many cases these doubts are based on opinions formed some years ago. It is highly desirable that the present status of vaccination be publicized, not only to the veterinary and medical professions, but to the dog-owning public and the public in general, as well.

Additional reinforcement for the growing confidence in vaccination has come from the Subcommittee on Rabies of the Committee on Animal Health of the National Research Council (13). This group stated in its November 1945 report that vaccination combined with other dog control measures appears to be the most satisfactory method of securing prompt recession of the disease and that when rabies occurs

in a community dog owners should be required to have their pets vaccinated. A single subcutaneous injection of 5 ml. of an approved vaccine was recommended, but it was pointed out that 3 weekly injections would produce a more certain immunity. It also stated that vaccinated dogs, properly tagged, may be allowed at large 30 days after vaccination.

Another evidence of increased confidence is the revision of the recommendations for control of rabies issued by the American Public Health Association in its pamphlet (14) "Control of Communicable Disease." In the 1943 edition appears the statement: "Preventive vaccination of dogs is still in the experimental stage"; in the 1945 version this has been revised to read: "Preventive vaccination of dogs is practicable but cannot be relied upon as the sole means of controlling the disease."

The practical experience of the War Department with the dogs used by the armed forces during World War II bears further witness to the efficacy of vaccination. The Veterinary Division (15) of the Office of the Surgeon General, United States Army, has reported that all the war dogs were vaccinated each year with 3 weekly injections of commercial vaccine and that only 1 case of rabies developed among the 19,050 dogs processed and the 9,261 reprocessed at the War Dog Replacement and Training Centers. The Chief of the Division commented that the single dog that had rabies may not have been vaccinated as prescribed. It was also recorded that vaccination of all pets at army posts, camps, and stations has been recommended for many years.

Replies to the Committee's questionnaire relating to vaccination reflected clearly the changing opinion. Seven States now have rabies control laws requiring yearly vaccination of dogs. The States are: Alabama, Arizona, Arkansas, Georgia, Mississippi, North Carolina, and South Carolina. The District of Columbia required vaccination in 1945 and 1946 under new authority granted to the District Commissioners in 1945. The State Department of Health of Kentucky made efforts in two recent sessions of the legislature to have a law enacted that would have established a system of dog wardens and required them to supervise licensing and immunization of all dogs, but these attempts failed.

All States and all county and local authorities that require vaccination specify that dogs shall be immunized annually. This requirement now rests on a scientific basis, since Johnson, in a paper delivered before the United States Livestock Sanitary Association in December 1945 (8) presented evidence that immunity was maintained at a high level for 6 months and was still effective 1 year after vaccination.

Interstate Transportation of Dogs

Johnson (7) has declared that "the relative freedom of transport of dogs from one community to another is the main reason for the continual development of new foci of rabies." As a means of preventing the introduction of rabies from an outside source, 24 States and the District of Columbia have regulations governing the importation of dogs. Seventeen States definitely mentioned that health certificates were required; in general, these certificates must indicate that the animal is in good health and has not been in a rabies-infected area for a stated period, usually 6 months. On the last point, the recommendation of the United States Livestock Sanitary Association is that the animal shall not have been exposed to rabies within 100 days prior to importation. A few States and some counties require vaccination in addition to the health certificate; some require vaccination if the animal does not meet the requirements for certification.

Canada has no regulations governing the interprovincial transportation of dogs, but there are strict quarantine regulations for those entering from outside the country. Dogs from Europe, Asia, or Africa must be put in quarantine at the importer's expense for 6 months at the port of entry. Dogs from Great Britain, North Ireland, and the Irish Free State may be admitted without restriction, provided their owners present certificates of the place of origin.

Since September 15, 1944, Canada has restricted the entry of dogs from the United States. To enter Canada, a dog from the United States must be accompanied by either (1) a certificate signed by an inspector of the Bureau of Animal Industry stating that the animal is free from contagious disease, that it has not been exposed to rabies, and that no case of rabies has occurred for 6 months within a radius of 50 miles of the place in which the dog has been kept, or (2) a certificate signed by a veterinarian in the State of origin certifying that the dog is well, that it has not been exposed, so far as can be ascertained, and that it has been vaccinated within the preceding 6 months. Performing dogs entering for temporary stay and kept under direct control are exempt.

RABIES CONTROL IN PRACTICE

Rabies control methods have been applied with gratifying success in a number of communities; some programs have been planned as demonstrations in States that do not have statewide protective measures.

Maryland

During 1943 and 1944 an outbreak of rabies occurred in Maryland, with the largest number of cases in Montgomery and Prince Georges Counties, adjacent to the District of Columbia. It soon became evi-

dent that the usual quarantine restrictions were not fully effective. Control programs instituted by county agencies in cooperation with the State Livestock Sanitary Service have been described by Brueckner (16, 17) and by Ellicott (18).

Clinics were held in widely scattered places in the two counties for periods of 2 weeks in the spring and summer of 1944. The State agency furnished the vaccine, and the county commissioners paid local veterinarians to administer it. A single injection of 5 cc. was used. In addition, Montgomery County had an excellent system of licensing and removal of unlicensed dogs; control was less rigid in Prince Georges County, and the number of ownerless and stray dogs was higher.

As a result of these programs, about 90 percent of the dogs in Montgomery County and about 75 percent of those in Prince Georges were vaccinated. In Montgomery County vaccinated dogs were freed from quarantine restrictions 2 weeks after the vaccination clinics ended; because of the larger number of stray dogs in Prince Georges the restrictions were continued for 30 days after the vaccination period. The number of cases in Montgomery decreased rapidly; in Prince Georges the number remained high for 6 weeks, but later decreased.

New York

A carefully planned program of rabies control is in progress in New York State, where rabies has been increasing since 1944. The details of this project have been well described by Broad and Zeissig (19). The model for the campaign, being carried out by counties, was the plan evolved in Tompkins County by a committee of volunteers composed of veterinarians and public health officers who in the spring of 1945 observed that the county was in the path of an advancing wave of rabies. City and county officials accepted the committee's proposals for preventive measures, which included: (1) more rigorous enforcement of quarantine on dogs; (2) collection and disposal of stray dogs; (3) instruction of the public; (4) requesting that all dog bites be reported to the family physician or health officer and be properly treated; and (5) plans for procedures to be employed should rabies make its appearance. It was believed to be too early to obtain public cooperation for mass vaccination.

When rabies struck Tompkins County in June 1945 with two cases within a few days, the plans were swiftly put into effect. The Rabies Advisory Council, representing all elements in the community concerned in the eradication program, sponsored an intensive program of publicity and a public vaccination program. Quarantine was imposed first; extra dog wardens were appointed to collect and impound un-

wanted animals, and dog owners were asked to restrain their pets. According to Broad and Zeissig, the response was phenomenal. They consider quarantine the most important measure in rabies control.

A program of mass vaccination was then initiated. The county board of supervisors approved an appropriation of \$4,000 for the purchase of vaccine and to pay administrative costs. Over a period of 2 weeks, 10 clinics were conducted in Ithaca and 20 in other parts of Tompkins County. A total of 3,312 dogs, about 58 percent of the dog population, was vaccinated at a cost of about 60 cents per dog. Writing in January 1946, Broad and Zeissig reported that no new cases had come to their attention.

Since the Tompkins County experiment, the New York State Department of Health has made available \$75,000 to aid other counties sponsoring vaccination programs, and Dr. Alexander Zeissig, associate professor of bacteriology at the New York State Veterinary College at Cornell University, who was active in Tompkins County, has been appointed to direct a campaign for the State. Up to June 24, 1946, five more counties had completed their programs, and nine others had programs contemplated or in progress. The State will finance a county campaign on a 50 percent basis for the fiscal year up to \$16,000 and not over 35 cents per dog vaccinated. Assurance is required that at least 60 percent of enumerated dogs in the county have been vaccinated during the program.

Massachusetts

Since 1934 Massachusetts has encouraged vaccination clinics at which vaccine is given either free or for a small fee. Each year more communities have instituted such clinics, usually on an annual basis. The State health department has encouraged communities in which rabies has occurred to restrict movement except on leash of all dogs not vaccinated within a year. This plan was used in 1941 in an area in which two rabid dogs appeared, and the focus was stamped out.

It will be noted that in most of these programs considerable effort was devoted to education of the public. In the opinion of Johnson (7), "the public must be informed about the disease and the necessary control procedures through radio programs, newspaper articles and pamphlets giving the salient information." The report (19) of the campaign in Tompkins County, N. Y., describes the publicity methods used there, and the value of this activity is indicated in the following:

Naturally, some of these procedures, particularly that of picking up stray dogs which were claimed as pets by groups rather than by individuals, met with criticism. However, as soon as the necessity for what seemed like cruelty or overzealousness on the part of persons charged with protecting public health was explained and understood, this criticism subsided.

Later, when cases of rabies appeared, dog owners were asked, through radio announcements, not to let their pets run loose. The report declares:

The response to this request was phenomenal. We were totally unprepared for the practically universal public compliance which followed. The dogs disappeared from the streets. For several days there was much barking and yipping emanating from the homes of dog owners. In 3 or 4 days this racket ceased as the dogs became used to the idea.

In both the Maryland and the New York programs it was considered important that clinics be arranged for the convenience of dog owners and that there should be no expense attached. According to Broad and Zeissig,

It was the feeling of the Advisory Council that unless the cost to the dog owner were little or nothing, clinics for the vaccination of dogs would not serve a sufficient number to make their establishment worth while.

Recent Scientific Developments

Striking advances in the knowledge of rabies and its control have been made during the past decade by investigators at the Rockefeller Institute for Medical Research, at the Rockefeller Foundation Rabies Research Laboratory near Montgomery, Alabama, and at the National Institute of Health, Bethesda, Maryland, as well as by individual workers. With the development of new methods for the study of virus diseases, fresh interest in rabies has been awakened, and the entire problem has been restudied.

The late Dr. Leslie T. Webster of the Rockefeller Institute for Medical Research, New York, reviewed most of the literature concerning rabies and its control through the year 1941 in his monograph (9) "Rabies," published in 1942, to which reference was made earlier. Since that time a number of significant advances, many of them based on Webster's work, have been reported. A thorough search of the literature has not been attempted, but brief summaries of some recent reports are presented here.

Diagnosis

Webster and Dawson in 1935 developed a mouse inoculation test for diagnosis, which is more sensitive than any biological test previously used and more accurate than microscopic examination. Investigators who have reported on the use of the mouse inoculation test have shown that this procedure almost invariably confirmed the microscopic demonstration of Negri bodies and, in addition, revealed the virus in about 10 percent of cases in which the inclusion bodies had not been shown by other tests.

Johnson (20) reported from the Alabama rabies research laboratory a study of mouse inoculation of routine specimens of dog brains in

which the average percentage of positive specimens missed by microscopic examination in 1 year was 10.5 percent. He also studied 404 fox brains, of which 137 were positive by mouse inoculation; of the mouse-positive specimens, 9.4 percent had been negative by microscopic examination.

Johnson (20) has stated the problem as follows:

In general, confirmatory animal inoculation should be performed when a human being has been exposed and when: (1) the brain in question is from an animal diagnosed as clinically rabid by a veterinarian or other competent observer; (2) atypical inclusion bodies are found; (3) the animal was killed or died with a history suggestive of rabies; (4) the biting animal was a stray and was immediately killed.

In an investigation of the significance of Negri bodies in diagnosis, Johnson (20) observed that the inclusion bodies were demonstrated by microscopic diagnosis in dogs with the furious type of rabies more frequently than in those with the paralytic type. He recommended the rapid microscopic diagnosis method of Sellers, in which cross sections of brain tissue are stained with carbol-fuchsin-methylene blue stain.

Difficulties that may arise in laboratory diagnosis were outlined by Stovall and Pessin (21) in 1942. There are two types of difficulties: first, the differentiation of Negri bodies from inclusion bodies of other types of cell structures, and second, deficiencies in the methods of examination.

Although typical Negri bodies are readily identified, there are instances in which only small forms occur, and since the typical "inner bodies" cannot be seen in these, diagnosis is doubtful, and the mouse test is essential. There are also "lyssa bodies," which resemble Negri bodies but do not contain "inner bodies"; mouse inoculation is also necessary in these cases to establish the diagnosis. These investigators held the opinion that paraffin sections made for more accurate results in microscopic diagnosis than smears or impressions. They preferred eosin-methylene blue as a stain and emphasized that a low pH was necessary for good results. They found this stain so satisfactory that they used it also for smears. They also stressed the importance of examining tissue from different parts of the brain.

A group of Army medical and veterinary officers recently drew attention to the difficulty of differentiating Negri bodies from the inclusion bodies found in dogs with distemper. On a Pacific island, where rabies was unknown, Rifkin (22) and his associates encountered in six dogs an encephalitis complicating distemper which caused nervous signs and symptoms almost identical with those of rabies. The inclusion bodies found in the brains of the animal were similar to, but not characteristic of Negri bodies, and animal tests gave no re-

action for rabies. Webster (9) commented in relation to this problem that the distemper inclusions "can be differentiated from Negri bodies by their lack of inner corpuscles, their homogeneous structure, their presence in degenerated rather than in normal-appearing nerve cells, their general distribution throughout the central nervous system rather than a predilection for Ammon's horn and ganglion cells, and finally, their frequent extracellular situation."

Research on the Virus

Studies of the virus, its distribution in the tissue of victims of rabies, and its characteristics under varying conditions have revealed information that has contributed materially to the production of more effective vaccines and to more accurate knowledge of manifestations of the disease.

A recent development is the preparation of a standard challenge virus to be used in potency tests. When the Division of Biologics Control of the National Institute of Health began routine testing of rabies vaccines, discrepancies were discovered in the potency values of vaccines, whether they were produced in one laboratory or in different laboratories. Investigation revealed that the discrepancies were due in part to variations brought about by homologous and heterologous strains of virus. New methods of testing evolved in the division have apparently overcome both of these difficulties and have made possible the production of a dependable challenge virus.

With relation to the virus used in production of human rabies vaccines, the minimum requirements established by the National Institute of Health state:

The virus shall be of such activity as to kill all mice injected intracerebrally with 0.03 ml. of the rabbit brain suspension in a dilution of not less than 10^{-5} . The production virus is maintained either by frequent rabbit passage, preferably not less than monthly or by holding the infected tissue at minus 15° C. or lower until needed and then giving at least 2 rapid rabbit passages before use.

Since mice were known to vary considerably in susceptibility to neurotropic viruses, Johnson and Leach (23) studied mice procured from various commercial sources and some private laboratories, and field mice. Two strains of virus, one from a human case, the other from a dog, were used for the tests. All the mice from commercial sources were equally satisfactory for diagnostic use, they concluded. Field mice and some obtained from laboratories were slightly less susceptible.

Sulkin and Harford (24) in 1943 demonstrated the virus in the saliva of a human patient with rabies and concluded that reasonable precautions should be taken to prevent contact of saliva with wounds,

abrasions, or mucous membranes of attendants in such cases. The investigators pointed out that the saliva in which the virus was found was obtained during a convulsive seizure, whereas the virus was not demonstrated in a specimen obtained by swabbing the mouth of a patient.

Vaccination

Irradiated vaccine.—Levinson (25) and his associates at the Michael Reese Research Foundation, Chicago, working under a contract with the Committee on Medical Research of the Office of Scientific Research and Development during the war, produced in 1944 a potent inactivated virus vaccine with ultraviolet irradiation from a new type of lamp which is a source of both total and extreme ultraviolet. So promising is this method that the National Institute of Health, after confirming the work of the investigators, has recommended the technic to manufacturers of vaccine for human use.

Inactivation of viruses had been accomplished in the past with ordinary ultraviolet irradiation, but the antigenicity of the product was destroyed. In 1937, Hodes, Lavin, and Webster had shown that total loss of antigenicity could be avoided if irradiation was discontinued as soon as inactivation was completed. Webster and Casals (27) in 1942 compared irradiated vaccines with those treated with phenol and chloroform in immunizing dogs and mice and found the irradiated products superior; in their experiments the viral suspension was exposed to ultraviolet rays for 35 minutes. They found it difficult, however, to produce a consistently potent vaccine by this method.

The new method described by Levinson and his group (25, 26) has apparently overcome many of the drawbacks of the older types. According to the report, the investigators were able to inactivate suspensions of infected brain by single exposures of from 0.17 to 0.33 seconds with the new lamp, as compared with 35 or 40 minutes necessary when ordinary ultraviolet is used. Comparison of the potency of several lots of the new vaccine with that of phenolized control vaccines from the same viral suspension showed that the irradiated vaccine protected against at least 20,000 MLD, whereas the highest potency shown by any of the phenolized material was 2,477 MLD. The requirement of the National Institute of Health is 1,000 MLD. Vaccine produced by the new type of irradiation not only has a high potency, but is consistently potent, whereas with other methods of inactivation, lots of vaccine vary in their protective effect.

Webster (9) emphasized that no vaccine known at that time would protect animals once they had been exposed to rabies, but Webster and Casals (27) found in 1942 that vaccines inactivated with ordinary

ultraviolet light brought about an appreciable degree of immunity in mice following intramuscular injection of street virus. Levinson reported that the new irradiated vaccine also produced some degree of immunity after the virus had been injected.

Tests of the new irradiated vaccine indicated no appreciable loss of potency after six months of storage. The National Institute of Health in its announcement approving irradiation as a method of inactivation observed that more experience is needed regarding its keeping qualities, but that evidence has so far indicated that its potency after prolonged storage is as good if not better than that of vaccines prepared by other methods.

Finally, the investigators reported that irradiated vaccines would not cause the toxic reactions that sometimes result from chemicals left in the other vaccines after manufacture.

Potency—The mouse test for determination of the potency of vaccines represents one of the greatest advances ever made in immunization against rabies. This test was developed first by Webster and his associates at the Rockefeller Institute for Medical Research during the years 1936 to 1940. Casals (28) recently observed that with this new tool it is now possible not only to test potency, but to study the variables influencing potency, these include the strain of virus, the animal used to propagate the vaccine, the age of the animals, the agent used for inactivation of the virus, and the stability of the product.

Habel (29) of the United States Public Health Service studied the mouse test in 1940 and recommended modifications of the technique originally suggested by Webster. Use of the mouse test as modified by Habel is now required for approval of manufacturers by both the National Institute of Health and the United States Department of Agriculture.

Single Injection Method

Johnson's work in Alabama has shown (8) that with the potent vaccines now available a single injection of 5 cc. of an approved vaccine produces a high degree of immunity satisfactory for about 1 year, if given 1 month before exposure. Fifty-two dogs received subcutaneous injections of 5 ml. of a phenolized vaccine containing 20 percent brain tissue, and 52 were selected as controls. At the end of 1 year both groups were tested for susceptibility to rabies by intramuscular inoculation with a standard salivary gland street virus. Three months later 6, or 11.5 percent, of the vaccinated dogs had died of rabies, whereas 41, or 79 percent, of the control dogs had died.

During this experiment studies were made of the development and persistence of virus-neutralizing substances in the blood serum of

the vaccinated dogs. These studies showed that 75 percent of the vaccinated dogs developed virus-neutralizing substance in the blood serum and that this was maintained at a high level for 6 months. At the end of a year only 44 percent showed a significant amount of virus-neutralizing substance in the blood serum, and all these dogs resisted infection. Johnson pointed out, however, that a considerable proportion of the animals that did not have a significant amount of virus-neutralizing substance in the blood one year after vaccination nevertheless resisted infection.

A concurrent test was made with three injections of vaccine in 25 dogs, and these were compared with 25 controls. All were held for three months and tested for susceptibility. None of the vaccinated dogs died of rabies, but there were seventeen deaths (68 percent) among the unvaccinated controls.

Serum Prophylaxis in Man

The possibility that the use of immune serum alone or in combination with vaccine may bring about effective prophylaxis against rabies in man has been suggested recently by Habel (30).

Experiments with mice, guinea-pigs, and monkeys indicated that immune serum injected intramuscularly at the site of an inoculation with virus would either destroy the virus while it was still localized or retard the spread of the virus within the nervous tissue until vaccine could take effect. In all the experiments, the best results were achieved when serum and vaccine were used in combination, preferably with an interval of 6 days between the administration of serum and the beginning of the course of vaccine.

Habel suggested that an injection of serum might be given immediately to a person bitten by an animal suspected of having rabies. Administration of vaccine might then be deferred until the mouse test for diagnosis could be completed, which by modern methods can be done in 6 days. If the diagnosis is positive, there is still time for effective treatment, if it is negative, the person has been spared the painful Pasteur treatment.

RECOMMENDATIONS FOR RABIES CONTROL

1. Efforts should be made to secure uniform national control measures against rabies. The Federal agencies concerned with rabies should draft a national plan for rabies eradication to be recommended to all health, agriculture, livestock, sanitary and conservation authorities.
2. Transportation of dogs and other susceptible animals from one State to another by common carriers should be regulated by the Federal Government in cooperation with the State agencies concerned.

Permits for entry into a State should be contingent upon vaccination. Effective measures should be devised for the control of interstate transportation by private automobiles or other means not involving common carriers.

3. Health provisions governing the importation of all dogs and other susceptible animals from foreign countries should be promulgated and administered by the United States Public Health Service.

4. Rabies in any animal or human being should be made reportable in all States and local units of health jurisdiction, and the figures published in Public Health Reports.

5. Every State should require annual licensing of dogs. The license fee should be large enough to provide for efficient administration of the law, which requires an adequate force of control officers and veterinarians, as well as funds for vaccine and for the maintenance of pounds.

6. Annual vaccination of dogs is recommended, particularly in urban areas. In these areas, the granting of a dog license should be made contingent upon vaccination.

7. Until further knowledge concerning immunity against rabies is available, the recommendations on vaccination set forth by the National Research Council through its Subcommittee on Rabies in a report issued November 26, 1945, should be generally accepted. These recommendations are based on evidence that a single injection of 5 cc. of an approved vaccine is effective for use in mass vaccination programs and that three injections of 5 cc. each, administered a week apart, provide greater immunity and should be advised when practical.

8. Control measures other than registration and vaccination should be emphasized. These include the establishment of quarantine over sufficiently large areas during outbreaks of rabies among dogs, proper disposition of rabid dogs and those suspected of being rabid, destruction or supervised detention for not less than three months of all dogs known to have been bitten by or exposed to rabid animals, and the impounding and disposal of all stray dogs.

9. The United States Public Health Service or the Bureau of Animal Industry, or both jointly, should be urged to formulate standard quarantine procedures covering the various situations that arise during an outbreak of rabies and to recommend these to the states and territories for adoption.

10. Dog pounds should be available for every unit of local health jurisdiction.

11. An educational program should be launched by appropriate health authorities to explain the necessity for control measures and especially the efficacy of the vaccines now approved by the Bureau of Animal Industry and the National Institute of Health.

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APPENDIX A

Types of Legislation for Control of Rabies, 1945²

- Alabama:** State dog control act provides for compulsory vaccination; State Livestock Sanitary Association regulates entrance to State by railway express.
- Arizona:** State rabies law requires vaccination of dogs to obtain license.
- Arkansas:** State law requires vaccination; State Board of Health regulation covers reporting and quarantine.
- California:** State law authorizes State Board of Health to establish quarantine; Board issues regulations as part of general control of communicable disease; some cities have ordinances.
- Colorado:** State Board of Health regulations on communicable disease include rabies.
- Connecticut:** Control of rabies included in "Laws Relating to Dogs." Commissioner on domestic animals promulgated regulation on interstate transportation.
- Delaware:** State Department of Agriculture, State Game and Fish Commission have power to declare quarantine; State Board of Health also investigates.
- District of Columbia:** District Commissioners empowered to promulgate rules and regulations.
- Florida:** No State law; some communities have regulations requiring vaccination.
- Georgia:** State rabies control law modeled on that of Alabama requires vaccination; some counties require vaccination to obtain license.
- Idaho:** State Department of Agriculture prescribes control measures.
- Illinois:** State law authorizes Department of Agriculture to prescribe measures deemed necessary; animal bites reported to State Department of Health.
- Indiana:** State Board of Health authorized to establish quarantine.
- Iowa:** State Board of Health issues regulations as part of communicable disease control; State Department of Agriculture may establish quarantine.
- Kansas:** State Livestock Commission prescribes control measures.
- Kentucky:** State Department of Agriculture may apply quarantine; local boards of health have power to make emergency rules and regulations.
- Louisiana:** State sanitary code prescribes control measures; some parishes and communities require vaccination.
- Maine:** State law directs State Department of Health and Welfare to have certain impounded dogs killed; Department issues regulations on other measures.
- Maryland:** State law authorizing State Board of Agriculture to protect human health against diseases of animals includes rabies; State livestock sanitary service formulates regulations.
- Massachusetts:** Local communities have power of action.
- Michigan:** State law prescribes control measures.
- Minnesota:** State law authorizes quarantine; State Livestock Sanitary Board makes rules and regulations.
- Mississippi:** State law requires vaccination.
- Missouri:** Control measures left to county courts; Kansas City and St. Louis have local ordinances.
- Montana:** State Livestock Sanitary Board promulgates regulations.
- Nebraska:** Control handled under general provisions for quarantine of livestock affected with or exposed to an infectious or contagious disease.
- Nevada:** State Board of Health regulations on communicable diseases include rabies; State Department of Agriculture controls interstate transportation.
- New Hampshire:** State Board of Health issues "instructions."
- New Jersey:** Rabies control law administered by State Board of Health emphasizes licensing as primary control measure; State Department of Agriculture controls interstate transportation.

² As indicated in material submitted to the Committee.

- New Mexico: State Board of Health regulations on communicable diseases include rabies.
- New York: State public health law authorizes quarantine by State Health Commissioner; State sanitary code includes regulations for control of canine rabies.
- North Carolina: State law requires vaccination and other control measures; State Board of Health issues regulations for control in human beings.
- North Dakota: State Livestock Sanitary Board issues regulations.
- Ohio: State law authorizes local boards of health to declare quarantine if rabies is prevalent.
- Oklahoma: State Health Department makes regulations; some towns and cities have local ordinances.
- Oregon: Information not sufficient for determination of type.
- Pennsylvania: State law makes rabies reportable to Department of Agriculture which exercises control; municipalities, boroughs, and first-class townships also have power to place quarantine; State dog law used as adjunct in rabies control.
- Rhode Island: State law empowers State veterinarian to declare quarantine; he notifies State Director of Public Health; Department of Agriculture and conservation makes regulations; town and city councils make own ordinances.
- South Carolina: State law empowers State health officer to declare quarantine; special law requires vaccination, but counties may suspend law; some cities have local ordinances.
- South Dakota: State Board of Health regulations on communicable diseases include rabies; Livestock Sanitary Board regulates interstate transportation.
- Tennessee: State law authorizes State veterinarian to declare quarantine; several cities have local ordinances.
- Texas: State Livestock Sanitary Commission declares quarantine and regulates importation of dogs; some cities have ordinances.
- Utah: State law empowers both State Health Department and State Department of Agriculture to establish quarantine and take any other necessary steps; Department of Agriculture regulates importation of dogs into State.
- Vermont: State law empowers State Board of Health and State Department of Agriculture to act jointly in outbreaks to establish quarantine; Department of Agriculture controls importation by regulation.
- Virginia: Local governing bodies may adopt control measures.
- Washington: Department of Agriculture prescribes control measures by regulations.
- West Virginia: Authority not stated; Department of Agriculture in charge.
- Wisconsin: State law directs Department of Agriculture to declare quarantine and specifies methods of restraining dogs. Local governing bodies may pass ordinances or local boards of health may make regulations; State Board of Health provides a model regulation.
- Wyoming: Livestock import proclamation by governor in effect April 1943² to April 1945, included dogs among animals subject to regulation by livestock and sanitary board.

APPENDIX B³

Enforcement Agencies and Officers

- Alabama: State public health veterinarian under Departments of Health and Agriculture; rabies inspectors in counties supervised by county boards of health.
- Arizona: State veterinarian; constable or peace officer; County Board of Health furnishes vaccine.
- Arkansas: State health officer establishes quarantine; local police enforce. State veterinarian makes regulations on vaccination and administers vaccination law.
- California: State health department establishes quarantine.
- Colorado: State Division of Public Health.
- Connecticut: Commissioner on domestic animals; deputies; dog wardens.
- Delaware: State Board of Agriculture and State Game and Fish Commission may establish quarantine; Board of Health also investigates.

² As indicated in material submitted to the committee in 1945.

- District of Columbia: Health Department.
- Florida: No rabies law.
- Georgia: State Department of Public Health; rabies inspector under supervision of County Boards of Health.
- Idaho: State Bureau of Animal Industry; no information on local enforcement.
- Illinois: State Department of Agriculture; no information on local enforcement.
- Indiana: State Board of Health may establish quarantine.
- Iowa: State Department of Agriculture through State veterinarian; local boards of health may require vaccination.
- Kansas: State Livestock Sanitary Commission; county attorney and sheriff.
- Kentucky: State Department of Agriculture; local boards of health.
- Louisiana: State Department of Health; local health departments.
- Maine: State Department of Health and Welfare; municipal officers enforce destruction of impounded dogs.
- Maryland: State Livestock Sanitary Service; all local enforcement agencies, including health officers.
- Massachusetts: Local community authorities.
- Michigan: State Department of Agriculture; township boards of health; justices of peace.
- Minnesota: Executive Officer, State Livestock Sanitary Board; local peace officers and health officers.
- Mississippi: State Board of Health; sheriffs, game wardens, peace officers of counties and municipalities.
- Missouri: County courts.
- Montana: State Livestock Sanitary Board; no information on local enforcement.
- Nebraska: Bureau of Animal Industry; no information on local enforcement.
- Nevada: State Departments of Agriculture and Health; no information on local enforcement.
- New Hampshire: State Board of Health.
- New Jersey: Rabies control unit in State Department of Health; local boards of health; municipal governing bodies.
- New Mexico: Director of Public Health; local enforcement officer not indicated.
- New York: State Commissioner of Health; dog warden or any peace officer; local health officers.
- North Carolina: State Boards of Health and Agriculture; county health officers; rabies inspectors; sheriffs.
- North Dakota: State veterinarian or his local agent; State Health Department; local health officer.
- Ohio: Local boards of health.
- Oklahoma: County health officer establishes quarantine; sheriff enforces.
- Oregon: Health departments.
- Pennsylvania: State Department of Agriculture; police officers, local agencies, and organizations designated by State Secretary of Agriculture.
- Rhode Island: State veterinarian; local health officers.
- South Carolina: State health officer; sheriffs, constables, police and health officers.
- South Dakota: State Board of Health; county health officers.
- Tennessee: State veterinarian declares quarantine; no information on local enforcement.
- Texas: State veterinarian declares quarantine; no information on local measures.
- Utah: State Health and Agriculture Departments; no information on local enforcement.
- Vermont: Departments of Agriculture and Public Health; local law enforcement officers.
- Virginia: State Health Department acts in advisory capacity to county boards of supervisors.
- Washington: Director of Agriculture; no information on local enforcement.
- West Virginia: State Department of Agriculture; no information on local enforcement.
- Wisconsin: State Department of Agriculture; peace officers; humane societies, local health officers, authorized veterinarians.
- Wyoming: State Livestock and Sanitary Board.

INCIDENCE OF DISEASE

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

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 2, 1947

Summary

A total of 218 cases of poliomyelitis was reported currently, as compared with 167 last week, 1,284 for the corresponding week last year, and a 5-year (1942-46) median of 474. Increases of more than 3 cases occurred in only 8 States, as follows (last week's figures in parentheses): Massachusetts 14 (3), Rhode Island 7 (0), New York 22 (15), Indiana 8 (0), Illinois 19 (9), Michigan 14 (5), Minnesota 9 (5), California 28 (16). The 12 States reporting more than 13 cases in the past 3 weeks are as follows (figures for the corresponding period last year in parentheses): Massachusetts 18 (16), New York 50 (95), Pennsylvania 31 (29), Ohio 30 (95), Illinois 39 (225), Michigan 22 (66), Minnesota 19 (542), Nebraska 21 (89), Tennessee 17 (16), Texas 27 (156), Idaho 15 (5), California 68 (150). The total for the year to date is 1,954, as compared with 5,450 for the same period last year and a 5-year median of 2,913. For the period since March 15 (the approximate average date of seasonal low incidence in past years) 1,343 cases have been reported, as compared with 4,983 for the corresponding 20 weeks last year and a 5-year median for the period of 2,516.

Of the current total of 40 cases of Rocky Mountain spotted fever reported (as compared with 48 last week and a 5-year median of 41), 29 occurred in the South Atlantic and East South Central area, 8 in the Middle Atlantic and East North Central Areas, and 1 each in Oklahoma, Wyoming, and Utah. The cumulative total is 335, as compared with 353 for the same period last year and a 5-year median of 323.

One case of smallpox was reported, in New Mexico (see p. 1244), 1 case of psittacosis in Michigan, and 1 case of anthrax in Arkansas.

Current figures are below the respective corresponding expectancy figures for all of the diseases listed in the following tables except amebic dysentery, tularemia, and whooping cough.

A total of 8,445 deaths was registered during the week in 93 large cities of the United States, as compared with 8,113 last week, 7,986 and 8,152, respectively, for the corresponding weeks of 1946 and 1945, and a 3-year (1944-46) median of 8,140. The total to date for these cities is 292,453, as compared with 289,518 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended August 2, 1947, and comparison with corresponding week of 1946 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 1942-46	Week ended—		Median 1942-46	Week ended—		Median 1942-46	Week ended—		Median 1942-46
	Aug. 2, 1947	Aug. 3, 1946		Aug. 2, 1947	Aug. 3, 1946		Aug. 2, 1947	Aug. 3, 1946		Aug. 2, 1947	Aug. 3, 1946	
NEW ENGLAND												
Maine.....	0	2	0				3	30	27	2	0	0
New Hampshire.....	0	0	0	3			2	3	3	1	0	0
Vermont.....	1	0	0				27	71	17	1	0	0
Massachusetts.....	7	9	3				39	210	95	1	0	8
Rhode Island.....	0	1	1				5	11	11	0	1	1
Connecticut.....	3	1	0	2		1	38	85	18	0	0	1
MIDDLE ATLANTIC												
New York.....	8	17	6	(1)	11	(1)	182	387	176	5	6	17
New Jersey.....	2	4	1	2	2	2	120	104	49	1	2	6
Pennsylvania.....	8	8	7	(2)	(2)	(2)	44	150	57	3	6	6
EAST NORTH CENTRAL												
Ohio.....	2	4	4			1	110	167	46	3	2	2
Indiana.....	6	4	4				12	8	7	1	0	0
Illinois.....	0	7	7	1		4	76	48	48	2	6	6
Michigan ²	1	15	8				102	107	57	1	2	5
Wisconsin.....	1	4	4	1		5	153	154	109	1	1	3
WEST NORTH CENTRAL												
Minnesota.....	5	4	2				49	20	13	0	2	0
Iowa.....	0	0	3				27	20	16	0	1	1
Missouri.....	4	1	2				33	12	12	0	0	4
North Dakota.....	4	0	0		20		9	1	2	0	1	0
South Dakota.....	1	1	1				10	1	6	0	1	0
Nebraska.....	1	0	1	5	3	2	7	1	2	0	1	0
Kansas.....	2	1	1				6	5	13	0	1	2
SOUTH ATLANTIC												
Delaware.....	0	0	0				4			0	1	0
Maryland ³	4	6	5	2		1	12	64	31	0	0	4
District of Columbia.....	0	0	0				3	19	7	0	0	1
Virginia.....	4	11	7	43	99	35	16	51	11	5	1	2
West Virginia.....	2	1	2	4			12	9	9	2	1	1
North Carolina.....	7	9	9				10	24	11	2	2	2
South Carolina.....	2	4	4	114	72	72	9	22	17	1	0	2
Georgia.....	3	6	5	4		5	2	13	6	0	0	1
Florida.....	5	3	3	3	1	1	14	7	5	1	0	1
EAST SOUTH CENTRAL												
Kentucky.....	0	5	2				5	6	6	2	0	1
Tennessee.....	5	2	3	3	1	2	7	10	6	0	2	2
Alabama.....	5	2	7	5	17	17	12	11	7	1	1	2
Mississippi ²	3	9	7	1						0	5	2
WEST SOUTH CENTRAL												
Arkansas.....	3	4	4	5		3	5	6	7	0	1	0
Louisiana.....	3	4	4	2		3	15	8	8	0	0	1
Oklahoma.....	2	5	2	8	10	10	1	21	4	0	0	1
Texas.....	13	29	29	206	233	190	58	109	54	6	2	5
MOUNTAIN												
Montana.....	0	0	1				24	10	10	0	0	0
Idaho.....	1	0	0	4	17		3	9	17	1	0	0
Wyoming.....	0	0	0				2	3	3	1	0	0
Colorado.....	3	9	4		3	1	33	6	12	2	0	0
New Mexico.....	0	0	1	2	1		2	3	3	0	0	0
Arizona.....	0	3	1	22	8	14	3	22	10	0	0	0
Utah ²	0	0	0		1		2	20	22	0	0	0
Nevada.....	0	0	0					1	11	0	0	0
PACIFIC												
Washington.....	4	12	5				13	21	46	0	1	2
Oregon.....	1	3	2	7			12	34	21	2	0	1
California.....	9	20	11			5	54	135	164	6	7	10
Total	135	230	190	453	489	489	1,387	2,239	1,476	54	57	123
31 weeks.....	6,823	9,462	7,084	301,966	190,686	80,678	182,185	636,019	533,746	2,383	4,331	6,004
Seasonal low week ⁴	(27th) July 6-11			(30th) July 26-Aug. 1			(35th) Aug. 30-Sept. 5			(37th) Sept. 13-19		
Total since low.....	526	834	669	453	489	489	205,072	662,143	571,759	3,355	5,835	8,456

¹ New York City only.

² Philadelphia only.

³ Period ended earlier than Saturday.

⁴ Delayed report: Meningitis, Virginia, 2 June cases.

⁵ Dates between which the approximate low week ends. The specific date will vary from year to year.

Telegraphic morbidity reports from State health officers for the week ended August 2, 1947, and comparison with corresponding week of 1946 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1942-46	Week ended		Median 1942-46	Week ended—		Median 1942-46	Week ended—		Median 1942-46
	Aug. 2, 1947	Aug. 3, 1946		Aug. 2, 1947	Aug. 3, 1946		Aug. 2, 1947	Aug. 3, 1946		Aug. 2, 1947 ¹	Aug. 3, 1946	
NEW ENGLAND												
Maine.....	0	1	1	0	2	8	0	0	0	0	0	0
New Hampshire.....	1	12	1	0	2	2	0	0	0	0	0	0
Vermont.....	1	1	1	1	1	3	0	0	0	0	0	0
Massachusetts.....	14	11	11	24	42	49	0	0	0	1	11	5
Rhode Island.....	7	0	0	2	1	1	0	0	0	1	0	0
Connecticut.....	3	0	9	3	8	11	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York.....	22	43	43	62	58	79	0	0	0	4	4	6
New Jersey.....	2	14	14	12	17	19	0	0	0	4	4	3
Pennsylvania.....	10	9	9	31	39	47	0	0	0	4	7	8
EAST NORTH CENTRAL												
Ohio.....	7	44	12	44	53	55	0	0	0	4	3	7
Indiana.....	8	11	5	13	9	11	0	0	0	6	3	1
Illinois.....	19	117	26	17	20	38	0	0	0	4	3	5
Michigan ²	14	46	7	39	27	32	0	0	0	2	9	6
Wisconsin.....	3	30	3	11	30	30	0	0	0	0	0	1
WEST NORTH CENTRAL												
Minnesota.....	9	257	6	10	22	18	0	0	0	2	1	0
Iowa.....	5	50	1	6	6	13	0	0	0	0	0	1
Missouri.....	4	77	4	5	11	14	0	0	0	1	8	8
North Dakota.....	2	31	0	3	1	1	0	0	0	0	1	0
South Dakota.....	0	23	0	3	1	5	0	0	0	0	0	0
Nebraska.....	7	37	3	6	8	6	0	0	0	0	0	0
Kansas.....	1	80	5	2	4	10	0	0	0	1	1	3
SOUTH ATLANTIC												
Delaware.....	2	2	2	2	1	1	0	0	0	0	0	0
Maryland ¹	1	2	2	9	8	12	0	0	0	5	2	2
District of Columbia.....	0	2	2	6	2	4	0	0	0	0	0	0
Virginia.....	2	12	12	11	14	13	0	0	0	5	14	7
West Virginia.....	0	5	5	3	10	11	0	0	0	2	5	5
North Carolina.....	4	6	5	11	8	17	0	0	0	0	2	6
South Carolina.....	0	1	2	4	2	3	0	0	0	3	1	3
Georgia.....	2	8	5	6	5	9	0	0	0	2	4	8
Florida.....	2	17	1	2	0	2	0	0	0	1	8	2
EAST SOUTH CENTRAL												
Kentucky.....	3	3	8	9	6	11	0	0	0	4	8	13
Tennessee.....	1	10	10	6	10	14	0	0	0	2	4	6
Alabama.....	3	14	4	2	14	11	0	0	0	3	2	3
Mississippi ²	0	9	2	1	102	3	0	0	0	2	4	9
WEST SOUTH CENTRAL												
Arkansas.....	4	30	4	0	0	2	0	0	0	5	2	5
Louisiana.....	0	20	4	3	2	5	0	0	0	6	2	6
Oklahoma.....	1	28	14	3	3	3	0	3	0	5	2	8
Texas.....	8	43	38	8	18	18	0	0	0	14	31	29
MOUNTAIN												
Montana.....	1	7	0	0	1	3	0	0	0	1	3	0
Idaho.....	5	3	0	0	8	5	0	0	0	1	4	1
Wyoming.....	0	6	0	0	0	2	0	0	0	0	1	0
Colorado.....	3	63	5	7	10	10	0	0	0	3	0	1
New Mexico.....	1	9	2	0	1	1	1	0	0	2	2	3
Arizona.....	2	9	1	0	3	2	0	0	0	1	1	1
Utah ²	0	2	2	5	5	5	0	0	0	0	0	0
Nevada.....	0	1	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington.....	5	13	5	15	7	11	0	0	0	1	0	2
Oregon.....	1	5	5	6	10	7	0	0	0	4	1	2
California.....	28	60	18	38	61	66	0	0	0	18	7	5
Total.....	218	1,284	474	451	673	744	1	3	2	124	165	186
31 weeks.....	1,954	5,450	2,913	61,648	85,740	96,206	143	273	283	1,951	2,241	2,893
Seasonal low week ³	(11th) Mar. 15-21			(32nd) Aug. 9-15			(35th) Aug. 30-Sept. 5			(11th) Mar. 15-21		
Total since low.....	1,343	4,983	2,516	88,334	124,311	134,527	197	349	405	1,466	1,766	2,110

¹ Period ended earlier than Saturday.

² Dates between which the approximate low week ends. The specific date will vary from year to year.

³ Including paratyphoid fever reported separately, as follows: Massachusetts 1 (salmonella infection); New Jersey 3; Illinois 1; Maryland 1; Oklahoma 1; Texas 5; Colorado 1; Oregon 1; California 12.

⁴ Delayed reports: Typhoid fever, Oklahoma 5 cases; South Carolina, week ended July 12, 2 cases.

Telegraphic morbidity reports from State health officers for the week ended August 2, 1947, and comparison with corresponding week of 1946 and 5-year median—Con.

Division and State	Whooping cough			Week ended Aug. 2, 1947							
	Week ended—		Median 1942-46	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
	Aug. 2, 1947	Aug. 3, 1946		Amoebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine.....	19	18	18								1
New Hampshire.....	1	3	2								2
Vermont.....	18	17	25								3
Massachusetts.....	102	171	141								2
Rhode Island.....	18	12	12								2
Connecticut.....	67	27	33				1				
MIDDLE ATLANTIC											
New York.....	229	159	249	8	5		2	1			4
New Jersey.....	208	186	186					1			1
Pennsylvania.....	267	121	228					1			1
EAST NORTH CENTRAL											
Ohio.....	331	116	252	1				1			4
Indiana.....	88	9	42				1	2	1		1
Illinois.....	106	188	188	3				2	2		9
Michigan ²	234	77	99	3							3
Wisconsin.....	178	225	225								13
WEST NORTH CENTRAL											
Minnesota.....	60	12	15	1							10
Iowa.....	24	46	32				1				16
Missouri.....	62	13	19						6		1
North Dakota.....	1	1	3			1					
South Dakota.....	14		1								1
Nebraska.....	17	5	6	1							2
Kansas.....	56	26	26				1				1
SOUTH ATLANTIC											
Delaware.....	15	2	1								
Maryland ²	83	35	60					6			
District of Columbia.....	16	10	16	2							
Virginia.....	67	144	71			101		2			
West Virginia.....	15	13	41						1		
North Carolina.....	72	125	163					12	1		1
South Carolina.....	72	27	71	3	7						3
Georgia.....	51	12	20	3	3			1			3
Florida.....	62	15	11	2							5
EAST SOUTH CENTRAL											
Kentucky.....	53	27	54	1	2			3	1		1
Tennessee.....	32	22	28			2		4			1
Alabama.....	38	278	22					1			6
Mississippi ²	12		22	2	1			1	1		1
WEST SOUTH CENTRAL											
Arkansas.....	43	4	10	3	10	6			10		3
Louisiana.....	9		2	5							4
Oklahoma.....	15	8	7	1				1	3		
Texas.....	422	194	178	9	296	27					10
MOUNTAIN											
Montana.....	21	4	17				1				
Idaho.....	10	13	6								
Wyoming.....		1	5					1			
Colorado.....	55	9	30		1						11
New Mexico.....	8	3	3		3		1				
Arizona.....	32	5	12			23					
Utah ²	21	8	33			1		1			2
Nevada.....									1		
PACIFIC											
Washington.....	32	30	35				2				1
Oregon.....	13	28	19	1							
California.....	197	70	182	4			3				6
Total	3,566	2,519	3,000	50	328	171	13	40	27	46	116
Same week, 1946.....	2,519			45	330	200	19	51	24	104	135
Median, 1942-46.....	3,000			45	568	356	19	41	16	155	¹⁰ 119
31 weeks: 1947.....	95,725			1,763	9,767	6,151	225	⁹ 335	930	¹¹ 1,183	3,574
1946.....	60,231			1,387	11,050	4,141	338	353	595	1,890	3,012
Median, 1942-46.....	79,405			1,124	11,050	4,141	338	323	564	1,923	¹⁰ 2,980

¹ Period ended earlier than Saturday.

² Virus encephalitis; also 1 case of virus encephalitis reported in Springfield, Mass., July 12.

³ Delayed reports: Rocky Mt. spotted fever, Virginia 3 June cases; Oklahoma 1 case; typhus fever, Oklahoma 1 case. Corrections: Typhus fever, South Carolina, July 12, 0 cases (instead of 2); Arkansas, January 4, 0 cases (instead of 1); Rocky Mt. spotted fever, Arkansas, June 28, 0 cases (instead of 1).

¹⁰ 2-year average, 1945-46.

Anthrax: Arkansas 1 case.

Leptosy: Louisiana 1 case.

Territory of Hawaii, week ended August 2: Bacillary dysentery 2; amoebic dysentery 1; influenza 7; poliomyelitis 1; whooping cough 34; epidemic typhus fever 1; leprosy 1.

Psittacosis: Michigan 1 case.

Alaska, week ended August 2: Mumps 2.

WEEKLY REPORTS FROM CITIES ¹

City reports for week ended July 26, 1947

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.

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Pollomyelitis 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	0	1	0	0	0	0	4
New Hampshire:												
Concord.....	0	0	0	0	0	0	0	0	0	0	0	0
Vermont:												
Barre.....	0	0	0	0	1	0	0	0	0	0	0	0
Massachusetts:												
Boston.....	2	0	0	0	12	2	9	2	7	0	1	28
Fall River.....	0	0	0	0	0	0	1	0	0	0	0	1
Springfield.....	0	0	0	0	1	0	0	0	0	0	0	1
Worcester.....	0	0	0	0	1	0	2	0	0	0	1	3
Rhode Island:												
Providence.....	0	0	0	0	2	0	0	2	0	0	0	26
Connecticut:												
Hartford.....	0	0	0	0	22	0	0	0	0	0	0	0
New Haven.....	0	0	0	0	6	1	0	0	1	0	0	60
MIDDLE ATLANTIC												
New York:												
Buffalo.....	1	0	0	0	0	0	2	0	0	0	0	25
New York.....	13	1	3	0	119	2	35	9	25	0	3	79
Rochester.....	0	0	0	0	0	0	2	0	2	0	0	6
Syracuse.....	0	0	0	0	0	0	2	0	0	0	0	27
New Jersey:												
Camden.....	0	0	0	0	0	1	1	0	0	0	0	1
Newark.....	0	0	0	0	16	0	0	0	1	0	0	38
Trenton.....	0	0	1	0	0	0	0	0	0	0	0	7
Pennsylvania:												
Philadelphia.....	1	0	2	0	7	1	16	0	6	0	3	83
Pittsburgh.....	2	0	0	0	1	0	4	1	1	0	0	14
Reading.....	0	0	0	0	1	0	3	0	0	0	0	1
EAST NORTH CENTRAL												
Ohio:												
Cincinnati.....	0	0	0	0	0	1	2	2	0	0	0	6
Cleveland.....	1	0	1	0	7	0	6	2	14	0	0	125
Columbus.....	0	0	0	0	17	0	2	4	2	0	0	23
Indiana:												
Fort Wayne.....	0	0	0	0	0	0	0	0	0	0	0	2
Indianapolis.....	0	0	0	0	0	1	0	1	2	0	0	29
South Bend.....	0	0	0	0	0	0	0	0	1	0	0	1
Terre Haute.....	0	0	0	0	0	0	0	0	0	0	0	3
Illinois:												
Chicago.....	1	0	0	0	33	1	9	5	7	0	0	26
Springfield.....	0	0	0	0	0	0	2	0	0	0	0	1
Michigan:												
Detroit.....	1	0	0	0	5	0	8	1	13	0	0	75
Flint.....	0	0	0	0	0	0	1	0	0	0	0	0
Grand Rapids.....	0	0	0	0	11	0	0	0	3	0	0	20
Wisconsin:												
Kenosha.....	0	0	0	0	4	0	0	0	0	0	0	6
Milwaukee.....	0	0	0	0	23	0	2	0	2	0	0	27
Racine.....	0	0	0	0	20	0	0	0	1	0	0	13
Superior.....	0	0	0	0	1	0	0	0	1	0	0	5
WEST NORTH CENTRAL												
Minnesota:												
Duluth.....	0	0	0	0	0	0	0	0	0	0	0	15
Minneapolis.....	1	0	0	0	21	0	3	1	3	0	0	3
St. Paul.....	1	0	0	0	34	0	1	0	0	0	0	34
Missouri:												
Kansas City.....	0	0	0	0	0	0	3	0	1	0	0	3
St. Joseph.....	0	0	0	0	0	0	0	0	0	0	0	0
St. Louis.....	1	1	0	0	21	3	5	2	4	0	1	40

¹ In some instances the figures include nonresident cases.

City reports for week ended July 26, 1947—Continued

Division, State, and City	Diphtheria cases	Enecephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Pollomyelitis 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	2	0	0	0	0	0	0	0	2
Nebraska:												
Omaha	1	0	0	2	0	1	3	1	0	0	0	---
Kansas:												
Topeka	1	0	0	0	0	1	0	1	0	0	0	7
Wichita	0	0	0	---	0	3	0	0	0	0	0	10
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	0	---	0	1	0	0	0	0	0	3
Maryland:												
Baltimore	0	0	4	2	1	0	2	1	3	0	0	79
Cumberland	0	0	0	0	0	0	0	0	0	0	0	---
Frederick	0	0	0	---	0	0	0	1	0	0	0	---
District of Columbia:												
Washington	0	0	0	2	0	5	0	0	0	0	0	11
Virginia:												
Richmond	1	0	0	3	0	1	0	0	0	0	4	3
Roanoke	0	0	0	1	0	0	0	0	0	0	0	0
West Virginia:												
Charleston	0	0	0	1	0	0	0	0	0	0	0	---
Wheeling	0	0	0	---	0	0	0	0	0	0	0	---
North Carolina:												
Raleigh	0	0	0	---	0	0	0	0	0	0	0	4
Wilmington	0	0	0	---	0	0	0	1	0	0	0	---
Winston-Salem	0	0	0	---	0	0	0	0	0	0	0	---
South Carolina:												
Charleston	0	0	2	0	0	0	0	0	0	0	0	6
Georgia:												
Atlanta	0	0	1	1	0	0	0	1	0	0	0	1
Brunswick	0	0	0	2	0	0	0	0	0	0	0	---
Savannah	0	0	0	---	0	1	0	0	0	0	0	1
Florida:												
Tampa	0	0	0	---	0	1	0	0	0	1	0	7
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	0	3	0	3	5	0	0	0	0	14
Nashville	0	0	0	---	0	0	0	1	0	0	0	5
Alabama:												
Birmingham	0	0	0	1	0	2	0	1	0	0	0	5
Mobile	0	0	0	1	0	1	0	1	0	0	0	---
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	0	4	0	1	0	0	0	1	0	4
Louisiana:												
New Orleans	1	0	0	9	0	5	1	0	0	1	0	11
Shreveport	0	0	0	---	0	0	0	0	0	1	0	---
Oklahoma:												
Oklahoma City	0	0	0	---	1	2	1	3	0	0	0	3
Texas:												
Dallas	1	0	0	3	0	1	1	3	0	0	0	8
Galveston	2	0	0	---	0	3	0	0	0	0	0	---
Houston	0	0	0	---	1	5	0	0	0	0	0	1
San Antonio	1	0	0	---	0	1	1	0	0	0	0	4
MOUNTAIN												
Montana:												
Billings	0	0	0	1	0	1	0	0	0	0	0	---
Great Falls	0	1	0	---	0	0	0	1	0	0	0	3
Helena	0	0	0	---	0	0	0	0	0	0	0	---
Missoula	0	0	0	---	0	0	0	0	0	0	0	---
Idaho:												
Boise	0	0	0	---	0	1	3	0	0	0	0	---
Colorado:												
Denver	1	0	1	0	4	0	3	1	6	0	0	13
Utah:												
Salt Lake City	0	0	0	2	0	1	0	2	0	0	0	1

City reports for week ended July 26, 1947—Continued

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Pollomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle.....	0	0		0	1	0	3	0	2	0	0	12
Spokane.....	0	0		0		0	0	0	0	0	0	1
Tacoma.....	0	0		0	1	0	1	0	1	0	0	2
California:												
Los Angeles.....	0	0	3	0	13	0	5	3	3	0	0	45
Sacramento.....	1	0	1	1				0	1	0	0	4
Total.....	35	3	19	4	445	15	177	52	130	0	17	1,131
Corresponding week, 1946*	35		13	5	572		209		131		0	712
Average, 1942-46**	41		18	5	556		218		207		1	965

* Exclusive of Oklahoma City.
 ** 2-year average, 1944-46.
 *** 5-year median, 1942-46.

Dysentery, amebic.—Cases: New York 4; Chicago 1; Detroit 14; Minneapolis 1; Memphis 1; New Orleans 4; Los Angeles 2.

Dysentery, bacillary.—Cases: Syracuse 2; Charleston, S. C., 1; Oklahoma City 1; Los Angeles 1.

Dysentery, unspecified.—Cases: San Antonio 7.

Leprosy.—Cases: New Orleans 1.

Rocky Mt. spotted fever.—Cases: Philadelphia 1; Washington, D. C., 1; Winston-Salem 1.

Typhus fever, endemic.—Cases: New York 2; Baltimore 1; Tampa 2; Mobile 1; New Orleans 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (latest available estimated population, 33,589,600)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Pollomyelitis 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.....	5.7	0.0	0.0	0.0	133	8.5	36.8	11.3	23	0.0	5.7	348
Middle Atlantic.....	7.9	0.5	2.8	0.0	67	1.9	30.1	4.6	16	0.0	2.8	130
East North Central.....	1.8	0.0	0.6	0.0	74	1.8	19.5	9.1	28	0.0	0.0	220
West North Central.....	9.9	2.0	0.0	0.0	159	6.0	33.8	11.9	20	0.0	2.0	227
South Atlantic.....	1.7	0.0	11.6	5.0	17	0.0	18.2	1.7	10	0.0	8.3	190
East South Central.....	0.0	0.0	0.0	0.0	30	0.0	35.4	29.5	18	0.0	0.0	142
West South Central.....	12.7	0.0	0.0	0.0	41	5.1	45.7	10.2	15	0.0	7.6	79
Mountain.....	8.7	8.7	8.7	0.0	61	0.0	52.0	34.7	78	0.0	0.0	147
Pacific.....	2.1	0.0	8.3	2.1	31	0.0	18.7	6.2	15	0.0	0.0	133
Total.....	5.4	0.5	3.0	0.6	69	2.3	27.6	8.1	20	0.0	2.6	176

SMALLPOX CASE ON TRAIN

A smallpox patient, a dining-car employee, was taken off a Los Angeles-bound train at Clovis, New Mexico, on July 23 (previously stated as July 25). The passengers and members of the train crew were either vaccinated or detained on arrival in California, medical surveillance was continued during the incubation period, and other appropriate measures were taken.

The patient was employed on the run between Chicago and Los Angeles, and it is believed that the infection was contracted either in

Los Angeles or possibly en route to Chicago. On the previous trip he had arrived in Chicago on July 19.

(This is probably the case reported in New Mexico during the week ended August 2.)

PLAGUE INFECTION IN PARK COUNTY, COLO.

Plague infection was reported proved, on July 21, in organs from 1 prairie dog, *Cynomys* sp., taken 10 miles east and 5 miles north of Hartsell, Park County, Colo.

TERRITORIES AND POSSESSIONS

Panama Canal Zone

Notifiable diseases—June 1947.—During the month of June 1947, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Residence ¹									
	Panama City		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox.....	9		2		5		2		18	
Diphtheria.....	7		1				6		14	
Dysentery:										
Amebic.....	1						2		3	
Bacillary.....	3		1		1	1	3		8	1
Malaria ²	9		6		113		298	13	426	13
Measles.....					3				3	
Mumps.....	1		1		8		1		11	
Pneumonia.....		6		1	18			6	13	13
Poliomyelitis.....			1				1		2	
Tuberculosis.....		17		7	1			3	27	27
Typhoid fever.....	1						9	1	10	1
Whooping cough.....		1								1

¹ If place of infection is known, cases are so listed instead of by residence.

² 24 recurrent cases.

³ Reported in the Canal Zone only.

DEATHS DURING WEEK ENDED JULY 26, 1947

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

	Week ended July 26, 1947	Corresponding week, 1946
Data for 93 large cities of the United States:		
Total deaths.....	8, 113	8, 266
Median for 3 prior years.....	8, 266	
Total deaths, first 30 weeks of year.....	284, 008	281, 532
Deaths under 1 year of age.....	733	670
Median for 3 prior years.....	623	
Deaths under 1 year of age, first 30 weeks of year.....	22, 755	18, 768
Data from industrial insurance companies:		
Policies in force.....	67, 249, 985	67, 234, 427
Number of death claims.....	11, 811	11, 437
Death claims per 1,000 policies in force, annual rate.....	9.2	8.9
Death claims per 1,000 policies, first 30 weeks of year, annual rate.....	9.6	10.0

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 12, 1947.—During the week ended July 12, 1947, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox.....		60	2	53	102	22	40	50	48	377
Diphtheria.....		2		40	3					45
Dysentery, bacillary.....				4						4
German measles.....		2		2	11		8	1	11	35
Influenza.....					2	2				4
Measles.....		10		38	102	66	23	16	51	306
Mumps.....		27		27	134	5	12	4	27	236
Poliomyelitis.....				1	4	1	1	3	19	29
Scarlet fever.....		2	15	16	33		3		1	70
Tuberculosis (all forms).....		3	31	87	33	49	3		27	233
Typhoid and paratyphoid fever.....		1	1	7	2	1			2	14
Undulant fever.....				1	3	1	2	1	4	12
Venereal diseases:										
Gonorrhoea.....	1	16	15	(1)	76	44	29	43	76	300
Syphilis.....	2	3	4	(1)	57	14	8	6	30	124
Other forms.....									2	2
Whooping cough.....			1	7	71	11	2	14	14	120

¹ Report for Quebec for the period not received.

GREAT BRITAIN

England and Wales—Poliomyelitis.—During the week ended July 19, 1947, 177 cases of poliomyelitis were reported in England and Wales, and it is thought that the number of cases reported for the week ended July 26 may reach 300. This is a higher incidence than has previously been reported. The cases are said to be scattered throughout the country.

NEW ZEALAND

Notifiable diseases—4 weeks ended June 28, 1947.—During the 4 weeks ended June 28, 1947, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis.....	5		Puerperal fever.....	2	
Diphtheria.....	97	1	Scarlet fever.....	66	
Dysentery:			Tetanus.....	2	1
Amebic.....	2		Trachoma.....	1	
Bacillary.....	10		Tuberculosis (all forms).....	152	63
Erysipelas.....	26		Typhoid fever.....	7	1
Influenza.....	1		Undulant fever.....	3	
Malaria.....	5				