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TESTS OF THE EFFECTIVENESS OF DDT IN ANOPHELINE CONTROL[1]

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The return of troops with malaria to anopheline-infested areas in this country creates an urgent need for improved methods of malaria control. This rapidly growing problem is superimposed on that of continued protection of troops in hyperendemic combat areas. In meeting these problems the use of the chemical commonly known as DDT (2,2-bis(parachlorophenyl) 1, 1, 1-trichloroethane) is indicated to be an improvement of the first magnitude.

Work was recently initiated at the Henry Rose Carter Memorial Laboratory in Savannah, Ga., to develop practical working information, procedures, materials and equipment for use on the Malaria Control in War Areas program. Determination of the effectiveness and practicability of DDT in the control of anopheline mosquitoes is a major phase of the work. At the outset, data previously secured by other workers was drawn on heavily as a foundation. Information secured from reports and personal conferences with workers from the Orlando, Fla., laboratory of the Bureau of Entomology and Plant Quarantine, the National Institute of Health, and various contractors with the Office of Scientific Research and Development has been particularly helpful.

The work on DDT in mosquito control has fallen into two principal categories: First, its use as a residual house spray, and secondly, its use as a larvicide. As a larvicide DDT is distinctly promising but results from its use as a residual spray are spectacular. No other material has been shown to impart lethal effects to sprayed surfaces over a period of time comparable to that obtained with DDT. It is this ability, when conjoined with established mosquito control practices, that has caused malariologists to conceive the practicability of malaria eradication.

[1] From Malaria Control in War Areas, States Relations Division. This paper was submitted for publication on November 10, 1944, and was scheduled to appear in the November 24, 1944, issue of PUBLIC HEALTH REPORTS. Because of the subject matter the paper was witheld from publication at that time. The article is a summary of work conducted by the following officers of the U. S. Public Health Service: E. H. Arnold, Passed Assistant Engineer (R), R. W. Fay, Assistant Sanitarian (R), F. F. Ferguson, Assistant Sanitarian (R), W. A. Moore, Passed Assistant Sanitarian (R), S. W. Simmons, Sanitarian (R), R. L. Stenburg, Assistant Engineer (R), Harry Stierli, Assistant Engineer (R), C. M. Tarzwell, Passed Assistant Sanitarian (R), and W. M. Upholt, Assistant Sanitarian (R).

DDT AS A RESIDUAL ADULT SPRAY

The high toxicity, low volatility, and adhesion of the crystals of DDT on treated surfaces are factors contributing to its effectiveness as a residual house spray.

Field investigations.—In field tests vacant and occupied houses were sprayed and the effect on the intramural mosquito population determined. The windows of the houses were fitted with two types of traps; the first permitted the entrance of wild adult mosquitoes but captured them when they attempted to escape, the second was an outlet trap only, and doors were left open for the entrance of mosquitoes. In other tests, adults of *Anopheles quadrimaculatus* were released in rooms equipped only with outlet window traps. In general, the window trap catches consisted of adult mosquitoes which had received a minimum exposure, since the majority, receiving longer exposures were knocked down before they could reach the traps.

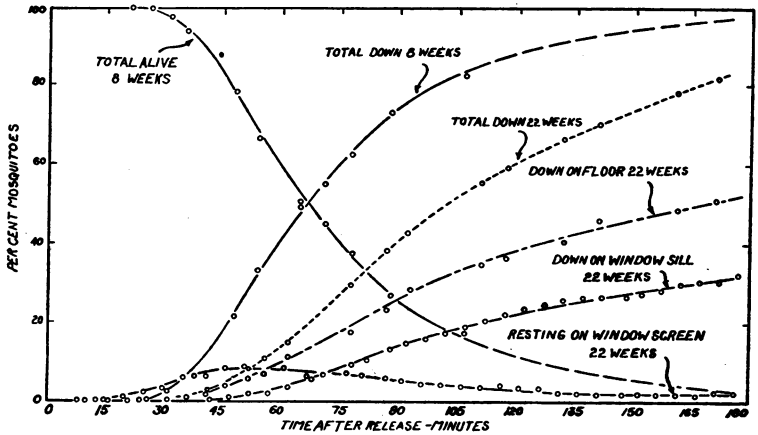

FIGURE 1.—Morbidity of *A. quadrimaculatus* released in rooms treated with 200 mg. per square foot DDT dosages, 8 and 22 weeks after treatment. Room temperature, 29° C.

Four unoccupied rooms treated with 100, 200, 400, and 800 mg. of DDT per square foot were giving 100 percent kills after periods of 6 to 8 weeks, while one room with a 200 mg. per square foot dosage was still effecting a complete kill 22 weeks after treatment. A 55-percent longer exposure time was necessary to obtain a 50-percent knockdown of mosquitoes exposed in rooms treated for 22 weeks as compared with those treated for only 8 weeks, at 200 mg. per square foot dosages. All results were balanced against checks, in which very little mortality occurred. To date 17 paired releases have been made involving 600 to 2,000 mosquitoes per room for each release.

The behavior pattern and morbidity of *A. quadrimaculatus* released in a treated room is illustrated in figure 1. When first released mosquitoes rest quietly on the walls and ceilings, no direct repellency reaction being noted. After 5 to 10 minutes they become sufficiently

irritated so that they begin a downward migration from the ceiling to the lower walls. Flight sounds begin at this time and increase in intensity until knockdown is 25 to 50 percent complete. Specimens most affected begin to move toward the light within 5 to 10 minutes after release. The first knockdown usually occurs in 8 to 18 minutes, with knockdown largely complete in 30 to 90 minutes. A few resistant adults may, however, still remain after 2 to 5 hours. These figures vary considerably depending upon temperature and the age of the treatment.

Once mosquitoes are knocked down there is very little apparent recovery. Mortalities after 24 hours are practically always greater than the knockdown recorded at the end of each test.

A vacant house with paper-covered plasterboard walls was treated April 19 with a kerosene-DDT solution at the rate of 200 mg. of DDT per square foot, and the weighted mortality of trapped mosquitoes held for 48 hours averaged 75 percent during July and 66 percent during August. In a house with wood walls, treated April 22 with a xylene emulsion at the same rate, the respective kills for the same periods were 90 and 87 percent. Many mosquitoes died in the rooms before reaching the traps. In 6 days 1,438 dead mosquitoes were picked from the floor of one 9- by 11-foot treated room, whereas almost no mortality occurred in untreated rooms.

The average weighted mortality of trapped mosquitoes from several unoccupied houses was 60 to 70 percent, 20 weeks after treatment. This may indicate that one treatment per season would suffice in the more northern malarial zones of this country, but two treatments may be desirable in the southern zones.

Death rates in some 50 occupied houses were lower than in unoccupied ones. The weighted death rate of mosquitoes caught in window traps during August, from houses treated in June, was only about 30 percent. Actual rates were higher than this, however, since those mosquitoes that died in the rooms before reaching the traps were not recovered.

The most important factor reducing mortality in occupied houses is the large proportion of untreated resting surfaces, such as furniture, bedding, and exposed wearing apparel. Such materials as exposed clothing are removed during treatment of the house but when returned offer safe resting places for mosquitoes. When possible, therefore, treatment of household effects is advised to enhance the effectiveness of mosquito control.

Tests have been conducted with several satisfactory DDT residual spray formulae. The one checked most thoroughly was DDT, 35 percent, and Triton X-100, 4 percent in xylene, Duponol OS at a 4-percent concentration, or the water-soluble Arctic Syntex A at a concentration of 0.5 percent are also satisfactory emulsifiers. This

concentrated solution is added to 6 parts of water to give a 5-percent DDT spray. The emulsion is quite stable and remains unbroken without agitation for 2½ hours or longer, and is satisfactory for use in small type sprayers without agitators. When applied at the rate of 4 cc. of spray per square foot of surface area to rough absorptive walls no damage occurred. Less absorptive walls, such as finished wood, may be treated with a 10-percent DDT emulsion at the rate of 2 cc. per square foot. If a power sprayer with adequate agitation is used almost any emulsifier will suffice. With hand sprayers, an emulsifier producing a stable emulsion should be selected.

At present prices the average tenant house of 1,700 square feet of wall and ceiling surface can be treated at a cost of about $1.50 to $1.75 with the DDT-xylene-Triton-water emulsion at the rate of 200 mg. of DDT per square foot of surface area. This includes labor, materials, and a 10-percent overhead allowance, but does not include the capital outlay for automotive or other heavy equipment. At present, material costs alone average about one-half the total cost of treatment. This low cost method of mosquito suppression, if used in conjunction with conventional procedures, should effect a degree of malaria control not heretofore obtainable.

A field method for determining toxicity of treated surfaces.—A technique for determining the toxicity of treated walls at stated intervals after treatment would be of considerable practical value, and a method has been devised that has some promise of fulfilling this need.

Mosquitoes are exposed to the treated surface for a definite period of time, ordinarily 30 minutes. A small wire or glass cage about 3 inches in diameter and ½ inch deep is used to confine the mosquitoes over the treated wall surface. After exposure, specimens are held and the mortality recorded at 24 and 48 hours. Six separate simultaneous exposures have been made in each treated room tested, along with 6 check exposures on untreated surfaces. An average of 15 specimens was used for each individual test and results are based on weighted kills 48 hours after exposure, when balanced against the control tests. Experiments conducted have been with wild specimens, mostly engorged females.

In most instances houses tested in this manner were treated with a power sprayer at the rate of 4 cc. of spray per square foot of surface area. In a few cases a hand-operated pressure sprayer was employed. Table 1 is an example of some preliminary results obtained.

The mortality of mosquitoes exposed to ceilings has been greater than those exposed to comparable treated walls. Observations indicate that *A. quadrimaculatus* prefer, under such conditions, to rest on a horizontal rather than vertical surface, and thus a better exposure is secured with the ceiling tests.

TABLE 1.—*Results of exposure for stated periods of* A. quadrimaculatus *adults to walls treated with specified doses of DDT*

Dosage (mg. per square foot)	Solvent	Type wall surface	Occupancy	Age after treatment (weeks)	Exposure time (minutes)	Net mortality (percent) on—	
						Walls	Ceilings
100	Xylene	Unpainted fibre board	Unoccupied	2	30	90	-------
150	Pine oil (sulphonated)	Painted plasterboard	do	14	30	63	100
200	Xylene	Rough boards	Occupied	10	30	[1]48–74	[1]89–100
200	do	Painted wood	Unoccupied	14	30	74	100
200	do	Calcimined plaster	do	14	30	61	-------
200	do	Calcimined plasterboard.	do	20	15	60	100
288	do	Rough boards	Occupied	8	30	61	100
288	do	Newspaper	do	8	30	77	100
385	do	Rough boards	do	8	30	80	-------
385	do	Newspaper	do	8	30	98	-------
800	do	Calcimined plasterboard.	Unoccupied	2	30	89	100

[1] Range of mortalities obtained with tests in 2 different houses.

Five of the tests in table 1 were conducted in occupied houses and six in unoccupied ones. No consistent differences in actual wall toxicity were obtained. Both wood and plasterboard walls are represented, but comparative evaluation of results on different surfaces should await further tests over longer periods of time. A good residual effect was obtained on old painted walls, but DDT on freshly painted surfaces does not give comparable results, even failing to crystallize on very recently painted surfaces.

In these tests specimens were confined to the wall surface, but nocturnal observations of specimens in a room, using a cow as a host, showed that *A. quadrimaculatus* normally rest on walls a sufficient time to obtain a lethal dose of DDT. Some engorged specimens were observed to remain on untreated walls from 8:30 p. m. to 7 a. m. without moving. Other specimens shifted, but practically all remained on the walls overnight, and even during the following day. On treated walls, mosquitoes moved when irritation began but usually alighted on some other treated place within the building. None were noted to rest for as long as one-half hour, and all showed effects of the DDT, many being knocked down in less than 30 minutes.

Laboratory investigations.—Four wooden panels, 3 x 12 inches, treated either in the laboratory or in the field, were fitted into a wooden frame to make a standard exposure chamber. Known numbers of adults, usually 20, of *A. quadrimaculatus* were introduced into the test chamber by a buoyant air current, and held for exposures ranging from 25 minutes to 4 hours. Mortality readings were taken in untreated holding cages at 24-, 48-, and 72-hour intervals after treatment and results balanced against controls. To date 33,000 specimens, both wild and insectary reared, have been exposed in a series of 1,800 individual tests.

To determine the relationship between exposure time and mortality, series of pine plywood panels were treated with a standard DDT-xylene-water emulsion at rates of 50, 100, 200, and 300 mg. of DDT per square foot of surface area. The minimum exposure time necessary for a 100-percent mortality at varying intervals after treatment was determined. In brief, a 100-percent mortality was obtained by a 45-minute exposure to a 200 mg. per square foot panel 1 week after treatment, by 60-minute exposure 2 weeks after treatment, by 90-minute exposure 1 month after treatment, and by 120-minute exposure 2 months after treatment.

In these tests exposure time was prolonged to kill the small percentage of resistant specimens. This is demonstrated by the fact that 10 weeks after treatment a 35-minute exposure gave an 84-percent mortality, a 60-minute exposure gave 89 percent, and a 120-minute exposure gave 94 percent.

A series of wood panels was sprayed in the laboratory with mixtures of DDT and xylene, in kerosene and in pine oil. The xylene

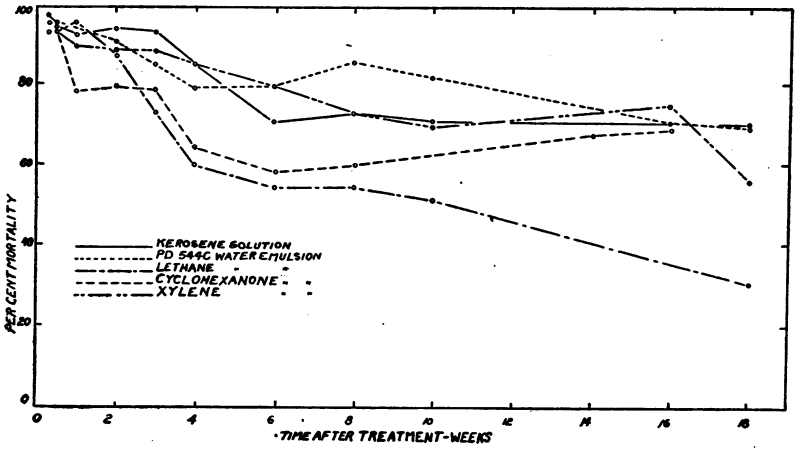

FIGURE 2.—Comparative mortalities of *A. quadrimaculatus* 48 hours after exposure for 30 minutes to 200 mg. per square foot residual doses of DDT in specified solvents.

and kerosene mixtures after 18 weeks with a 60-minute exposure at 200 mg. per square foot concentration, gave a kill of approximately 80 percent, while the pine oil mixture gave a 60-percent kill.

Kerosene base sprays are about as effective as xylene sprays but the action of the DDT is somewhat delayed, and results 24 hours after exposure usually show the xylene to kill more rapidly. PD544C, a light proprietary oil which will dissolve about 35 percent DDT, has shown results somewhat comparable to xylene. Figure 2 illustrates some of the differences encountered with the use of different solvents.

The form, penetration, and effectiveness of DDT deposits on the test chamber panels vary with the type of solvent used. Solvents such as kerosene give long, fragile, needle-shaped crystals, usually

radiating from a central nucleus. Crystals from emulsions with such solvents as xylene and cyclohexanone are also needle-shaped but smaller. A relatively less fragile, compact, fan-shaped, crystalline mass is ordinarily obtained from emulsions with pine oil or orthodichlorobenzene as solvents. Thanite and Lethane emulsions give amorphous-like deposits. Apparently the solvent forms a dry surface film which greatly inhibits crystal formation, and such deposits exhibit less prolonged toxicity, due probably to the protective solvent film present. Deposits from other solvents tested have, in general, fallen into one or another of the above categories.

Within a limited range the density of DDT makes very little difference in laboratory effectiveness, for after 10 weeks at a 50 mg. per square foot concentration the mortality was 70 percent with a 60-

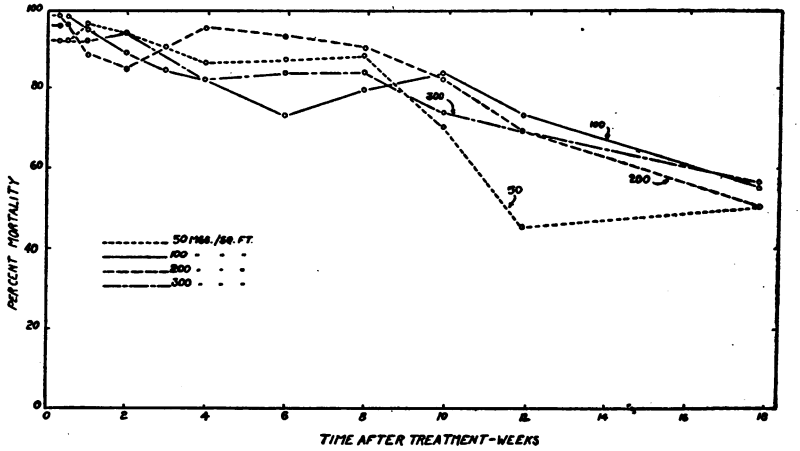

FIGURE 3.—Comparative mortalities of *A. quadrimaculatus* 48 hours after exposure for 60 minutes to specified residual doses of DDT applied as a xylene-water emulsion.

minute exposure, at 100 mg. per square foot it was 83 percent, at 200 mg. per square foot it was 82 percent, and finally at 300 mg. per square foot the death rate was 74 percent (fig. 3). Recent tests have indicated, however, that the 50-mg. dose loses toxicity sooner than doses of 100 mg. or more, particularly in the field.

Tests on the weathering resistance of residues have shown that the mechanical action of rain is the most important deteriorating factor. Panels exposed to 14 inches of rainfall over a 4-week period killed only 25 percent of mosquitoes exposed for 30 minutes, as compared with 75 percent on panels maintained inside the laboratory and 65 percent on panels exposed daily to direct sunlight only.

DDT AS AN ANOPHELINE LARVICIDE

Malaria Control in War Areas performs larviciding operations in some 25 States, usually by the application of oil with knapsack or similar type sprayers, at the rate of 15 to 20 gallons of material per

acre treated. Preliminary work has been conducted on the feasibility of substituting a DDT spray for the oil without radically changing the technique of application in which laborers are already trained.

There has been no marked deviation from standard field practices in larval sampling, or checking results of treatment. Solutions used are emulsified in water before treatment, so that the total amount of spray applied is in the neighborhood of 15 to 20 gallons per acre. Solvents without DDT are tested for toxicity by application to check plots. Control and experimental plots are normally checked at 24 and 48 hours after treatment and at as frequent intervals as necessary thereafter to ascertain the duration of the treatment. Water samples are taken before and after spraying for laboratory examination, where more critical studies are made of field experiments to determine duration of toxicity and dosage mortality.

At the present time the following types of application are under study:

1. *Surface films.*—These consist of DDT dissolved in some lighter than water solvent such as kerosene or fuel oil plus an emulsifying-spreading agent. A type formula is 1.25 percent DDT, 0.5 percent B–1956 (an emulsifying-spreading agent) in No. 2 fuel oil. One gallon of this DDT concentrate is mixed with 15 to 20 gallons of water at the site of treatment and applied at the rate of 1 gallon of concentrate per acre, by means of knapsack sprayers. This dosage (0.1 pound DDT per acre), as recommended by the Bureau of Entomology and Plant Quarantine, gave excellent control on a variety of areas containing dense floating, submerged, and emergent vegetation. Reduction in the amount of solvent resulted in a slightly less effective application.

2. *Emulsions.*—These consist of DDT in some solvent plus an emulsifier. A type formula is DDT 35 percent in xylene, with Triton X–100, Duponol OS, or comparable emulsifiers. The DDT concentrate is emulsified in water so that the total application is about 15 to 20 gallons per acre. This stable emulsion has given excellent control at 0.1 pound of DDT per acre, volume concentrations being between 1 part in 14 million to 1 part in 20 million. Presumptive evidence indicates that it is more harmful to other aquatic insects than the fuel oil-DDT surface film applications.

Xylene is only one of several satisfactory solvents that may be employed. Gas liquor, or condensate (*1*), a byproduct from the destructive distillation of coal in the manufacture of cooking and heating gas, will dissolve as much as 90 gm. of DDT per 100 cc. of liquid. This material is available at most municipal gas plants, and its pre-war price average about 6 cents per gallon. Excellent results were obtained with this material when used as a solvent for DDT in larviciding.

3. *Suspensions.*—Those tested have been made by dissolving DDT in a water miscible solvent such as alcohol, and adding to water with a dispersing agent. This material, applied at rates similar to the emulsions, has given comparable results.

Experiments indicate that DDT properly applied will kill all anopheline larval stages within 24 hours at a dosage of 0.1 pound per acre. Tests on emulsions indicate that 90 to 95 percent of the kill takes place within the first hour after treatment. Field samples taken from the surface of a pond treated with the DDT-xylene-Triton

emulsion at the rate of 1 p. p. m. gave 100 percent mortality up to 24 hours. After 48 hours the kills ranged from 30 to 40 percent and after 4 days no surface toxicity was apparent. Laboratory tests with 5 percent DDT in No. 2 fuel oil applied at the rate of 15 gallons per acre, showed that samples taken 2 inches below the surface, without disturbing the surface film, were nontoxic to larvae up to 24 hours after treatment. Samples taken 4 days after treatment, however, produced 100 percent mortality in 24 hours. Application of 1.25 percent DDT in fuel oil, applied at the rate of 0.1 pound of DDT per acre, showed no subsurface mortality during the first 5 days after treatment. Five to eight days after treatment subsurface toxicity was present.

Time-mortality curves for DDT in No. 2 fuel oil at dosages greater than 0.02 p. p. m. are typically sigmoid. Curves for dosages between 0.02 p. p. m. and 0.2 p. p. m. at 26° C. to 28° C. lie very close together with the critical regions between 1½ and 4 hours, and the steepest points on the curve at 30 to 40 percent mortality.

Time-morbidity data follow similar, though steeper, curves with the critical regions lying between 15 minutes and 2 hours.

No pupal mortality has been noted in the field tests. In the laboratory 80 percent of *A. quadrimaculatus* pupae, not more than 24 hours old at the beginning of the test, emerged from water containing 1 p. p. m. of DDT, which was equally as great emergence as occurred from the check. A high mortality was obtained at a 4 p. p. m. DDT concentration with pupae not more than 5 hours old, but in this instance an equivalent amount of xylene solvent produced equally lethal results.

DDT in the concentrations and combinations applied seems to have virtually no effect on most of the plankton organisms and a relatively large number of the somewhat larger forms such as *Daphnia*. It is too early as yet, however, to say that there is no accumulated effect. No damage to fish life has been observed at concentrations of one-tenth pound of DDT per acre. Volume applications in the field at the rate of 1 p. p. m. have killed pike, warmouth bass, bream, catfish, and gambusia.

Observations have shown an apparent lack of residual properties of DDT in larviciding, although some lengthening of the necessary larviciding interval has been noted. Laboratory work indicates that DDT is inactivated by the bottom mud complex. A DDT emulsion at ¼ p. p. m. in laboratory containers with mud from the bottom of a pond had a relatively rapid reduction in toxicity, giving only a 45-percent mortality on the third and fourth days, even after 48 hours' exposure. A xylene-DDT-syntex emulsion at a concentration of ¼ p. p. m. lost its effectiveness in less than 5 days in the presence of bottom mud, while in clean laboratory glassware an 80-percent

mortality was obtained even after 14 days. The addition of clean sand, or aquatic plants such as *Utricularia*, to the DDT failed to reduce appreciably its toxicity. The nature of this inactivating process is not known. It is not believed that it is due to a simple settling-out process since bottom mud from treated ponds or laboratory containers has not shown toxicity when agitated in the presence of larvae.

DDT is easily applied as a larvicide with existing equipment without appreciable modification, and the cost of materials is less than one-fifth that of fuel oil. Labor cost involved is approximately the same as for oiling.

It may be summarily stated that the work described is of a preliminary nature. A final definition on the toxic properties and use of DDT presents a striking challenge to all who are interested in malaria control.

SUMMARY

The average tenant house can be treated with a DDT residual spray at a cost of about $1.50 to $1.75, including labor, materials, and overhead, but exclusive of initial outlay for heavy equipment. The spray can be applied either with a hand-pressure sprayer or with a power machine, and at a dosage of 200 mg. of DDT per square foot of surface area has effected a 60- to 90-percent mortality of wild mosquitoes in unoccupied houses 20 weeks subsequent to treatment. A residual toxicity of this duration suggests that one treatment per year might be sufficient in the more northern malaria zones of this country, but two treatments will probably be required in the southern zones.

Residual sprays do not give as effective a kill in occupied houses, not because of lack of toxicity, but due to the large proportion of untreated resting places such as furniture, bedding, and exposed wearing apparel. Treatment of household effects is advised where practical.

Treated wood surfaces exposed to 14 inches of rainfall over a period of 4 weeks effected a 25-percent kill compared with a 75-percent kill obtained from control panels. Sunlight alone caused a reduction in toxicity of 10 percent over the same period.

Apparatus and methods for a critical bio-assay of the lethal effectiveness of treated surfaces both in the laboratory and field are described and illustrated. When applied as a spray at the rate of one-tenth pound of DDT per acre essentially 100-percent larva kills were obtained. According to the solvent and spreading or emulsifying agent employed, applications may be made as a surface film treatment, a stable emulsion, or as a suspension. No appreciable residual toxicity to larvae has been noted, and laboratory tests have shown that bottom mud inactivates the DDT. Distribution of the DDT-

laden mud throughout the water has failed to restore toxicity, which suggests that the DDT actually combines with or adheres to components of the mud.

Materials for effective larviciding with DDT cost less than one-fifth as much as a comparable effective application of fuel oil.

REFERENCE

(1) Simmons, S. W., and Dove, W. E.: Experimental use of gas condensate for the prevention of fly breeding. J. Econ. Ent., 38: 23–25 (1945).

MEETING OF THE NATIONAL ADVISORY HEALTH COUNCIL

The National Advisory Health Council met at Public Health Service headquarters in Bethesda, Md., on June 19 and 20, 1945.

The 2-day session was devoted to discussion of the current and future activities of the several bureaus.

Surgeon General Parran, in opening the meeting, called attention to the legal functions now vested in the National Advisory Health Council under the provisions of the Public Health Service Act of 1944 (Public Law No. 410). Before the passage of this law, the Council served solely in an advisory capacity. The Council now has the responsibility to:

1. "* * * advise, consult with, and make recommendations to the Surgeon General on matters relating to health activities and functions of the Service;" and to serve in other capacities as requested.

2. Recommend research projects for grants-in-aid in scientific fields other than cancer research, and recommend other procedures for the advancement of scientific research.

3. Recommend the adoption of regulations by the Service with respect to interstate quarantine for the prevention of communicable diseases, including regulations for the apprehension, examination, and detention of persons who are spreading disease.

The programs of the Sanitary Engineering Division, the Bureau of Medical Services, and the Bureau of State Services were discussed on the first day. On the second day, a proposed plan for training of Public Health Service personnel was presented by the Division of Public Health Methods; the Nurse Education Division presented proposals for the postwar nursing program; and the work of the National Institute of Health was discussed.

The Council recommended the approval of a grant-in-aid of $92,000 to the University of Utah for research on muscular dystrophy. This is the first grant-in-aid for general research projects to be made under the provisions of Public Law No. 410.

Among other important decisions of the Council were recommendations that—

1. A committee of the Council be appointed to act with designated officers of the Service in the development of a program of clinical research.

2. The Public Health Service strengthen its control of the interstate spread of disease through consultant services to public health laboratories and through maintenance of a $1,000,000 emergency fund to be used in epidemics and disasters.

3. The Public Health Service undertake demonstrations in selected communities of generalized public health nursing programs, including bedside care.

4. The Public Health Service establish a training program for its own personnel, which would include orientation, work experience, observation, in-service training, and opportunities for State and local personnel to participate.

5. The program of grants-in-aid and technical services to the States in the field of industrial hygiene be expanded.

6. The Public Health Service seek appropriations for grants-in-aid for general research to be allotted to qualified institutions and individuals.

7. When the Federal Government undertakes grant-in-aid programs related to public health and sanitation, the Public Health Service be empowered to conduct investigations for determination of the nature and extent of the problem involved and to approve the allocation of funds, functional effectiveness, and placement of plants, installations, and constructions required of such programs.

In addition, the Council approved the policy of the Public Health Service on national programs for the control of water pollution.

Regular meetings of the Council will be held twice a year; special meetings will be called as needed. Council members are to serve as chairmen of special committees dealing with specific subjects.

RECOMMENDATIONS

The Council recommended that:

1. The Council meet twice a year—

(*a*) Special meetings be held as Council members determine.

(*b*) Members serve as chairmen of special committees dealing with specific subjects.

(*c*) Digests of Public Health Service activities be sent monthly to Council members.

(*d*) The Council be kept informed of the work of all advisory committees and councils.

2. The Public Health Service engage in clinical investigation on significant problems arising among the beneficiaries of the Service—

(*a*) A committee of the Council be appointed to act with Public Health Service officers designated by the Surgeon General to develop a program of clinical investigation within the Service.

3. The Public Health Service undertake to evaluate various diagnostic and analytic procedures used in public health laboratories, with a view to providing consultant services to the laboratories for improvement of their performance—

(*a*) A staff of consultants, especially trained in the diagnosis, management, and control of communicable diseases be maintained for service to the States.

4. The distribution and redistribution of infectious material imported to the United States for research work under authority of the Public Health Service (sec. 361a—Public Law No. 410) require the permission of the Surgeon General.

5. The Public Health Service maintain a fund of not less than $1,000,000 for use, under appropriate safeguards, during epidemics or disasters threatening public health.

6. The Public Health Service undertake in selected communities the study and demonstration of generalized public health nursing programs, including bedside care.

7. The Public Health Service recommend to the Central Committee of the American Red Cross the adoption of a policy whereby Red Cross nursing personnel would be integrated with the personnel of local health departments in a generalized community nursing program.

8. The Tuberculosis Control Division of the Public Health Service develop a program of—

(*a*) Field studies to evaluate and promote the use of new diagnostic and treatment methods.

(*b*) Research on the application of electronics to radiology; this work to be carried on in cooperation with other agencies and commercial organizations working in the field.

(*c*) Cooperative projects with the various scientific groups and universities throughout the United States in order to avoid duplication of research in tuberculosis control.

9. Operation of the Rapid Treatment Centers of the Venereal Disease Division be continued in the postwar period, with such administrative adjustments as developments may warrant.

10. The Public Health Service undertake studies of the treatment and management of asymptomatic neurosyphilis, provided these studies do not interfere with the primary public health responsibility to find and treat cases of infectious syphilis.

11. The Public Health Service establish a training program and facilities with competent full-time staff who will be given long-term assignments for the purpose of developing programs of general and special education and training for personnel of the Public Health Service. These programs should—

(*a*) Include orientation, work experience, observation, and in-service training.

(*b*) Provide opportunities for training State and local health personnel.

12. As a part of its training program, the Public Health Service develop an assignment policy which would realize the maximum potentialities of its officers. The Council recognizes that exigencies at times may determine assignments, but an effort should be made to develop officers specialized in the various Public Health Service functions. This can be accomplished only through adequate work experience in the individual officer's field, in addition to formal training. In the clinical fields, such a policy would lead to qualification for certification by the appropriate specialty boards.

13. The Public Health Service, under authority of Public Law No. 410 (sec. 314c)—

(*a*) Offer reserve commissions to faculty members of schools of public health.

(*b*) Afford such personnel an opportunity periodically for active duty and new field experience in their specialties.

14. The Public Health Service analyze the work performed by various categories of public health personnel, and the results of these analyses be made available—

(a) To schools of public health for use in curricula revision.

(b) To accrediting agencies and other groups interested in public health training and practice.

15. A committee of the Council review and develop recommendations for consideration by the Council on questions of—

(a) Grants-in-aid to universities for the development and improvement of departments of public health and preventive medicine for undergraduate and graduate training.

(b) Postwar financing of nurse education.

16. The Public Health Service seek additional appropriations under authority of Public Law No. 410 (sec. 314a) for grants-in-aid to States for—

(a) Industrial hygiene programs.

(b) Consultant and technical services in the field of industrial hygiene.

17. The Public Health Service seek appropriations under authority of Public Law No. 410 (sec. 301a) for grants-in-aid for general research to be allotted to qualified institutions and individuals.

18. When the Federal Government undertakes grant-in-aid programs related to public health and sanitation, the Public Health Service be empowered to—

(a) Conduct the necessary investigations to determine the nature and extent of the health problem involved.

(b) Approve the allocation of funds, the functional effectiveness and placement of plants, installations, and constructions required in such programs.

The Council also approved the following Statement of Policy of the Public Health Service Relative to Federal Legislation on Water Pollution Control, after suggesting the italicized amendments:

"The general magnitude and importance of the water pollution problem in the United States, and its relation to the various uses of water and the public health have been well established. Likewise, the inability of State and local authorities adequately to control the pollution of interstate waters without the assistance of the central coordinating agency has been demonstrated over the years.

It is generally recognized that there is a need for Federal legislation to provide a stimulus to water pollution abatement activities and the necessary coordination of existing control authorities.

The Public Health Service has been engaged for many years in the investigation of interstate water pollution problems, individually and in cooperation with State and Federal agencies. This activity has been limited in scope since it has, of necessity, been confined to investigations.

The Public Health Service is interested in any Federal legislation dealing with the pollution control of interstate waters which provides for the following items:

1. Provisions for a Federal agency to act as a coordinator and adviser in matters pertaining to water pollution and its abatement, with authority to carry on investigations and other activities necessary in developing more efficient methods of treatment of sewage and wastes, *including the utilization of end and byproducts*, and in preparing comprehensive water pollution abatement programs.

2. The authorization for appropriations of funds sufficient in amount to permit the Federal agency properly to carry on the duties assigned to it.

3. Provision for an advisory board to the agency, the membership of which will include representatives of Federal agencies officially concerned with uses and control of water resources which may be affected by pollution.

4. Permission for States to form interstate compacts for cooperative effort in the prevention and abatement of pollution of interstate waters.

5. The authorization for appropriation of funds for allocation to States for promotion, investigations, and preparation of engineering reports and *programs* necessary for the prevention and abatement of water pollution.

6. The authorization for appropriation of funds for grants-in-aid or loans to civil subdivisions of government and loans to persons for the purpose of constructing sewage and waste treatment works.

7. Provision for the continuing interest by the Federal authority in the efficient operation of completed projects to insure that maximum benefits are derived from improvement works on which Federal funds have been expended.

The Public Health Service makes no recommendations at this time relative to the nature or degree of regulatory or enforcement provisions in water pollution control legislation. The decision as to the extent to which the Federal Government should be provided with, and exercise police powers in the control and abatement of water pollution is a matter primarily of legislative policy to be determined by the Congress."

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

June 17–July 14, 1945

The accompanying table 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 July 14, 1945, the number reported for the corresponding period in 1944, and the median number for the years 1940–44.

DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—The poliomyelitis incidence rose from 302 cases during the 4 weeks ended June 16 to 678 during the 4 weeks ended July 14. The number of cases was only about 60 percent of the number reported during the corresponding period in 1944, but it was 1.6 times the 1940–44 median. The incidence was higher than in 1944 in only 3 of the 9 geographic sections of the country (New England, West South Central, and Pacific), but it was higher than the preceding 5-year median in all sections except the West North Central and Mountain. Of the total cases Texas reported 159, New York 82, California 61, Tennessee 53, New Jersey 40, Ohio and South Carolina 30 each, and Alabama 26 cases. The number of cases of this disease has been somewhat above the normal expectancy since the beginning of the year, but the rate of increase during the current period was considerably below that of the 2 preceding years and not much above the rate of increase that normally occurs at this season of the year.

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Number of reported cases of 9 communicable diseases in the United States during the 4-week period June 17–July 14, 1945, the number for the corresponding period in 1944, and the median number of cases reported for the corresponding period, 1940–44

Division	Current period	1944	5-year median	Current period	1944	5-year median	Current period	1944	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	770	616	623	2,545	1,936	1,936	12,059	21,021	23,946
New England	25	13	13	75	16	5	1,440	2,347	4,220
Middle Atlantic	70	64	93	18	10	22	2,303	3,935	6,666
East North Central	108	77	100	62	61	102	2,475	3,863	5,810
West North Central	72	62	45	37	8	26	479	923	1,263
South Atlantic	109	93	88	573	581	581	283	1,942	1,719
East South Central	58	45	50	58	97	73	172	238	503
West South Central	161	120	111	1,468	943	943	993	2,007	1,035
Mountain	46	42	42	194	166	199	723	603	1,071
Pacific	121	100	77	60	54	144	3,191	5,163	2,386
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	502	792	288	678	1,099	415	6,494	5,673	5,053
New England	25	42	41	25	14	8	622	643	519
Middle Atlantic	98	190	74	128	232	24	1,755	1,237	1,237
East North Central	114	145	15	50	104	35	1,710	1,412	1,412
West North Central	34	69	16	21	29	29	514	412	345
South Atlantic	60	121	51	105	401	24	476	457	275
East South Central	51	60	21	87	184	60	169	120	162
West South Central	52	50	21	187	73	56	232	152	129
Mountain	10	20	7	6	12	12	183	283	132
Pacific	58	95	46	69	50	50	833	957	356
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	18	19	51	498	501	790	10,251	8,461	13,933
New England	0	0	0	12	20	22	937	566	794
Middle Atlantic	0	0	0	40	34	74	2,614	1,011	2,640
East North Central	6	10	15	53	49	78	1,398	1,575	3,182
West North Central	6	3	11	12	24	36	285	648	725
South Atlantic	0	1	1	140	118	163	1,987	1,978	1,978
East South Central	1	0	6	74	69	99	398	690	581
West South Central	4	2	4	127	138	204	1,079	1,096	1,453
Mountain	1	1	5	28	21	26	398	490	769
Pacific	0	2	4	12	28	28	1,155	407	1,314

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

Meningococcus meningitis.—The number of cases of meningococcus meningitis dropped from 634 during the preceding 4 weeks to 502 during the current 4 weeks. The number represented a 35-percent decline from the figure for the corresponding period in 1944, but it was 1.7 times the preceding 5-year (1940–44) median. In the West South Central section the incidence stood at last year's level, but in all other sections the number of cases declined. Compared with the 5-year median the incidence was relatively high in all sections of the country except New England.

Diphtheria.—For the 4 weeks ended July 14 there were 770 cases of diphtheria reported, the number being about 25 percent above the preceding 5-year median for the corresponding period. While every section of the country except the Middle Atlantic reported an increase over the median, the greatest excesses occurred in the New England,

West North Central, West South Central, and Pacific sections. For the country as a whole the current incidence is the highest for this period since 1939. This disease has maintained a comparatively high level since the latter part of 1944. Since the beginning of the current year there have been approximately 7,100 cases reported as compared with about 5,800 for the same 24 weeks in 1944.

Influenza.—The influenza incidence (2,545 cases) was about 30 percent above the median expectancy. The New England and West South Central sections appeared to be mostly responsible for the increase. In the former region, the number of cases was not large, but it was 15 times the median number, while in the latter region the number of cases (1,468) was about 50 percent above the median. In all other sections the incidence either closely approximated that of last year or fell below it.

Scarlet fever.—There were 6,494 cases of scarlet fever reported for the 4 weeks ended July 14, the number being about 15 percent above the 1944 figure for these weeks and 30 percent above the 1940–44 median. In the East South Central section the incidence was about normal, but all other sections reported excesses ranging from 1.2 times the median in the New England and East North Central sections to 2.3 times the median in the Pacific section.

DISEASES BELOW MEDIAN PREVALENCE

Measles.—For the 4 weeks ended July 14 there were 12,059 cases of measles reported as compared with 21,021 for the corresponding weeks in 1944 and a 5-year (1940–44) median of approximately 24,000 cases. For the country as a whole the current incidence was the lowest in the 17 years for which these data are available. In the Pacific section the number of cases (3,191) was about 35 percent above the normal seasonal expectancy, but in all other sections the incidence was relatively low.

Smallpox.—The number of cases (18) of smallpox reported for the current period was about on a level with the incidence for the corresponding period in 1944. The 1940–44 median for this period was 51 cases. Twelve of the total cases occurred in the North Central section, 4 in the West South Central section, and 1 each in the East South Central and Mountain sections. The current figures for this disease compare with such figures as 648 in 1938, 1,675 in 1931, and 3,111 in 1930.

Typhoid and paratyphoid fever.—The incidence of this disease was also about the same as during the corresponding weeks in 1944. The number of cases (498) was about 65 percent of the 1940–44 median (790 cases). The number of cases reported in the Mountain section was about normal for this season of the year, but in all other sections

of the country the incidence was considerably below that of recent years.

Whooping cough.—The number of cases (10,251) of whooping cough was about 20 percent above the 1944 figure for this period and 25 percent below the 1940–44 median. The incidence was above normal in the New England section, about normal in the Middle Atlantic and South Atlantic sections, and below the median expectancy in the remaining 6 sections.

MORTALITY, ALL CAUSES

For the 4 weeks ended July 14 there were 34,665 deaths from all causes reported by 93 large cities to the Bureau of the Census. The average number reported for the corresponding period in the years 1942–44 was 33,253 deaths. The number of deaths for each of the first 3 weeks of the current 4-week period was higher than the preceding 3-year average, but during the last week of the period the number was about 0.2 percent less than the average. The increase for the 4 weeks as a whole was 4.2 percent.

DEATHS DURING WEEK ENDED JULY 14, 1945

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

	Week ended July 14, 1945	Corresponding week, 1944
Data for 93 large cities of the United States:		
Total deaths	8,174	8,845
Average for 3 prior years	8,340	
Total deaths, first 28 weeks of year	260,122	264,129
Deaths under 1 year of age	612	615
Average for 3 prior years	594	
Deaths under 1 year of age, first 28 weeks of year	17,088	17,382
Data from industrial insurance companies:		
Policies in force	67,323,083	66,661,607
Number of death claims	12,746	11,148
Death claims per 1,000 policies in force, annual rate	9.9	8.7
Death claims per 1,000 policies, first 28 weeks of year, annual rate	10.7	10.4

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 JULY 21, 1945

Summary

For the country as a whole, an increase of 115 cases, or 45 percent, was recorded for the week in the incidence of poliomyelitis. A total of 369 cases was reported, as compared with 254 last week, 568 for the corresponding week last year, and a 5-year (1940–44) median of 249.

About 90 percent of the total net increase occurred in 9 of the 10 States which reported 10 or more cases each and these States reported an aggregate of 247 cases, as compared with 143 in the same States last week. These States are as follows (last week's figures in parentheses): Massachusetts 14 (2), New York 46 (29), New Jersey 37 (23), Pennsylvania 12 (4), Virginia 28 (7), South Carolina 12 (11), Texas 62 (45), Utah 11 (0), California 25 (22). A decline occurred in Tennessee, 20 cases being reported currently, as compared with 27 last week.

The total for the year to date is 2,048, as compared with 2,320 for the same period last year and a 5-year median of 1,223. The total for the past 5 weeks is 1,049, as compared with 1,663 for the same period last year.

Of the total of 114 cases of meningococcus meningitis reported for the week, as compared with 128 last week and a 5-year median of 45, 26 occurred in New York and California (13 each), the only States which reported more than 9 cases each. The total to date is 5,770, as compared with 12,418 for the same period last year and a 5-year median of 2,188.

No unusual incidence was reported for any of the other communicable diseases, although the totals to date are slightly higher than for last year for diphtheria, the dysenteries, tularemia, undulant fever, murine typhus, and whooping cough. To date both smallpox and typhoid fever have established new lows.

A total of 7,654 deaths was recorded for the week in 91 large cities of the United States, as compared with 8,123 last week, a 3-year (1942–44) average of 8,152, and 7,722 for the corresponding week last year. The cumulative total is 265,885, as compared with 269,761 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended July 21, 1945, and comparison with corresponding week of 1944 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 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	July 21, 1945	July 22, 1944		July 21, 1945	July 22, 1944		July 21, 1945	July 22, 1944		July 21, 1945	July 22, 1944	
NEW ENGLAND												
Maine	0	1	0	-	-	-	1	10	43	0	1	1
New Hampshire	0	0	0	-	-	-	1	5	5	0	0	0
Vermont	0	0	0	-	-	-	5	7	25	0	0	0
Massachusetts	0	5	2	-	-	-	142	177	222	2	10	2
Rhode Island	0	0	0	-	13	-	3	8	38	2	2	1
Connecticut	0	0	0	-	-	-	22	37	69	2	5	0
MIDDLE ATLANTIC												
New York	7	6	6	[1] 2	([1])	[1] 1	70	152	486	13	34	9
New Jersey	3	1	2	1	4	2	34	121	251	3	10	1
Pennsylvania	3	5	5	-	1	-	111	131	131	4	10	3
EAST NORTH CENTRAL												
Ohio	5	0	3	3	1	5	12	18	73	2	7	1
Indiana	4	7	4	2	3	3	3	4	14	3	4	2
Illinois	3	3	10	4	1	4	178	32	106	5	5	1
Michigan [2]	15	4	3	1	-	1	100	84	241	4	7	2
Wisconsin	4	1	1	19	9	9	45	168	373	4	1	0
WEST NORTH CENTRAL												
Minnesota	6	3	1	-	-	1	2	33	33	3	3	0
Iowa	1	3	1	-	-	-	12	30	31	0	4	1
Missouri	4	5	4	1	-	-	17	5	11	9	3	0
North Dakota	1	0	0	11	-	-	3	1	8	0	3	0
South Dakota	1	0	1	-	-	-	8	0	3	1	0	0
Nebraska	3	0	0	1	3	3	3	11	7	0	0	0
Kansas	3	1	1	1	4	1	9	22	41	1	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	-	-	-	3	1	1	0	0	0
Maryland [2]	0	0	0	4	-	1	8	11	15	4	5	5
District of Columbia	0	0	0	-	-	-	0	9	9	0	1	0
Virginia	4	2	7	68	38	36	4	30	45	1	7	7
West Virginia	3	3	3	19	-	1	2	14	14	0	2	0
North Carolina	6	6	4	-	-	-	5	50	50	4	8	0
South Carolina	9	5	3	58	87	87	4	38	16	1	6	1
Georgia	6	7	3	6	7	9	3	12	10	1	0	1
Florida	5	16	3	-	2	4	0	45	10	2	6	0
EAST SOUTH CENTRAL												
Kentucky	2	3	3	-	1	-	7	13	19	5	2	2
Tennessee	4	3	3	5	10	8	6	6	25	8	3	0
Alabama	3	3	3	14	12	12	4	12	27	4	4	4
Mississippi [2]	5	3	2	-	-	-	-	-	-	1	0	0
WEST SOUTH CENTRAL												
Arkansas	3	3	3	4	13	5	8	21	21	2	1	1
Louisiana	[3] 10	5	5	2	8	4	[3] 5	7	5	[3] 3	2	1
Oklahoma	1	0	2	19	-	2	3	9	9	1	3	1
Texas	35	23	23	330	160	160	81	125	103	1	8	3
MOUNTAIN												
Montana	1	0	0	-	-	1	7	3	7	1	1	0
Idaho	1	0	0	10	-	-	12	2	2	0	0	0
Wyoming	2	0	0	-	-	-	8	9	8	0	0	0
Colorado	2	6	6	3	-	3	9	8	24	0	0	0
New Mexico	3	0	0	3	-	1	3	18	17	0	0	0
Arizona	1	0	0	19	16	25	1	13	13	0	0	1
Utah [2]	0	0	0	-	6	-	100	19	33	0	2	0
Nevada	0	1	0	-	-	-	1	21	5	1	0	0
PACIFIC												
Washington	1	2	1	1	-	-	93	61	36	2	3	1
Oregon	7	1	1	2	7	5	26	39	38	1	2	1
California	21	17	13	2	3	11	352	442	288	13	11	2
Total	198	154	148	615	409	409	1,536	2,094	3,313	114	186	45
29 weeks	[3] 7,318	6,021	6,765	68,307	336,856	167,533	[3] 97,111	586,074	528,294	[3] 5,770	12,418	2,188

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Corrections: Louisiana, week ended June 30. diphtheria 5 (instead of 4); measles 46 (instead of 27). meningococcus meningitis 2 (instead of 1).

Telegraphic morbidity reports from State health officers for the week ended July 21, 1945, and comparison with corresponding week of 1944 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	July 21, 1945	July 22, 1944		July 21, 1945	July 22, 1944		July 21, 1945	July 22, 1944		July 21, 1945	July 22, 1944	
NEW ENGLAND												
Maine	3	0	0	2	7	6	0	0	0	2	0	0
New Hampshire	4	3	0	0	0	2	0	0	0	0	1	0
Vermont	2	0	0	7	2	2	0	0	0	0	0	0
Massachusetts	14	6	1	62	35	37	0	0	0	2	3	1
Rhode Island	0	0	0	1	0	2	0	0	0	0	0	0
Connecticut	3	0	0	15	12	12	0	0	0	1	1	1
MIDDLE ATLANTIC												
New York	46	153	6	98	67	79	0	0	0	5	4	9
New Jersey	37	7	4	28	15	19	0	0	0	2	1	3
Pennsylvania	12	56	3	67	62	43	0	0	0	10	3	6
EAST NORTH CENTRAL												
Ohio	8	14	1	54	51	51	0	0	0	1	2	8
Indiana	2	10	2	14	10	10	0	0	0	2	4	3
Illinois	6	13	7	69	35	43	0	0	1	2	4	5
Michigan [3]	3	24	7	64	48	48	0	1	1	7	1	3
Wisconsin	0	2	1	40	37	37	0	0	1	0	1	0
WEST NORTH CENTRAL												
Minnesota	0	3	0	23	29	27	0	0	0	0	0	0
Iowa	1	8	4	14	8	8	0	0	0	0	1	1
Missouri	4	3	2	17	9	12	0	0	0	8	8	5
North Dakota	0	3	1	3	5	2	0	0	0	0	0	0
South Dakota	0	0	0	3	0	5	0	0	0	0	0	0
Nebraska	1	3	1	11	2	3	0	0	0	0	0	0
Kansas	8	5	5	37	9	10	1	0	0	0	0	1
SOUTH ATLANTIC												
Delaware	2	0	0	1	0	0	0	0	0	0	0	0
Maryland [3]	6	10	1	19	21	14	0	0	0	0	4	3
District of Columbia	9	8	0	4	3	3	0	0	0	0	0	0
Virginia	28	30	2	16	18	4	0	0	0	5	4	4
West Virginia	1	4	2	19	25	18	0	0	0	1	5	8
North Carolina	3	62	3	14	18	10	0	2	0	2	12	12
South Carolina	12	4	3	2	5	2	0	0	0	2	11	11
Georgia	5	5	4	7	11	11	0	0	0	11	14	23
Florida	2	5	1	2	4	1	0	0	0	1	6	3
EAST SOUTH CENTRAL												
Kentucky	3	77	4	21	8	15	0	1	0	8	11	11
Tennessee	20	1	1	12	17	14	0	0	0	6	9	11
Alabama	3	7	5	5	8	8	0	0	0	2	8	8
Mississippi [3]	0	5	5	5	3	3	0	0	0	4	4	6
WEST SOUTH CENTRAL												
Arkansas	3	0	1	4	5	4	0	0	0	2	9	14
Louisiana	[5] 4	5	5	3	4	3	0	0	0	12	15	14
Oklahoma	9	4	2	9	0	6	0	0	0	4	4	8
Texas	62	9	8	34	31	17	0	1	0	20	21	28
MOUNTAIN												
Montana	0	1	1	2	4	4	0	0	0	0	1	1
Idaho	0	0	0	8	6	2	0	0	0	0	0	0
Wyoming	0	0	0	1	2	2	0	0	0	0	0	0
Colorado	2	0	0	11	9	9	0	0	0	1	1	2
New Mexico	0	0	1	13	7	1	0	0	0	2	0	3
Arizona	0	0	0	2	11	4	0	0	1	0	0	1
Utah [3]	11	0	0	11	12	6	0	0	0	1	0	1
Nevada	0	0	0	0	1	0	0	0	0	0	0	0
PACIFIC												
Washington	4	1	1	12	45	14	0	0	0	0	2	1
Oregon	1	6	3	9	4	4	0	0	0	0	2	2
California	25	11	11	121	87	42	0	0	0	2	6	6
Total	369	568	249	996	812	807	1	5	12	129	183	269
29 weeks	[5] 2,048	2,320	1,223	131,152	144,569	94,785	255	283	596	2,133	2,584	3,116

[3] Period ended earlier than Saturday.
[4] Including paratyphoid fever reported separately as follows: Massachusetts 2; New York 3; Georgia 4; Louisiana 3; Texas 8; New Mexico 1; Utah 1; California 1.
[5] Correction: Louisiana, week ended June 30, poliomyelitis 2 (instead of 1).

Telegraphic morbidity reports from State health officers for the week ended July 21, 1945, and comparison with corresponding week of 1944, and 5-year median—Con.

Division and State	Whooping cough			Week ended July 21, 1945							
	Week ended—		Median 1940–44	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
	July 21, 1945	July 22, 1944		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	67	2	28	0	0	0	0	0	0	0	2
New Hampshire	9	0	0	0	0	0	0	0	0	0	0
Vermont	15	19	10	0	0	0	0	0	0	0	0
Massachusetts	141	81	141	0	17	0	0	0	0	0	0
Rhode Island	4	4	22	0	1	0	0	0	0	0	0
Connecticut	25	68	45	0	0	0	0	0	0	0	2
MIDDLE ATLANTIC											
New York	302	110	269	0	2	0	0	1	0	0	10
New Jersey	253	76	118	4	0	0	0	2	0	0	2
Pennsylvania	196	63	274	0	0	0	1	1	0	0	5
EAST NORTH CENTRAL											
Ohio	186	182	193	0	0	0	2	1	0	0	0
Indiana	29	25	30	1	0	0	0	0	0	0	2
Illinois	91	63	158	2	1	0	0	3	0	0	5
Michigan [2]	165	134	235	3	1	0	0	0	0	0	20
Wisconsin	50	136	161	0	0	0	0	0	1	0	5
WEST NORTH CENTRAL											
Minnesota	11	43	43	1	0	0	0	0	0	0	2
Iowa	8	14	30	0	0	0	0	0	0	0	16
Missouri	40	44	44	0	0	3	0	1	1	0	2
North Dakota	2	6	10	0	0	0	0	0	0	0	0
South Dakota	0	12	10	0	0	0	0	0	0	0	1
Nebraska	2	10	9	0	0	0	0	0	0	0	0
Kansas	39	59	58	0	7	0	0	0	0	0	6
SOUTH ATLANTIC											
Delaware	0	1	2	0	0	0	0	0	0	0	0
Maryland [2]	83	128	112	0	0	1	0	3	0	0	1
District of Columbia	10	2	9	0	0	0	0	0	0	0	0
Virginia	89	52	52	0	0	235	0	6	2	1	0
West Virginia	79	32	32	0	0	0	0	0	0	0	1
North Carolina	206	199	199	2	2	0	0	2	0	4	0
South Carolina	82	106	106	2	58	0	0	0	0	2	0
Georgia	14	22	28	0	18	0	0	3	1	38	3
Florida	20	34	12	7	0	0	0	0	0	16	0
EAST SOUTH CENTRAL											
Kentucky	61	82	82	0	1	0	0	1	0	0	0
Tennessee	15	33	39	1	0	13	0	0	4	0	3
Alabama	29	31	27	0	0	0	0	0	0	22	1
Mississippi [2]	0	----	----	0	0	0	0	0	0	4	7
WEST SOUTH CENTRAL											
Arkansas	15	22	25	16	12	0	[6] 0	0	1	0	1
Louisiana	6	0	7	[6] 2	[6] 1	0	0	0	0	11	2
Oklahoma	11	5	18	0	0	0	0	2	0	0	0
Texas	147	231	231	58	485	57	0	0	1	65	12
MOUNTAIN											
Montana	7	9	27	0	0	0	0	0	1	0	0
Idaho	14	0	5	0	1	0	0	1	0	0	1
Wyoming	2	1	6	0	0	0	0	0	2	0	0
Colorado	45	21	15	0	0	0	0	0	0	0	0
New Mexico	7	3	13	0	3	1	0	0	0	0	0
Arizona	15	19	19	0	0	23	0	0	0	0	0
Utah [2]	37	76	76	0	0	0	0	0	1	0	4
Nevada	0	1	1	0	0	0	0	0	0	0	0
PACIFIC											
Washington	36	32	49	0	0	0	0	0	0	0	1
Oregon	[6] 19	10	19	0	1	0	0	0	0	0	0
California	240	81	242	12	4	0	8	0	1	1	6
Total	2,924	2,384	3,439	111	615	333	11	27	16	164	123
Same week 1944	2,384	----	----	55	702	348	15	25	14	185	75
Average, 1942–44	3,338	----	----	64	554	364	13	[7] 25	17	[7] 131	----
29 weeks: 1945	[6] 73,290	----	----	[6] 1,045	[6] 13,607	3,876	[6] 205	231	456	1,986	2,729
1944	54,263	----	----	906	11,335	3,951	323	262	344	1,828	2,001
Average, 1942–44	93,835	----	[7] 109,174	880	7,948	3,325	306	[7] 262	484	[7] 1,271	----

[1] Period ended earlier than Saturday.

[6] Corrections: Arkansas, week ended June 30, encephalitis 1 (instead of 0). Louisiana, week ended June 30, amebic dysentery 9 (instead of 1), bacillary dysentery 8 (instead of 1). Oregon, week ended July 7, whooping cough 15 (instead of 0).

[7] 5-year median, 1940–44.

Leprosy: Minnesota 1, California 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 14, 1945

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	0	1	0	0	0	0	3
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	
Vermont:												
Barre	0	0	------	0	12	0	0	0	0	0	0	
Massachusetts:												
Boston	0	0	------	0	45	0	16	0	15	0	0	21
Fall River	0	0	------	0	1	0	0	0	2	0	0	0
Springfield	0	0	------	0	1	0	0	0	2	0	0	1
Worcester	0	0	------	0	50	0	4	0	0	0	0	3
Rhode Island:												
Providence	0	1	------	0	0	0	1	0	1	0	0	18
Connecticut:												
Bridgeport	0	0	------	0	0	1	0	1	1	0	0	0
Hartford	1	0	------	0	18	1	1	0	2	0	0	1
New Haven	0	0	1	0	0	0	0	0	0	0	0	2
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	3	0	5	3	1	0	0	1
New York	6	1	1	------	59	10	------	9	40	0	5	152
Rochester	0	0	------	0	4	1	1	2	3	0	0	16
Syracuse	0	0	------	0	0	0	0	0	0	0	0	34
New Jersey:												
Camden	3	0	------	0	4	0	0	0	1	0	0	5
Newark	0	0	------	0	1	0	3	3	4	0	0	23
Trenton	0	0	2	0	2	0	0	3	0	0	1	8
Pennsylvania:												
Philadelphia	3	0	------	0	118	1	20	1	16	0	0	90
Pittsburgh	0	0	------	0	0	1	5	1	12	0	0	17
Reading	0	0	------	0	0	0	0	0	1	0	0	0
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	1	4	1	8	1	2	0	0	10
Cleveland	0	0	------	0	2	0	4	1	4	0	1	50
Columbus	1	2	------	0	1	0	2	0	2	0	0	7
Indiana:												
Fort Wayne	0	0	------	0	0	0	1	0	0	0	0	1
Indianapolis	4	0	------	1	2	0	8	0	7	0	0	18
South Bend	0	0	------	0	1	0	0	0	3	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	1	0	------	0	170	1	15	3	25	0	1	81
Springfield	0	0	------	0	0	0	1	0	3	0	0	0
Michigan:												
Detroit	5	0	------	0	99	2	5	0	22	0	0	46
Flint	0	0	------	0	0	0	3	0	0	0	0	0
Grand Rapids	0	0	------	0	1	0	1	0	1	0	0	2
Wisconsin:												
Kenosha	0	0	------	0	4	0	0	0	0	0	0	4
Milwaukee	0	0	------	0	16	1	1	0	15	0	0	4
Racine	0	0	------	0	0	1	1	0	1	0	0	5
Superior	0	0	------	0	2	0	0	0	1	0	0	1
WEST NORTH CENTRAL												
Minnesota:												
Duluth	1	0	------	0	2	0	0	0	8	0	0	0
Minneapolis	0	0	------	0	0	2	3	0	6	0	0	2
St. Paul	0	0	------	0	2	1	2	0	1	0	0	5
Missouri:												
Kansas City	0	0	------	0	5	1	5	0	5	0	0	9
St. Joseph	0	0	------	0	3	0	0	1	1	0	0	0
St. Louis	4	0	1	2	11	0	4	1	3	0	0	23

City reports for week ended July 14, 1945—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	0	0	0	0	0	0	0
Nebraska:												
Omaha	2	0	------	0	0	0	2	0	2	0	0	0
Kansas:												
Topeka	0	0	------	0	0	1	0	0	5	0	0	0
Wichita	0	0	------	0	1	0	1	0	2	0	0	5
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	0	0	0	0	0	0	0	0
Maryland:												
Baltimore	4	0	------	0	2	0	6	0	9	0	0	57
Cumberland	0	0	------	0	0	0	0	0	1	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	1	0	1	1	3	6	7	0	0	12
Virginia:												
Lynchburg	0	0	------	0	1	0	0	0	1	0	0	0
Richmond	0	0	------	0	0	1	0	2	2	0	0	5
Roanoke	0	0	------	0	0	0	0	0	0	0	0	0
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	0	0	1	0
Wheeling	0	0	------	0	0	1	0	0	0	0	1	0
North Carolina:												
Raleigh	0	0	------	0	2	0	1	1	0	0	0	6
Wilmington	0	0	------	0	0	0	0	0	0	0	0	8
Winston-Salem	0	0	------	0	0	0	0	0	0	0	0	33
South Carolina:												
Charleston	0	0	------	0	1	0	1	0	0	0	1	6
Georgia:												
Atlanta	0	0	------	0	0	0	2	1	3	0	0	3
Brunswick	0	0	------	0	0	0	1	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	2	0	3	0	0	0	0	17
Nashville	0	0	------	0	1	1	1	1	2	0	0	0
Alabama:												
Birmingham	0	0	------	0	0	1	5	4	4	0	0	0
Mobile	0	0	------	1	0	0	1	0	3	0	0	1
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	0	0	0	0	0
Louisiana:												
New Orleans	8	0	------	0	9	1	1	1	3	0	0	0
Shreveport	0	0	------	0	0	0	3	1	1	0	0	0
Texas:												
Dallas	0	0	------	0	1	0	0	5	2	0	0	4
Galveston	0	0	------	0	0	0	3	1	0	0	0	0
Houston	2	0	------	0	0	0	6	5	0	0	0	0
San Antonio	2	0	------	0	0	0	4	2	0	0	0	1
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	1	0
Great Falls	0	0	------	0	0	0	0	0	0	0	0	0
Helena	0	0	------	0	1	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	4	0	1	0	2	0	4	0	1	0	0	13
Pueblo	0	0	------	0	0	0	1	0	0	0	0	0
Utah:												
Salt Lake City	0	0	------	0	21	0	3	0	1	0	0	11

City reports for week ended July 14, 1945—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	30	0	6	2	6	0	0	3
Spokane	0	0	------	0	4	0	2	0	0	0	0	0
Tacoma	0	0	------	0	25	0	1	0	0	0	0	2
California:												
Los Angeles	7	0	1	1	27	3	1	2	16	0	0	31
Sacramento	0	0	------	0	1	0	3	0	5	0	0	2
San Francisco	1	0	2	0	53	0	4	2	14	0	0	8
Total	60	4	10	6	828	35	191	66	301	0	12	891
Corresponding week, 1944	40	------	17	8	754	------	259	------	268	0	26	677
Average, 1940–44	43	------	24	[1] 7	[2] 1,441	------	[1] 244	------	330	0	26	1,078

[1] 3-year average, 1942–44.
[2] 5-year median, 1940–44.

Dysentery, amebic.—Cases: New York, 1; Philadelphia, 1.
Dysentery, bacillary.—Cases: New York, 5; Cleveland, 1; Charleston, S. C., 11; Los Angeles, 1.
Dysentery, unspecified.—Cases: Baltimore, 1.
Rocky Mountain spotted fever.—Cases: Lynchburg, 1; Richmond, 1; Denver, 1.
Typhus fever, endemic.—Cases: New York, 1; Atlanta, 1; Birmingham, 1; Mobile, 2; New Orleans, 1; Houston, 2; San Antonio, 2.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1943, 34,130,900)

	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	2.6	2.6	2.6	0.0	332	5.2	60.1	2.6	60	0.0	0.0	128
Middle Atlantic	5.6	0.5	1.4	0.0	88	6.0	15.7	10.2	36	0.0	2.8	160
East North Central	7.3	1.2	0.0	1.2	184	3.6	30.4	3.0	52	0.0	1.2	139
West North Central	13.9	0.0	1.9	4.0	48	9.9	33.8	4.0	66	0.0	0.0	88
South Atlantic	7.1	0.0	1.8	0.0	12	5.3	24.7	17.7	41	0.0	5.3	230
East South Central	0.0	0.0	0.0	5.9	18	11.8	59.0	29.5	53	0.0	0.0	106
West South Central	34.4	0.0	0.0	0.0	29	2.9	51.7	43.0	17	0.0	0.0	14
Mountain	33.0	0.0	8.3	0.0	198	0.0	66.1	0.0	17	0.0	8.3	198
Pacific	12.7	0.0	4.7	1.6	221	4.7	26.9	9.5	65	0.0	0.0	73
Total	9.2	0.6	1.5	0.9	127	5.4	29.2	10.1	46	0.0	1.8	136

PLAGUE INFECTION IN CHEYENNE COUNTY, KANS.

Plague infection has been reported proved, on July 17, in a pool of 17 fleas from 21 mice, *Microtus*, sp., taken on July 7 at a location in Cheyenne County, Kans., 5 miles east on an unmarked road from a point on State Highway No. 61, 5 miles south of Benkleman, Nebr., and in another pool of 73 fleas from 116 mice, *Peromyscus*, sp., taken at the same time and place. This is the same location from which specimens collected on June 2 were taken and proved plague-infected on June 23. (See Public Health Reports July 20, p. 849.)

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 30, 1945.—During the week ended June 30, 1945, 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	21	31	1	57	261	92	10	107	78	658
Diphtheria	1	3		21		1			2	28
Dysentery, bacillary				8						8
Encephalitis, infectious						1				1
German measles		2		5	35		2	35	36	115
Influenza	42	4			13				3	62
Measles	2	1		28	229	14	43	54	132	503
Meningitis, meningococcus			3	2	1				1	7
Mumps		8		30	111	43	22	54	11	279
Poliomyelitis					2				2	4
Scarlet fever	2	1	5	78	82	12	13	12	7	212
Tuberculosis (all forms)		6	7	103	31	14		2	8	171
Typhoid and paratyphoid fever				3				1		4
Undulant fever				1	1					2
Venereal diseases:										
Gonorrhea	1	25	39	104	179	38	31	25	84	526
Syphilis	1	21	9	82	71	9	6	8	29	236
Whooping cough	2	1	1	75	26	2		11	3	121

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 the current year. 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.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Cholera

China—Szechwan Province.—According to an unofficial report dated July 16, 1945, cholera was said to be spreading to Kweyang where 26 cases were reported, 8 of which were fatal. About 50 deaths daily from cholera were also reported in Chengtu, Szechwan Province, China.

Plague

Canada—Alberta Province.—On July 4, 1945, plague infection was reported in 1 squirrel found north and east of Cereal, Acadia, Alberta Province, Canada.

Egypt.—For the week ended June 16, 1945, 12 cases of plague were reported in Egypt.

France—Corsica—Ajaccio.—For the week ended July 14, 1945, 2 cases of plague with 1 death were reported in Ajaccio, Corsica, France.

Great Britain—Malta.—Information dated July 9, 1945, states that 8 cases of plague of which 4 cases have been confirmed have been reported in Mdida Gzira Hamrun, Malta, Great Britain.

Morocco (French).—For the period June 21–30, 1945, 77 cases of plague were reported in French Morocco.

Peru.—For the month of May 1945, plague was reported in Peru by Departments as follows: Ica Department, Chincha, 1 case; Libertad Department, Province of Otuzco—La Quesera, 2 cases, Farm Huayabamba, 1 case.

Smallpox

Belgian Congo.—For the week ended June 23, 1945, 599 cases of smallpox with 4 deaths were reported in Belgian Congo.

Bolivia—Beni Department—Magdalena.—Information dated July 14, 1945, states that 200 cases of smallpox have occurred in Magdalena, Beni Department, Bolivia.

Morocco (French).—For the period June 21–30, 1945, 75 cases of smallpox were reported in French Morocco.

Union of South Africa.—For the month of April 1945, 241 cases of smallpox with 20 deaths were reported in the Union of South Africa.

Uruguay—Rocha Department.—For the week ended June 30, 1945, 19 cases of smallpox (alastrim) were reported in the Department of Rocha, Uruguay. Vaccination is being carried on in the whole country.

Typhus Fever

Cameroon (French).—For the period June 21–30, 1945, 5 cases of typhus fever were reported in the Nyongetsanaga region, French Cameroon.

Egypt.—For the week ended June 16, 1945, 406 cases of typhus fever with 55 deaths were reported in Egypt.

France.—For the period June 2–27, 1945, 127 imported cases of typhus fever were reported in France.

Iran.—For the week ended March 17, 1945, 29 cases of typhus fever were reported in Iran.

Morocco (French).—For the period June 21–30, 1945, 415 cases of typhus fever were reported in French Morocco, including 23 cases reported in Casablanca and 6 cases in Rabat.

Turkey.—For the week ended July 14, 1945, 42 cases of typhus fever were reported in Turkey, including 6 cases reported in Istanbul, 1 case in Izmir, and 2 cases in Zonguldak.

Union of South Africa.—For the month of April 1945, 131 cases of typhus fever with 9 deaths were reported in the Union of South Africa.

Yellow Fever

Gold Coast—Nsawam.—On June 29, 1945, 1 case of suspected yellow fever was reported in Nsawam. On July 14, 1945, 1 case of suspected yellow fever was reported in Nsawam with the place of onset as Mangoase, Gold Coast.

Ivory Coast—Grand Bassam.—On July 14, 1945, 1 case of suspected yellow fever was reported in Grand Bassam, Ivory Coast.

Peru—Loreto Department—San Martin Province.—For the month of April 1945, 1 confirmed case of yellow fever was reported in San Martin Province, Loreto Department, Peru.

Venezuela.—According to telegraphic information dated July 10 and July 13, 1945, 1 case of yellow fever was reported in the village of Las Mesas and 2 cases of yellow fever were reported in the village of Omuquena, La Grita municipality, Jauregui District, Tachira State, Venezuela. Two cases of yellow fever were also reported in the village of Cucbilla Los Cristales, and 1 case in the village of Mesa del Carmen, Seboruco municipality, Jauregui District, Tachira State. Telegraphic information dated July 20, 1945, states that 1 case of yellow fever was reported in the village of Los Giros, Zea municipality, Merida State, Venezuela, and 1 case of yellow fever was reported in the village of Suruma, Perija municipality, Zulia State, Venezuela. All cases have been confirmed.

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