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OPERATION OF THE UNITED STATES PUBLIC HEALTH SERVICE MALARIA CONTROL PROGRAM [1, 2]

By FRANK TETZLAFF, *Sanitary Engineer, United States Public Health Service*

The United States Public Health Service has carried on its malaria control activities largely within the framework of the State health departments. Where necessary, the staffs of the State health departments were reinforced by the detail of suitable professional, subprofessional, administrative, clerical and labor personnel. This personnel, both commissioned officers and civil-service employees, became, in effect, employees of the State and local health departments. At the peak of wartime operations there were approximately 185 commissioned officers and 3,500 civil-service employees on detail to State health departments on malaria control activities. Numerous benefits resulted from this method of operation. The more outstanding are:

1. With the use of existing malaria control organizations in State health departments there was no unnecessary expenditure of funds by duplication of personnel. Existing personnel in many cases could readily take on additional duties like those already being performed. Office, garage and warehouse space frequently were available or could be expanded to accommodate an enlarged program.

2. There was no loss of time in acquiring a background of knowledge of the malaria problem and of previous malaria control activities, such as malaria surveys and drainage and larviciding projects, and prompt advantage could be taken to permit institution or expansion of control measures where needed.

3. Where no malaria control organization existed previously in State health departments and this activity was carried on as part of a general sanitation program by personnel devoting only part time, the value of personnel specializing in malaria control was demonstrated. Certainly the need for entomological guidance of the malaria control activities as well as for the guidance of programs for the control

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[1] From the Communicable Disease Center, Atlanta, Georgia.

[2] From the paper presented at meeting of the National Malaria Society, Atlanta, Ga., December 2, 1947.

of other insect-borne diseases is now more generally acknowledged and will continue to be considered an essential part of a health department organization.

4. Most important perhaps is the almost certain result that health departments, having been so intimately connected with the wartime malaria control measures and having sponsored in most cases for the first time an operating program extremely popular with the public, will probably continue these control measures with local funds alone, if necessary.

Papers presented previously at annual meetings of this society (*1*, *2*) have indicated the changing pattern of malaria control operations of the Public Health Service. The emphasis from war establishment malaria control, a program intended primarily to prevent the spread of malaria into military and war establishments from surrounding civilian areas where malaria was prevalent, has been shifted to the protection of the civilian population from malaria brought in by returning military personnel. The latter program, known as the extended program, involved the extension of malaria control activities from the immediate vicinity of purely war-important areas to all areas of relatively high malaria endemicity.

While a maximum of about 2,200 war establishments were included at the peak of the war establishment malaria control program, there has since been a drastic curtailment. Malaria control activities or merely surveillance were conducted during the 1947 season in the vicinity of only 73 military areas and 40 Veterans' Administration facilities throughout the United States. At present it does not seem that this number of military establishments requiring malaria control or surveillance will be reduced considerably. This control and surveillance ordinarily are conducted by the Communicable Disease Center of the Public Health Service with the cooperation of or through the State malaria control organization where there is such an organization. Some military areas requiring malaria control or surveillance, however, are located in States which do not have such organizations. In such cases personnel have been made available in the District offices of the Public Health Service either to do the surveillance or control or to arrange for it to be carried on locally.

With the shift of the Public Health Service malaria control program to the extended program there was also a change in the control procedures. War malaria control was conducted primarily by means of larviciding and drainage. The transition to extended malaria control occurred at a time during the war when DDT was just being made more available for civilian use, or at least for war-essential civilian use. This factor undoubtedly influenced and encouraged the transition since the objective of protecting civilian populations from outbreaks due to returning military malaria carriers could obviously be achieved much more readily and positively by such control measures. With the more general availability of DDT, it was possible to contemplate the use of residual DDT spray treatment of homes as a malaria control procedure almost to the exclusion of other measures such as drainage and larviciding.

Funds allocated to the United States Public Health Service for the malaria control program were apportioned to the States on the basis of the malaria problem in the States concerned. Use of these funds was limited largely to areas preapproved for operations—the areas being delineated substantially by a determination of the average annual malaria death rates for the various counties weighted by a factor for population density and further modified by evidence subsequently submitted by State health authorities.

At the start of the residual DDT spraying program in 1945, an average annual death rate of 10 or more per 100,000 population (during the period 1938–42) was used as the criterion for establishing a list of counties preapproved for operations. Although some States from the beginning insisted that local areas participate in the cost of the residual spraying operations, in many States Federal funds paid for almost the entire cost of the program. Where this was the case it was soon apparent that the Federal funds available probably would not be adequate to establish the residual spraying program in the entire preapproved area. It was urged, therefore, that local funds be solicited or be made available in some way to permit expansion of the program to all areas shown to be in need of the malaria control program.

Local participation made it possible during the 1947 season to reduce the criterion for operations to counties having an average annual death rate of 5 or more per 100,000 population.

There was no uniform method of securing the State and local participation. The methods of participation varied extensively, depending on the malaria problem, the local interest, and other conditions peculiar to the particular area.

Three principal methods of obtaining local participation in the malaria control program were used:

1. The county or city government provided funds from general taxation or special tax levies for labor and transportation costs. Federal funds, in such cases, were used to furnish supervisory personnel, spraying equipment and chemicals. This method has been perhaps the most satisfactory one from an organizational standpoint.

2. Some State legislatures appropriated funds for the malaria-control program. These funds were expended under the direction of the State health officer. Although convenient from the standpoint of avoiding the necessity of collection of funds, this method is, in some cases, difficult to administer, since legislators often assume the money will be spent throughout the State instead of being limited to areas where malaria is considered a problem by the State health department.

3. In some States, local participation in the malaria-control program has been obtained by collection of fees from the owners of homes in which the DDT residual spray was applied. Obviously the cost of collecting the funds under this method is considerable. Hence, the unit cost for residual DDT spray applications is above the average for the two methods outlined previously. Although it might be expected that the inability to pay the fee could result in a considerable number of homes in an area requiring protection being deprived of such protection, actual experience has shown that despite fees of from $0.50 to $3.25 per house there is very little difference between the coverage secured by this method of participation from that in other programs. The coverage in all States has varied from 70 to 80 percent of the homes in an area being sprayed, with refusals being due mainly to vacancies, adequate screening, illness in the family, or other reasons not pertaining to ability to pay a fee. It is likely, however, that a change in economic conditions might result in wholesale failure of a program based on this type of participation.

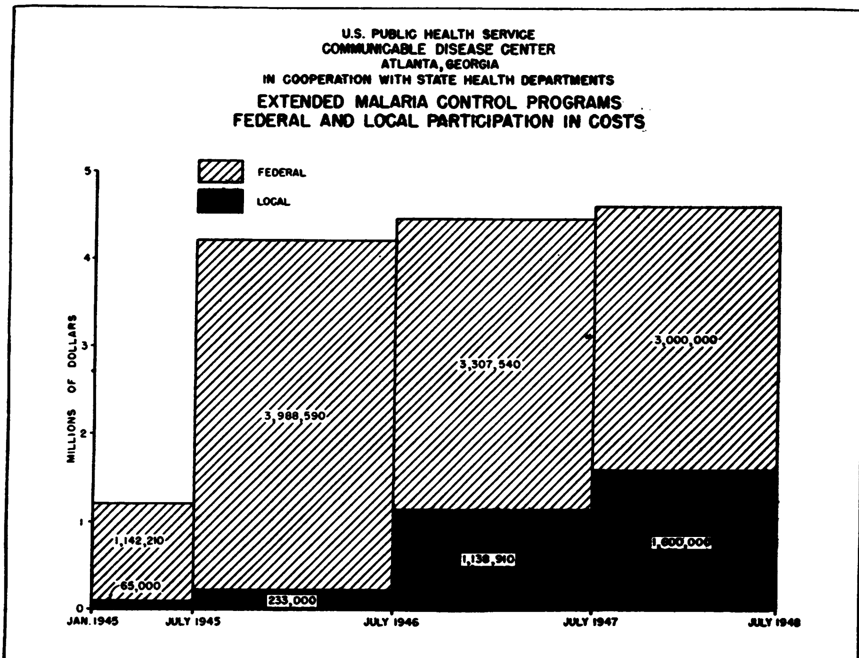

FIGURE 1.

With local participation in the cost of operations steadily increasing to a present participation rate of about 31 percent (fig. 1) it has been possible to expand the residual spraying program proportionately (table 1). Considerable expansion also has been made possible by increasing economy of operations. The average time required to treat one unit has been reduced from approximately 1.75 to 1.19 man-hours. More efficient operations have resulted from equipment developments and crew organization. Many of these improvements were initiated in the field. Improvements in hand spraying equipment have been particularly important in the elimination of time lost due to breakdown of equipment.

TABLE 1.—*Summary of residual house-spraying operations 1945–48, all States November 1947*

CALENDAR YEARS

Year	Number of counties	Number house spray applications	Pounds (DDT)	Pounds (DDT per house)	Man hours per house
1945	121	678,032	305,824	0.45	1.75
1946	267	1,166,572	918,125	.79	1.35
1947 (Sept. 27)	307	1,234,318	999,617	.81	1.20

FISCAL YEARS

Year	Number of counties	Number house spray applications	Pounds (DDT)	Pounds (DDT per house)	Man hours per house
1945	111	264,482	103,957	0.39	1.75
1946	266	1,055,397	715,656	.68	1.55
1947	297	1,236,841	964,449	.78	1.28
1948 [1]	300	1,000,000	1,250,000	1.25	1.00

[1] Estimated.

Some economies in the operational program may have had undesirable effects. A reduction in the emphasis on educational activities may, in some measure, be responsible for complaints which are now being received concerning the ineffectiveness of the DDT spray program as compared with previous years. People whose homes are being sprayed are forgetting that the purpose of the program is malaria control and not primarily fly control. It is true, however, that the incidental fly control resulting from the residual DDT spraying program undoubtedly has been one of the major factors in the ready acceptance and the success of the spraying program. It is possible that we should expect an eventual extension of this activity to provide control of all insects having public health significance.

Such a program is under consideration now. It would involve entire premise treatment; the spraying of all structures in which mosquitoes rest, such as barns, chicken coops, stables, sheds, in addition to home interiors, porches and privies. Undoubtedly it would be more acceptable than the present program which is directed specifically against those mosquitoes which are most likely to be malaria vectors. Because of the excellent results of our present program thus far, however, there is considerable doubt that under present conditions the additional expense of entire premise spraying against *quadrimaculatus* transmitted malaria is warranted. Nevertheless, it readily is admitted that such spraying might be desirable since the hazard of malaria transmission would be still further reduced and also might accomplish our aim in a shorter period of time. In addition, the increase in the degree of fly control achieved would be significant and would lead to a wider acceptance of the program.

Consideration has also been given to the value of spraying back and under surfaces of furniture. Preliminary results, as might be expected, indicate more rapid and perhaps more complete knockdown of adult mosquitoes. This modification of the DDT residual spray technique, however, like entire premise spraying, would also result in higher labor costs, especially by reason of the likelihood that furniture finishes may be marred in the process and require refinishing.

Although the rate of DDT application has in most States been 200 milligrams per square foot of sprayed surface there has been some variation among the States, with rates of 100 and even 300 milligrams of DDT per square foot having been used. The higher application rate has been used, particularly in some small areas, to determine the effectiveness of a single spray application for an entire season. A comparison of the effectiveness of these variations in the program is making it possible to determine which variations will lead to more economical operation. A considerable saving may be possible in labor costs if areas using a single spray application are shown to have had adequate protection by this variation of the program.

During the past 3 years the residual DDT spray operations have been expanded to the extent that they are now substantially covering the areas in the United States in which malaria has been a significant problem. Most States are applying residual DDT spray to the home of any confirmed case of malaria. Usually a blood slide confirmation of the case is required if the home to be sprayed is outside of the areas preapproved for malaria control operations. The incidence of malaria has continued to decrease in the areas treated with DDT and is now at the lowest point since records have been kept (figure 2).

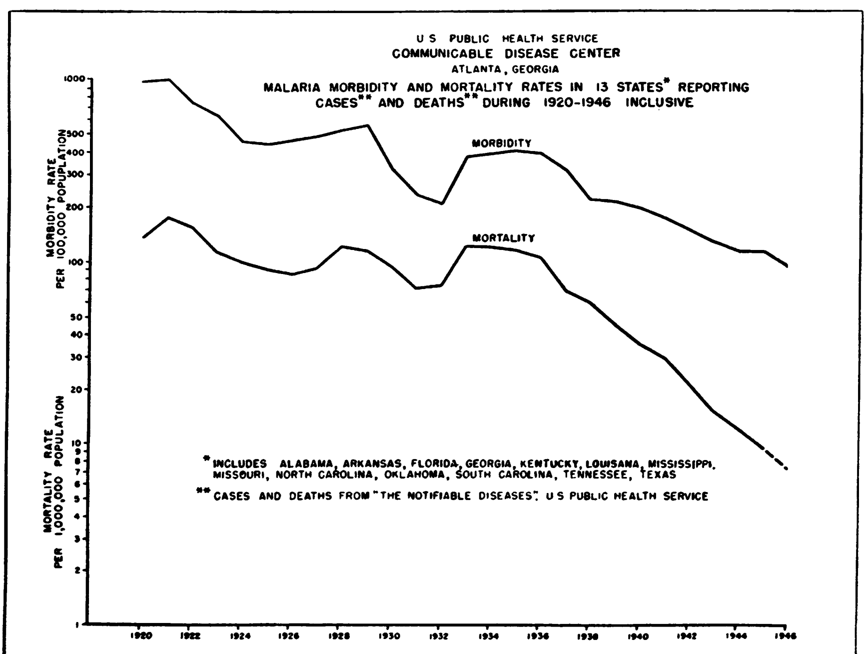

FIGURE 2.

By a close coordination of the malaria control operations of the Public Health Service with State and local health department activities, by a continual striving for economies in operation, and by an increasing participation by State and local areas in the cost of operations, it has been possible to give more nearly complete coverage of the area in which malaria has been a problem in the recent past. Continuation of these activities for a reasonable period should help reduce malaria to the point where it will no longer constitute a significant public health problem in the United States. The method of operation has been such that the impetus should keep the work going despite eventual reduction in Federal participation. Finally, the pattern has been established in State and local health departments for the institution of programs for the control of other insects having public health significance.

REFERENCES

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(*2*) Link, Vernon B.: A preliminary report on malaria control by DDT residual spraying. J. Nat. Malaria Soc. **6**: 124 (June 1947).

DENTAL EFFECTS OF COMMUNITY WATERS ACCIDENTALLY FLUORINATED FOR NINETEEN YEARS [1]

II. Differences in the Extent of Caries Reduction among the different Types of Permanent Teeth

By Henry Klein [2]

In preceding reports it was shown that children, born and reared in a New Jersey area, and who drink waters naturally containing from 1.3 to 2.2 parts per million of fluoride have, as a group, a lower than usual prevalence of dental caries experience (*1*) (*2*). However, the children are not protected all to the same extent. Those who have the least amount of caries experience have parents showing smaller than average amounts of experience with dental disease while the children who have the most caries experience (in spite of their residence in a fluoride environment) are the ones whose parents have had more than average amounts of such experience. Hence a powerful familial factor in dental caries susceptibility (*3*) is evident even in an area where fluoride is available in the community water supplies (*4*). It follows therefore, that variation exists among different children in their response to the caries-inhibitory effects of fluoride waters. Certain children are protected more, others less, and this variation is associated, among other factors, with familial susceptibility (*5*).

[1] From the Division of Public Health Methods, U. S. Public Health Service.
[2] Dental Public Health Administrator; at present on leave of absence as Dental Advisor, European Health Program, American-Joint Distribution Committee.

It has been demonstrated also that there exists among the different kinds of teeth (incisors, canines, premolars, and molars) different degrees of what might be termed, characteristic susceptibility to dental decay (*6*). Hence, the molars are most frequently attacked by caries while the canines are the least often involved. To what extent are these typical or expected susceptibilities of the different teeth (determined in non-fluoride areas) influenced or affected by fluoride exposure? Are all the teeth protected to the same extent or are some teeth protected more than others?

Analysis of this, and related questions, reveals that the various morphological types of teeth in the permanent dentition are indeed affected differently by exposure to fluoride. Certain teeth, particularly those located in the anterior of the mouth, are protected most while the molars, which are placed most posterior in the mouth, are protected least.

FINDINGS

The study to be reported here is based on examination of nearly 2,000 children residing in New Jersey and more than 6,000 children of Hagerstown, Md. Of the total of New Jersey children ranging in age from 5 to 19 years, 874 were born and reared in a fluoride area (lifetime residents), 725 moved into the fluoride area at various ages subsequent to birth in places outside the fluoride areas (migrants) and 340 children were lifetime residents of the non-fluoride area (table 1).

TABLE 1.—*Number of white children (both sexes) examined*

Item specified	Age (years)															
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	All
Fluoride:																
Lifetime	71	73	97	84	83	65	53	51	60	53	61	63	39	15	6	874
Migrants	21	57	52	56	48	53	72	50	59	73	65	49	43	21	6	725
Nonfluoride:																
Hagerstown (migrants and lifetime)	----	327	403	487	493	529	531	596	565	695	651	445	355	148	32	6,257
Williamstown-Clayton (lifetime)	10	28	30	43	41	24	21	26	32	23	27	15	15	5	----	340

Each child was examined under good light with mirror and explorer. The number of DMF teeth [3] per 100 children of particular ages for each of the pairs of the seven kinds of teeth in the mandible and maxilla (excluding the third molars) are shown in table 2 for lifetime residents and for migrants in the fluoride area. For comparison corresponding DMF rates of children of the same ages are given in the same table for two nonfluoride areas: Hagerstown, Maryland, and Williamstown and Clayton, New Jersey.

[3] The symbol "DMF" first introduced by the author in the year 1937 (*7*) and now widely used indicates decayed, missing and filled permanent teeth.

Dr. John F. Cody, dental officer, Public Health Service, made all the examinations reported; both those in Hagerstown, Md. and those in New Jersey.

Williamstown and Clayton were originally selected as the comparison areas (nonfluoride). However, as shown in table 2 and elsewhere (*8*), the Williamstown-Clayton children have excessively high DMF rates and therefore cannot be considered as representative of a nonfluoride area especially since evidence is available (*8*) to suggest that the Williamstown-Clayton waters contain principles which may accelerate caries attack. However, the DMF rates for Hagerstown children agree rather closely with those obtained for San Francisco (*9*) and New York City children (*10*). Hence, the Hagerstown DMF rates may be tentatively accepted as representative of nonfluoride areas and are used here for comparison with the fluoride area in New Jersey.

TABLE 2.—*Number of DMF teeth per 100 white children (both sexes), by age groups*

Item specified	Age	Maxillary teeth left and right sides							Mandibular teeth left and right sides							All [1]
		CI	LI	C	PM_1	PM_2	M_1	M_2	CI	LI	C	PM_1	PM_2	M_1	M_2	
Fluoride: Lifetime	5–9	1.5	0	0	0	0	8.3	0	0	0	0	0	0	7.2	0	17.0
	10–14	.7	1.8	1.8	4.6	3.2	36.5	5.3	0	0	0	1.8	3.2	59.9	13.1	131.9
	15–19	7.1	8.2	2.2	10.3	16.3	68.5	39.7	.5	0	0	4.9	10.9	11.9	79.3	358.7
Migrants	5–9	0	0	0	0	0	19.2	0	0	0	0	0	.4	32.1	0	51.7
	10–14	9.1	10.4	0	6.2	6.8	96.1	13.7	1.0	.3	.3	2.0	7.5	119.5	32.6	305.5
	15–19	36.4	33.2	6.0	30.4	31.5	124.5	58.2	2.2	1.6	1.6	10.3	28.3	142.4	87.0	593.5
Nonfluoride: Hagerstown (Lifetime and migrants)	5–9	2.2	1.8	.1	.8	.4	28.4	0	.4	.2	0	.2	.6	49.6	0	84.7
	10–14	25.2	23.2	1.4	11.3	11.2	106.0	15.0	6.2	2.4	.2	2.4	9.2	139.6	33.6	386.9
	15–19	47.6	52.8	11.4	41.6	45.4	141.0	87.0	6.8	6.0	2.4	11.2	39.8	169.8	119.2	782.0
Williamstown-Clayton (lifetime)	5–9	1.3	1.3	0	1.3	1.3	64.5	0	1.3	1.3	0	.7	.7	95.4	.7	169.8
	10–14	42.1	42.9	5.6	18.3	22.2	140.5	36.5	9.5	8.7	2.4	7.1	20.6	160.3	81.0	597.7
	15–19	82.3	75.8	24.2	75.8	82.3	164.5	116.1	11.3	9.7	3.2	24.2	66.1	183.9	150.0	1,069.4

[1] Summation of the individual DMF teeth to give total DMF teeth of all kinds per 100 children of given age groups.

Lifetime exposure to fluoride.—As shown in table 2, the 5- to 9-year-old-lifetime residents of the fluoride area average about 17 DMF teeth per 100 children. The migrants of the same ages average three times as many DMF teeth while children of the same ages in Hagerstown average about five times as many more DMF teeth as do the lifetime residents of the fluoride area. Inspection of the data given in table 2, and study of figures 1 and 2, reveal that (with but a few exceptions), for each kind of tooth at each age level, the DMF rates of the migrants are lower than those of Hagerstown children, while the DMF rates of the lifetime residents are in turn lower than the corresponding rates of the migrants. The Williamstown-Clayton children have the highest DMF rates for each kind of tooth (table 2).

Equally evident is the finding that all the different kinds of teeth are not protected by the fluoride waters to the same extent. The discussion at this point will deal only with findings on 15- to 19-year-old children who are lifetime residents as compared with the findings for children of the same ages, in Hagerstown, and in Williamstown and Clayton. Hagerstown children average nearly 48 DMF upper central incisors in contrast to only 7 DMF upper central incisors among the lifetime residents of the fluoride area. This is approximately a sevenfold difference. As between the two groups, the upper lateral incisors show more than a sixfold difference, the upper canines a fivefold difference, the upper first premolars a fourfold difference and the upper second premolars a threefold difference while the amount of caries experienced in the upper molars as between the two areas, represents approximately a twofold difference for 15- to 19-year-old children.

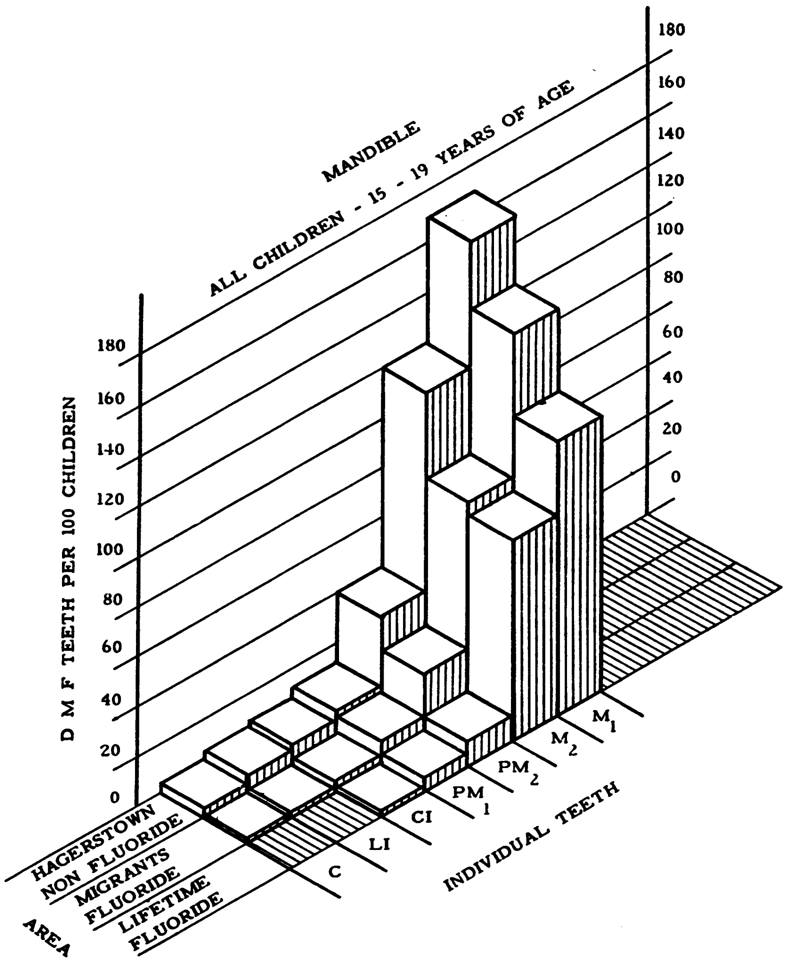

FIGURE 1.—Number of DMF teeth of specified kinds, left and right sides of the lower jaw (mandible) per 100 children of both sexes, 15–19 years of age; by specified areas and residence history. CI—central incisor, LI—lateral incisor, C—canine, PM—first premolar, PM_2—second premolar, M—first molar, M_2—second molar.

Using Williamstown-Clayton for comparison with the fluoride area it is found that the difference in the DMF rates for the upper central incisors is nearly twelvefold, for the upper laterals the difference is ninefold, for the upper canines it is twelvefold, the upper first premolar difference is sevenfold, the upper second premolar is fivefold, the upper first molar is more than twofold and the upper second molar is more than twofold for 15- to 19-year-old children.

In the lower jaw the differences between Hagerstown and the New Jersey fluoride lifetime residents 15 to 19 years of age represents a more than tenfold difference for the central and lateral incisors and canines, about a twofold difference for the first premolars, more than a threefold difference for the second premolars but less than a twofold difference for the molars.

If the comparison is made in terms of the New Jersey fluoride lifetime residents 15 to 19 years of age and children of the same ages who are lifetime residents of the nonfluoride area in New Jersey (Williams-

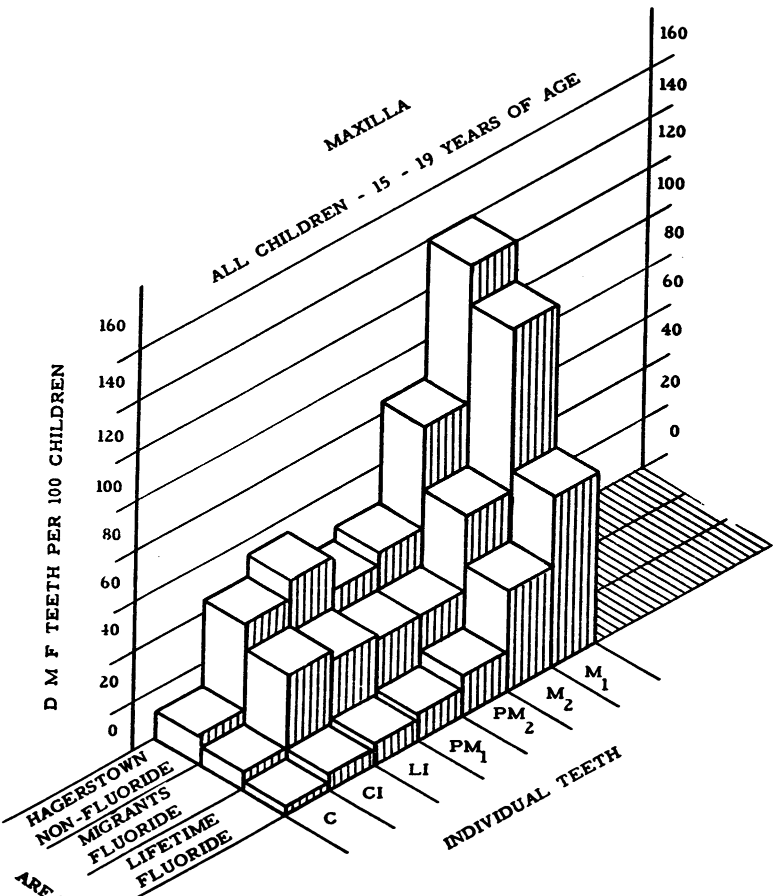

FIGURE 2.—Number of DMF teeth of specified kinds, left and right sides of the upper jaw (maxilla) per 100 children of both sexes, 15-19 years of age; by specified areas and residence history. CI—central incisor, LI—lateral incisor, C—canine, PM—first premolar, PM₂—second premolar, M—first molar, M₂—second molar.

town and Clayton), the differences between the DMF rates for the lower teeth are as follows: Central incisors, twenty-twofold; first premolars, nearly fivefold; second premolars, sixfold; first molars, 1.7 times and the second molars, 1.9 times.

From these findings, it becomes clear that exposure to fluoride waters over a life time of 15–19 years will reduce the amount of caries experience in each type of tooth; but to a different extent for the various types. The DMF experience of the molars is affected least while that of the upper and lower incisors and canines is affected most.[4] These differences between the DMF experience rates of the individual pairs of teeth as between Hagerstown and lifetime residents of the fluoride area can be expressed also as the absolute difference, and as the percent reduction below the Hagerstown rates as shown in table 3 and figure 3. Hence, among lifetime residents of the fluoride area, caries experience is reduced 100 percent below the expected rate (Hagerstown) in the lower lateral incisors and canines.[5]

TABLE 3.—*Absolute differences and percent reduction in the DMF rates for 15–19 year-old children (both sexes)*

ABSOLUTE DIFFERENCE IN DMF RATES

Item specified	Maxillary teeth left and right sides							Mandibular teeth left and right sides						
	CI	LI	C	PM_1	PM_2	M_1	M_2	CI	LI	C	PM_1	PM_2	M_1	M_2
Between Williamstown-Clayton (nonfluoride) and the fluoride areas in New Jersey	75.2	67.6	22.0	65.5	66.2	96.0	76.4	10.8	9.7	3.2	19.3	55.2	73.0	70.7
Between Hagerstown and the fluoride areas in New Jersey	40.5	44.6	9.2	31.3	29.1	72.5	47.3	6.3	6.0	2.4	6.3	28.9	58.9	39.9
PERCENT REDUCTION IN DMF RATES														
Between Williamstown-Clayton (nonfluoride) and the fluoride areas in New Jersey	91.4	89.2	90.9	86.4	80.4	58.4	65.8	95.6	100.0	100.0	79.8	83.5	39.7	47.1
Between Hagerstown and the fluoride areas in New Jersey	85.1	84.5	80.7	75.2	64.1	51.4	54.3	92.6	100.0	100.0	56.2	72.6	34.7	33.5

There is a nearly 93-percent reduction for the lower central incisors, and approximately an 85-percent reduction for the upper central and lateral incisors, an 80-percent reduction for the upper canines, more than a 70-percent reduction for the upper first and lower second premolars, a 64-percent reduction for the upper first premolars. The smallest reduction below the Hagerstown rate is shown by the lower first and second molars in which about a 33-percent reduction is achieved by a lifetime exposure in the fluoride area. The percentage reduction in the DMF rates of the lifetime residents in the fluoride versus the nonfluoride areas of New Jersey are also shown in table 3.

[4] Observations on DMF experience in the upper anterior teeth have been reported by other workers (*11*) (*12*).

[5] It is necessary to point out here that, where the reduction in the number of DMF teeth is 100 percent, this fact does not indicate an absolute protective power of fluoride waters but rather reflects sampling fluctuations due to a relatively small number of cases.

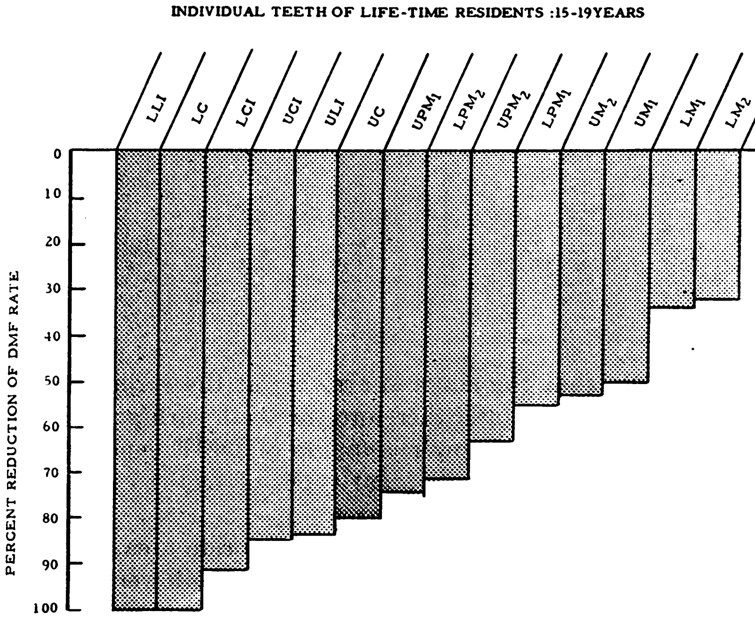

FIGURE 3.—Percent reduction below corresponding rates for Hagerstown children in number of DMF teeth of specified kinds, left and right sides of the upper and lower jaws (maxilla and mandible) per 100 children of both sexes, 15–19 years of age, lifetime residents of a fluoride area of New Jersey. LLI—lower lateral incisor, LC—lower canine, LCI—lower central incisor, UCI—upper central incisor, ULI—upper lateral incisor, UC—upper canine, UPM—upper first premolar, LPM_2—lower second premolar, UPM_2—upper second premolar, LPM—lower first premolar, UM_2—upper second molar, UM_1—upper first molar, LM—lower first molar, LM_2—lower second molar.

Various durations of exposure to fluoride.—Analyses of DMF findings on migrants exposed in a fluoride area may be viewed as providing information from which some of the effects of artificial fluorination may be anticipated. Migrants establishing residence in a fluoride area and consuming the waters containing fluoride may be considered perhaps as the equivalent of persons residing in a non-fluoride area but to whom subsequently fluoride exposure is provided by artificial fluorination of their water supplies.

As shown previously, the teeth of migrants are protected against caries by the fluoride waters. It has also been shown that the extent to which caries incidence among migrants is depressed is, among others variables, a function of (*a*) their age at time of arrival in the area and (*b*) the length of time they stay in the area (*1*) (*8*).

The question at this point in the discussion deals more specifically with the effect of duration of exposure in a fluoride area on the caries experience of the individual types of teeth among the migrants. Material bearing on that question is shown in table 4 and in figures 4 and 5.

From these data, it becomes evident that among children migrating to and establishing residence within a fluoride area of New Jersey, certain teeth are protected against caries attack more than are other

Table 4.—*Number of migrants and number of DMF teeth per 100 children (both sexes) and the duration of exposure in a fluoride area of New Jersey*

Age (years)	Exposure (years)	Number persons	Maxillary teeth left and right sides							Mandibular teeth left and right sides						
			CI	LI	C	PM_1	PM_2	M_1	M_2	CI	LI	C	PM_1	PM_2	M_1	M_2
5-9	0-4	175	0	0	0	0	0	21.7	0	0	0	0	0	0.6	35.4	0
	5-9	59	0	0	0	0	0	11.9	0	0	0	0	0	0	22.0	0
10-14	0-4	136	14.0	16.9	0	8.8	8.1	123.5	17.6	2.2	.7	.7	1.5	10.3	148.5	41.2
	5-9	118	5.1	4.2	0	4.2	5.9	83.9	11.0	0	0	0	0	4.2	103.4	26.3
	10-14	53	5.7	7.5	0	3.8	5.7	52.8	5.7	0	0	0	7.5	7.5	81.1	24.5
15-19	0-4	45	51.1	48.9	11.1	40.0	51.1	128.9	71.1	2.2	0	0	20.0	55.6	148.9	108.9
	5-9	67	46.3	38.8	9.0	34.3	25.4	147.8	61.2	1.5	1.5	3.0	6.0	28.4	155.2	91.0
	10-14	58	22.4	22.4	0	22.4	29.3	113.8	56.9	3.4	3.4	1.7	10.3	13.8	139.7	77.6
	15-19	14	0	0	0	14.3	7.1	42.9	7.1	0	0	0	0	0	71.4	35.7

teeth. It is clear that the children arriving at the earliest ages and exposed the longest time (and therefore the teeth earliest and longest exposed) have significantly lower amounts of DMF experience than do the children (and their individual types of teeth) most recently arrived and shortest exposed in the area.

As was true of life-time residents in the fluoride area, so with the migrants, caries experience is least retarded in the lower molar teeth

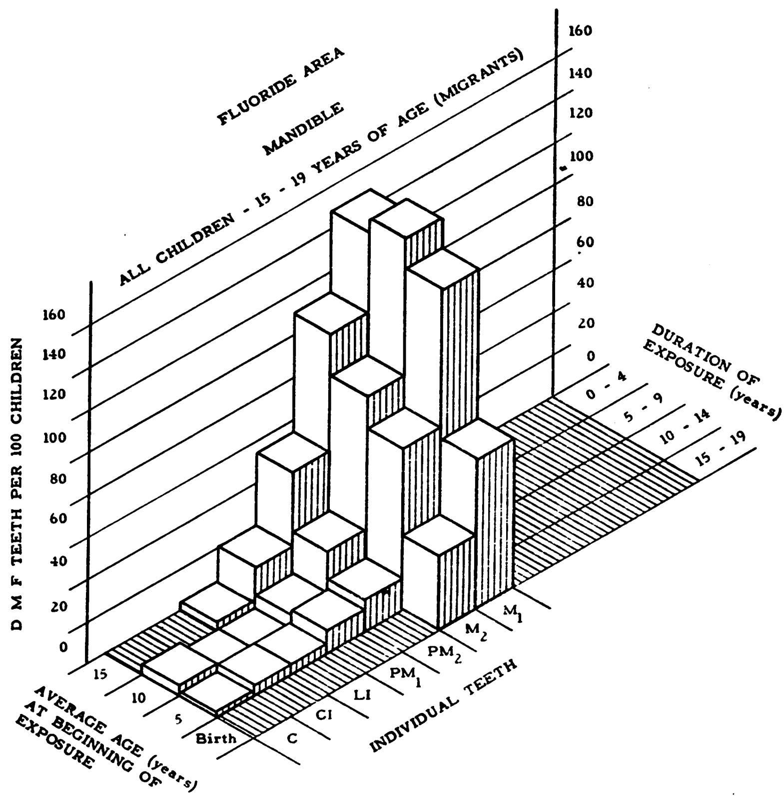

Figure 4.—Number of DMF teeth of specified kinds, left and right sides of the lower jaw (mandible) per 100 children of both sexes, 15-19 years of age; by duration of exposure in a fluoride area of New Jersey. CI—central incisor, LI—lateral incisor, C—canine, PM—first premolar, PM_2—second premolar, M—first molar, M_2—second molar.

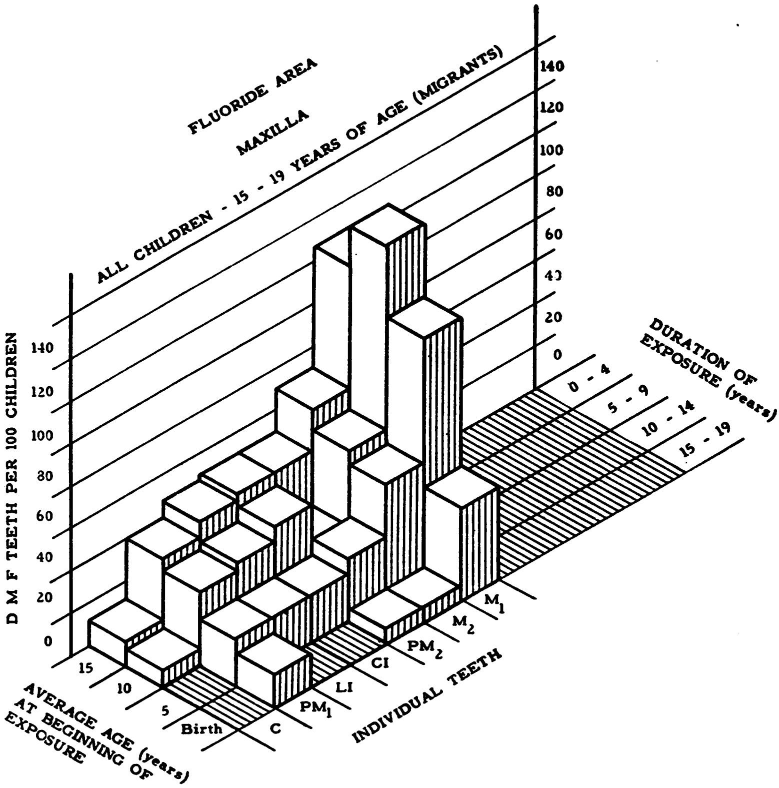

FIGURE 5.—Number of DMF teeth of specified kinds, left and right sides of the upper jaw (maxilla) per 100 children of both sexes, 15–19 years of age; by duration of exposure in a fluoride area of New Jersey. CI—central incisor, LI—lateral incisor, C—canine, PM—first premolar, PM_2—second premolar, M—first molar, M_2—second molar.

by exposure in the fluoride area, while the upper and lower anterior teeth are most protected. The extent to which caries experience is reduced in the different teeth is determined more or less quantitatively by duration of exposure and age at first arrival in the area (figs. 4 and 5). Computations show that as between the longest and shortest exposed among the migrants, caries experience is reduced 100 percent in the upper and lower anterior teeth (incisors and canines), approximately 86 percent in the upper first premolars, about 66 percent in the upper first molars and a little more than 50 percent in the lower first molars.

The values derived here for the percentage reduction in the DMF rates of the different teeth should not be accepted as firmly established predictable values. As shown in the present report, the percentage reduction values are based on Hagerstown DMF rates which are accepted only tentatively as representative of nonfluoride areas. Accordingly, the data presented here are meant only to serve as illustrations of the finding that fluoride exposure does not protect all

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the different teeth to the same extent, but rather provides a greater effect on anterior teeth than on teeth located more posterior in the mouth.

COMMENT

It is now generally accepted that children born and reared in an area where they consume waters containing 1 to 2 parts per million of naturally occurring fluoride have, as a group, a lower prevalence of caries experience than children born and reared in a nonfluoride area such as Hagerstown, Md. Furthermore, children not born in a fluoride area, but migrating and establishing residence therein are also protected against caries attack; but to an extent which is determined more or less quantitatively by age at time of arrival, and the length of time they are resident in the fluoride area (*1*) (*8*).

The depressant effect of fluorides on caries may be approximately of equal potential for all the different types of teeth. However, because of the different gradients in the characteristic or expected caries susceptibilities of the different teeth, the resultant effect may be a variation in the percent reduction of caries among the different teeth, such as described above for the New Jersey children. Consideration of the differences in caries reduction among the different teeth leads to the view that the differential effects are perhaps related to basic differences in the characteristic susceptibilities of the different teeth. By this speculation, it would follow that the tooth most protected by exposure to fluoride would be that tooth having the strongest natural resistance to caries attack; the tooth least protected would be the tooth having the strongest natural tendency to be attacked by caries. The findings described here suggest such an explanation. Analyses designed to identify the relationship between tooth-specific caries susceptibility and the caries-inhibitory effect of fluoride will be given in a subsequent report.

From a practical point of view, the findings direct attention to the pertinent observation that even after prenatal exposure and a postnatal residence of 15–19 years in a fluoride environment, caries attack is reduced only by about a third of normal expectation in the lower molar teeth of lifetime residents. Although this is a significant reduction, particularly from the point of view of the total need for dental service in the population, it is necessary to recognize that approximately two-thirds of the treatment problem for caries still arises among molars in the fluoride area; a phenomenon which probably explains why practicing dentists in that area did not, previous to the present study, independently consider that the teeth of their patients were uniquely different from those of other children in the United States.

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DIPHTHERIA EPIDEMIC IN UTAH IN 1947 [1]

By Alton A. Jenkins, M. D., *Director, Division of Epidemiology*

During 1947 there was a diphtheria epidemic in Utah with 117 resident cases, including 11 deaths. While that number is small, it is the largest number of cases of diphtheria in any 1 year during the past 10 years (table 1). The yearly average for the 5-year period 1941–45 is 16 cases and 1 death. From 1937 to the present epidemic the number of cases of diphtheria decreased rapidly.

Table 1.—*Diphtheria cases in Utah by years*

Year	Cases	Deaths	Year	Cases	Deaths
1937	305	7	1943	14	0
1938	101	6	1944	0	0
1939	30	5	1945	17	0
1940	26	0	1946	16	3
1941	35	1	1947	117	11
1942	13	3			

Several unusual events connected with this epidemic, such as the isolation of the minimus strain of *Corynebacterium diphtheriae*, the localization of the epidemic, the large number of cases among school children and older adults, and a fairly large percentage of all cases being caused by the minimus strain of *C. diphtheriae*, warrants a discussion of the epidemic at this time.

[1] From the Utah State Department of Health.

STRAINS OF *C. DIPHTHERIAE* ISOLATED FROM CASES

For a good many years now, the incidence of diphtheria in Utah has been practically at a minimum and during the past several years no bull-neck diphtheria cases have been reported to the State Department of Health. However, relatively early in the 1947 diphtheria epidemic, two bull-neck cases were seen and the gravis strain of *C. diphtheriae* was isolated in each instance. It may be of passing interest to mention that one of the bull-neck cases was a school boy 6 years of age who was immunized against diphtheria 1 year prior to the onset of his illness with two injections of an alum precipitated diphtheria toxoid administered about 1 month apart. This case had a fatal termination. This child's grandmother, age 64 and living in the same household, was the other case. She recovered from the infection.

Our Division of Public Health Laboratories started determining the strain of the diphtheria organism on each culture received during the month of August 1947, and has continued that program to the present time.

On November 20, 1947, the minimus strain of *C. diphtheriae* was first isolated in Utah. Since then this strain has been frequently isolated from cultures obtained from cases, contacts, and other groups. However, the minimus strain of *C. diphtheriae* was isolated previously by C. Howe Eller and Martin Frobisher, Jr. (*1*) of Baltimore in 1944.

During the month of December 1947, a case of diphtheria caused by the minimus strain of *C. diphtheriae* was reported in a high school student. Subsequently, throat cultures were obtained from 72 apparently healthy students from the same high school and the minimus strain was isolated from 5 of that number.

In 93 of the 117 diphtheria cases reported in 1947, the strain of the organism was determined. Table 2 shows the number of cases and the percent for each strain.

TABLE 2.—*Cases of diphtheria by strains of* C. diphtheriae

Strain	Number of cases	Percent
Mitis	69	74.19
Minimus	17	18.28
Gravis	6	6.45
Intermedius	1	1.08
Total	93	100

The first minimus diphtheria case was reported from Uintah County, the patient being an Indian from the Uintah-Ouray Indian Reservation in eastern Utah. By race, eight of the cases were among Indians and only nine among the white population of the State, which far exceeds the Indian population.

LOCALIZATION OF EPIDEMIC

During the first 10 months of 1947, only a few sporadic cases of diphtheria occurred in the State and they were reported from several different counties.

During the latter part of October, November, and the first part of December, diphtheria cases increased rather rapidly and reached a peak during the week of December 5, when 15 cases were reported.[1] Sixty-seven, or 57 percent, of all cases occurred in Uintah County. This county has a total population of 10,200 (including Indians) which amounts to only 1.6 percent of the total population of the State of Utah (635,000).

AGE GROUPS

There were 25 cases in the 5–9 year age group and 25 cases in the 10–14 age group. These two groups account for almost 50 percent of the total number of cases. On the other hand, 73 percent of all cases in which the age was given (100) occurred in children under 15 years of age and 27 percent over 15 years of age. Six or 35.3 percent of the minimus cases occurred in the age group 0–14 years and a similar number and percentage between 15 and 29 years of age.

Table 3 shows the frequency of the cases among the various age groups. It is interesting to note the several cases in the older age groups and the large number of cases among school children in the 5–14 age group.

TABLE 3.—*Diphtheria cases by age groups*

Age groups	Number of cases	Age groups	Number of cas
0–4	23	35–39	3
5–9	25	40–50	3
10–14	25	51–60	2
15–19	4	61–70	3
20–24	2		
25–29	5	Total	100
30–34	5		

DIPHTHERIA CASES CAUSED BY MINIMUS STRAIN OF *C. DIPHTHERIAE*

Of the 93 diphtheria cases in which the strain of the organism was determined, 17 cases, or 18.28 percent, were caused by the minimus strain of *C. diphtheriae*. Ten of the 17 cases were males and seven females.

It has been frequently pointed out in the literature that the incidence of diphtheria in older children and adults has been increasing over a period of years (*2*) and our figures in Utah this year substantiate those findings.

[1] By week of onset.

NUMBER OF DIPHTHERIA CASES PREVIOUSLY IMMUNIZED

Previous writers, including Eller and Frobisher (*1*), have pointed out the increasing frequency of the occurrence of diphtheria among those previously immunized. Thirty-six, or 30.77 percent, of all cases of diphtheria during this epidemic gave a previous history of being immunized against diphtheria. This information has been obtained from diphtheria case reports sent to the State Department of Health by the attending physicians.

Table 4 shows the immunization status of all cases and by strain for the 93 cases studied.

It is interesting to note that 10 of the 17 minimus cases were previously immunized against diphtheria and 5 of the 10 were immunized during 1946 and 1947. These numbers are small and therefore must be considered in that light.

By weeks of onset the minimus cases reached a peak twice, once during the week of November 21 and again during the week of December 5, when, in both instances, four cases were reported.

TABLE 4.—*Number of cases previously immunized*

Strain	Number of cases	Number immunized	Percent
Mitis cases	69	24	34.78
Minimus cases [1]	17	10	59.00
Gravis cases	6	1	16.67
Intermedius cases	1	0	0
Total	93	35	37.63
All cases	117	36	30.77

[1] 5 of the 10 cases were immunized during 1946 and 1947.

CASE FATALITY RATE

Complete mortality reports are not yet available for 1947, but so far there have been no deaths due to a minimus infection. Up to the present time, 11 diphtheria deaths have been reported which gives a diphtheria case fatality rate of 9.40 percent for the epidemic, which is a considerable increase over the 6.25 percent median case fatality rate for the 5-year period 1941 to 1945. Until complete mortality reports are in, it will be impossible to determine what effect, if any, the cases caused by the minimus strain of *C. diphtheriae* have had on the high fatality rate for the year.

SUMMARY

1. In 1947 there were 117 cases of diphtheria in Utah.
2. Sporadic cases were reported from various areas throughout the State during the first 10 months, but the great majority of cases occurred during late October, November, and the first part of December. Fifty-seven percent of all cases occurred in Uintah County located in the eastern part of Utah.

3. The minimus strain of *C. diphtheriae* was isolated for the first time in Utah on November 20, 1947.
4. Of all cases, 30.77 percent gave a previous history of immunization against diphtheria and 59 percent of all minimus diphtheria cases gave a history of previous immunization.
5. Twenty-seven percent of all cases in which the age was given occurred in the age group of 15 years and over.
6. Mortality statistics are not yet complete for 1947, but on the basis of provisional figures now available, the case fatality rate in this epidemic was 9.40 percent as compared with 6.25 percent which is the yearly median rate for the 5-year period, 1941 to 1945.

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APPEARANCE OF "MINIMUS" TYPE DIPHTHERIA IN UTAH [1]

By Ted. W. Galbraith, R. S. Fraser, and E. H. Bramhall

During 1947 the number of cases of diphtheria reported in the State of Utah has shown a manifold increase. Recent laboratory isolations have outstripped the number of reported cases markedly. Therefore, this paper will deal especially with those made since November 20, 1947, as on that date a type of diphtheria bacillus new to us was first isolated and identified.

This laboratory follows the procedures usually employed in identifying *Corynebacterium diphtheriae*, i. e., Loeffler's slants, methylene blue and Gram stains, tellurite plates for purifications, pure culture studies of the reactions on various carbohydrate media, and guinea pig inoculations. Until this fall the tellurite medium was made up of bacto-tellurite blood solution and bacto-dextrose proteose #3 agar. This medium was not entirely satisfactory and a modification was evolved which yielded a greater percentage of isolations and gave colonial characteristics which aided in differentiating between the gravis, mitis and intermedius types of *C. diphtheriae*. These were the only types encountered until November 20, 1947, when a new type of colony was first seen. This colony was very small and would have been overlooked except for our routine use of a stereoscopic microscope at magnifications of 9× and 18×, using reflected light.

Subcultures from these colonies in dextrose broth failed to produce acid within 7 days. Maltose, lactose, and sucrose broth cultures also remained alkaline. Intracutaneous inoculation of guinea pigs (*1*)

[1] From the Division of Laboratories, Utah State Department of Health, Salt Lake City, Utah.

revealed that these organisms were of low virulence for that animal, producing only slight induration and but little erythema.

These characteristics led to the belief that this small colony type must be the minimus type described by Eller and Frobisher (*2*), Frobisher et al. (*3*), and Frobisher (*4*) in 1945 and 1946. Although there has yet been no opportunity to compare our strains with those of Dr. Frobisher, the characteristics of the organisms we isolated seem to compare very closely to his criteria for recognition of the "minimus" type.

The following are the criteria we are using for naming a given strain "minimus" type.

1. On our modified tellurite medium, colonies are very small, 0.2–0.3 mm. in diameter.
2. On the above medium, young colonies are effuse, with erose to lobulate margins, grey in color and dull in appearance.
3. Older colonies on this medium are effuse but with a slightly raised circular ridge about one-third way from the periphery surrounding a crater-like depression.
4. Stained smears from Loeffler's slants show the organism to be typically short, somewhat dumb-bell shaped, generally solid staining but sometimes barred but with no metachromatic granules observed.
5. No acid was produced in dextrose broth in 72 hours. Some strains may ferment dextrose after prolonged incubation or several transfers. Maltose, lactose, and sucrose are not fermented.
6. This organism is relatively avirulent as determined by intracutaneous inoculation of guinea pigs, producing only slight induration and erythema (Fraser method).

Since November 20, diphtheria bacilli of all types have been isolated from 73 individuals. Of these, 39, or 53.3 percent, were of the minimus type and came from 14 separate communities. The clinical picture in patients from whom minimus strains have been isolated ranged from apparently normal to severe diphtheric infection including peripheral paralysis. A few cases have exhibited regional adenopathy, but not to the extent of being called "bull neck," and no deaths attributable to the minimus type have as yet been reported.

DISCUSSION

The fact that minimus strains were not recognized until November 20, 1947 does not prove that we had not dealt with them prior to that time. Indeed, in view of the fact that only this fall did we modify our tellurite medium so that type differentiation became possible, it seems likely that we had failed to identify this organism on many previous occasions. On the Difco medium, minimus colonies show no darkening and give little or no hint as to their true nature. The morphological picture is not typical of *Corynebacterium hoffmanni* but the usual fermentation pattern is that of Hoffmann's bacillus and the relative avirulence to guinea pigs would cause the unsuspecting bacteriologist to classify the organisms as Hoffmann's or a diphtheroid.

If the above is true, and we believe it is, there must be a great deal of diphtheria missed from the laboratory standpoint, and this may account for some of the discrepancies between the laboratory and the clinician. If this organism is about to come into prominence, it appears desirable that bacteriologists should routinely employ a tellurite medium capable of assisting in the differentiation of the various types of *C. diphtheriae*. That this organism is probably very widely spread appears probable, as Frobisher (*4*) speaks of receiving four such strains from Leeds in 1936. He reports finding the minimus type in Baltimore in 1944, and we have found it in Utah in 1947.

CONCLUSIONS

Diphtheria increased in the State of Utah during the year 1947. *C. diphtheriae*, minimus type, was recognized a few weeks after the Division of Laboratories modified its tellurite medium so that type differentiation of the diphtheria bacillus was facilitated. The fact that this organism is capable of producing severe diphtheria in human beings, coupled with identification difficulties, presents a problem to public health laboratory workers which can be solved only by using one of the tellurite media capable of type differentiation.

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DEATHS DURING WEEK ENDED APR. 3, 1948

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

	Week ended Apr. 3, 1948	Corresponding week, 1947
Data for 91 large cities of the United States:		
Total deaths	9,616	10,093
Median for 3 prior years	9,034	
Total deaths, first 14 weeks of year	141,442	140,341
Deaths under 1 year of age	685	787
Median for 3 prior years	600	
Deaths under 1 year of age, first 14 weeks of year	9,620	11,236
Data from industrial insurance companies:		
Policies in force	71,109,393	67,321,203
Number of death claims	12,329	11,429
Death claims per 1,000 policies in force, annual rate	9.1	8.9
Death claims per 1,000 policies, first 14 weeks of year, annual rate	10.2	9.9

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 APRIL 10, 1948

Summary

Of the total of 37 cases of poliomyelitis reported for the current week Texas reported 9 (last week 5), New York and California 4 each, and Ohio and Iowa 3 each. No other State reported more than 2 cases. While the current total is above the corresponding figure for prior years (5-year median 22), and twice that for last week (18, the lowest weekly total recorded since May 1944), it is only 4 cases above the figure for the next earlier week. The total for the past 3 years (since the average date of seasonal low incidence) is 88, as compared with 77 for the same period last year, the latter number being the 5-year median for the period.

Of the current week's total of 2,702 cases of influenza (last week 3,658, 5-year median 2,148), only 3 States, all showing declines, reported more than 187 cases (Virginia 287, South Carolina 449, and Texas 1,104). The total for the year to date is 124,010, as compared with 242,601 for the same period last year and a 5-year median of 177,855.

For the current week, 2 cases of anthrax were reported (1 each in New York and New Jersey), 3 cases of smallpox (2 in Kansas and 1 in North Carolina), and 1 case of leprosy was reported in Texas.

For the year to date, figures above the corresponding medians have been reported for amebic and undefined dysentery (bacillary dysentery cases 3,516, 5-year median 3,991); Rocky Mountain spotted fever (6 cases to date, 5-year median 4); and undulant fever (1,269 cases to date, 3-year median 1,184).

A total of 9,663 deaths from all causes was recorded for the week in 92 large cities in the United States, as compared with 9,683 last week, 10,122 and 9,063, respectively, for the corresponding weeks of 1947 and 1946, and a 3-year (1945–47) median of 9,112. The cumulative total (15 weeks ended April 10) is 151,869, as compared with 151,189 for the corresponding period last year. Infant deaths for the week in the same cities totaled 713, as compared with 676 last week and a 3-year median of 596. The total to date is 10,391, as compared with 12,025 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended Apr. 10, 1948, and comparison with corresponding week of 1947 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 1943-47	Week ended—		Median 1943-47	Week ended—		Median 1943-47	Week ended—		Median 1943-47
	Apr. 10, 1948	Apr. 5, 1947		Apr. 10, 1948	Apr. 5, 1947		Apr. 10, 1948	Apr. 5, 1947		Apr. 10, 1948	Apr. 5, 1947	
NEW ENGLAND												
Maine	0	0	0	1	1	1	19	172	26	0	0	1
New Hampshire	0	0	0	------	1	------	------	37	26	0	0	0
Vermont	0	0	0	------	38	------	3	253	212	0	0	0
Massachusetts	2	13	6	------	------	------	1,332	390	643	0	3	5
Rhode Island	0	1	0	2	1	1	9	162	14	1	1	1
Connecticut	0	0	1	6	5	3	190	462	341	1	0	3
MIDDLE ATLANTIC												
New York	8	23	21	[1] 4	[1] 14	[1] 5	2,242	448	2,756	7	8	27
New Jersey	2	11	5	7	17	6	1,316	326	1,411	4	3	9
Pennsylvania	8	0	12	([2])	([2])	[2] 2	1,570	------	860	5	0	12
EAST NORTH CENTRAL												
Ohio	6	8	8	3	61	11	1,477	744	744	7	6	9
Indiana	6	11	7	------	21	19	782	57	226	0	1	4
Illinois	0	5	5	------	100	18	2,346	72	932	9	3	17
Michigan [3]	4	4	4	2	332	3	1,287	49	848	3	2	6
Wisconsin	2	9	3	16	282	40	1,953	382	1,627	1	2	4
WEST NORTH CENTRAL												
Minnesota	1	3	3	------	2	2	499	95	95	1	1	1
Iowa	0	0	2	------	3,842	------	755	251	235	2	1	2
Missouri	5	6	3	7	33	2	383	28	314	1	2	4
North Dakota	1	0	0	1	82	5	30	16	16	0	1	1
South Dakota	0	0	0	1	------	------	64	7	26	0	0	1
Nebraska	1	3	2	9	152	7	187	12	146	0	0	0
Kansas	1	5	4	1	1,634	4	55	10	566	0	3	5
SOUTH ATLANTIC												
Delaware	0	1	1	------	3	------	79	------	7	0	0	1
Maryland [3]	2	3	6	4	52	8	122	33	91	3	4	4
District of Columbia	0	0	0	------	------	------	123	18	57	2	0	1
Virginia	3	8	8	287	4,153	246	160	383	559	4	4	5
West Virginia	6	1	2	85	3,832	5	428	26	79	2	3	3
North Carolina	1	12	5	------	------	------	10	145	202	2	3	7
South Carolina	4	14	7	449	3,009	376	128	195	207	0	1	5
Georgia	4	2	2	22	502	15	63	212	177	0	0	2
Florida	0	7	3	3	142	2	183	89	89	1	2	4
EAST SOUTH CENTRAL												
Kentucky	6	11	6	------	------	3	128	17	112	2	3	4
Tennessee	5	7	5	70	1,276	57	260	106	252	4	1	5
Alabama	5	4	6	187	2,061	107	65	293	190	3	1	7
Mississippi [3]	1	4	4	12	435	------	75	25	------	2	1	5
WEST SOUTH CENTRAL												
Arkansas	1	5	4	98	3,167	50	156	103	153	0	0	2
Louisiana	0	8	3	7	19	18	4	47	170	1	3	3
Oklahoma	2	4	3	86	2,282	137	68	2	66	0	0	2
Texas	11	24	31	1,104	7,144	931	2,333	227	1,150	7	10	16
MOUNTAIN												
Montana	13	1	1	16	183	6	64	105	105	1	0	0
Idaho	0	0	1	10	184	2	25	6	28	0	0	0
Wyoming	0	0	0	------	16	1	166	12	58	0	0	0
Colorado	9	5	5	17	171	21	485	88	293	0	2	2
New Mexico	3	0	0	4	4	2	34	64	23	0	0	0
Arizona	1	4	4	108	196	83	275	47	60	0	0	0
Utah [3]	2	0	0	3	220	13	48	19	212	0	1	1
Nevada	0	0	0	------	------	------	------	------	1	0	0	0
PACIFIC												
Washington	4	4	3	1	52	2	440	53	349	0	1	3
Oregon	1	0	2	35	173	20	68	29	123	0	0	1
California	4	10	17	34	45	45	3,353	185	1,057	5	6	11
Total	135	241	219	2,702	35,939	2,148	25,842	6,502	25,377	81	83	191
14 weeks	2,860	4,061	4,001	124,010	242,601	177,855	225,048	75,568	235,785	1,200	1,200	3,423
Seasonal low week [4]	(27th) July 5-11			(30th) July 26-Aug. 1			(35th) Aug. 30-Sept. 5			(37th) Sept. 13-19		
Total since low	9,218	11,567	12,644	167,568	275,576	275,576	259,994	98,455	273,798	1,982	2,172	5,875

[1] New York City only. [2] Philadelphia only.
[3] Period ended earlier than Saturday.
[4] 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 Apr. 10, 1948, and comparison with corresponding week of 1947 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever (streptococcal infections)			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1943–47	Week ended—		Median 1943–47	Week ended—		Median 1943–47	Week ended—		Median 1943–47
	Apr. 10, 1948	Apr. 5, 1947		Apr. 10, 1948	Apr. 5, 1947		Apr. 10, 1948	Apr. 5, 1947		Apr. 10, 1948 [5]	Apr. 5, 1947	
NEW ENGLAND												
Maine	0	0	0	16	19	24	0	0	0	0	0	0
New Hampshire	0	0	0	0	15	8	0	0	0	0	0	0
Vermont	0	0	0	3	7	11	0	0	0	3	0	0
Massachusetts	0	0	0	170	103	383	0	0	0	4	2	1
Rhode Island	0	0	0	5	15	21	0	0	0	0	0	0
Connecticut	0	0	0	33	53	82	0	0	0	0	1	1
MIDDLE ATLANTIC												
New York	4	3	3	183	402	667	0	0	0	1	2	3
New Jersey	0	0	0	72	130	176	0	0	0	0	1	1
Pennsylvania	2	1	1	265	0	482	0	0	0	0	0	2
EAST NORTH CENTRAL												
Ohio	3	0	0	279	381	409	0	2	0	1	2	2
Indiana	0	0	0	162	190	190	0	0	0	1	1	1
Illinois	0	3	2	144	111	180	0	0	0	3	2	2
Michigan [3]	2	1	0	144	140	159	0	0	0	1	1	2
Wisconsin	0	0	0	57	64	245	0	0	0	0	1	0
WEST NORTH CENTRAL												
Minnesota	0	0	0	50	30	76	0	0	0	0	0	0
Iowa	3	0	0	34	41	56	0	0	0	0	0	0
Missouri	0	1	0	25	51	80	0	0	0	4	1	1
North Dakota	0	0	0	4	10	10	0	0	0	0	0	0
South Dakota	0	0	0	6	13	17	0	0	0	0	0	0
Nebraska	2	0	0	12	30	53	0	0	0	3	0	0
Kansas	0	0	0	22	55	80	2	0	0	0	1	0
SOUTH ATLANTIC												
Delaware	0	0	0	5	9	9	0	0	0	0	0	0
Maryland [3]	0	0	0	22	33	174	0	0	0	0	0	0
District of Columbia	0	0	0	5	18	26	0	0	0	0	0	0
Virginia	1	0	0	24	34	97	0	0	0	2	2	2
West Virginia	0	0	0	25	13	27	0	0	0	1	2	2
North Carolina	2	0	0	11	30	41	1	0	0	3	0	0
South Carolina	1	0	1	3	7	5	0	0	0	0	0	0
Georgia	0	1	1	9	10	10	0	0	0	6	1	4
Florida	2	1	1	5	5	5	0	0	0	5	3	3
EAST SOUTH CENTRAL												
Kentucky	1	0	1	22	26	43	0	1	0	0	1	1
Tennessee	0	0	0	26	47	35	0	0	0	1	0	1
Alabama	0	0	1	4	28	17	0	0	0	1	1	1
Mississippi [3]	1	0	1	2	7	6	0	0	0	1	1	1
WEST SOUTH CENTRAL												
Arkansas	0	1	0	3	4	7	0	0	0	2	0	0
Louisiana	0	2	1	4	7	9	0	0	0	4	3	3
Oklahoma	0	0	0	10	2	14	0	0	0	3	0	0
Texas	9	3	2	44	27	76	0	0	0	10	3	6
MOUNTAIN												
Montana	0	0	0	10	7	12	0	0	0	0	0	0
Idaho	0	0	0	13	12	38	0	0	0	0	0	0
Wyoming	0	0	0	13	2	15	0	0	0	0	0	0
Colorado	0	0	0	21	46	50	0	0	0	0	0	0
New Mexico	0	0	0	4	6	6	0	0	0	0	0	1
Arizona	0	1	0	1	6	14	0	0	0	1	0	1
Utah [3]	0	0	0	13	21	35	0	0	0	0	0	0
Nevada	0	0	0	1	1	1	0	0	0	0	0	0
PACIFIC												
Washington	0	0	0	61	26	45	0	0	0	0	0	0
Oregon	0	0	0	14	21	30	0	0	0	1	1	2
California	4	4	2	77	139	180	0	0	0	3	6	4
Total	37	22	22	2,028	2,354	4,246	3	3	13	65	39	58
14 weeks	436	689	485	32,881	38,223	55,284	36	68	150	631	609	743
Seasonal low week [4]	(11th) Mar. 15–21			(32d) Aug. 9–15			(35th) Aug. 30–Sept. 5			(11th) Mar 15–21		
Total since low	88	77	77	55,420	64,909	93,605	57	118	233	158	124	158

[3] Period ended earlier than Saturday.
[4] Dates between which the approximate low week ends. The specific date will vary from year to year.
[5] Including paratyphoid fever reported separately, as follows: Vermont 2, Massachusetts 3 (salmonella infection), Michigan 1, North Carolina 1, Georgia 6, Alabama 1.

Telegraphic morbidity reports from State health officers for the week ended Apr. 10, 1948, and comparison with corresponding week of 1947 and 5-year median

Division and State	Whooping cough: Week ended— Apr. 10, 1948	Whooping cough: Week ended— Apr. 5, 1947	Whooping cough: Median 1943–47	Week ended Apr. 10, 1948: Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
NEW ENGLAND											
Maine	25	34	34								
New Hampshire		3	3								
Vermont	49	9	19								9
Massachusetts	48	109	109		4						1
Rhode Island		15	15								
Connecticut	14	74	44				1				2
MIDDLE ATLANTIC											
New York	93	166	166	9	6		1			2	2
New Jersey	65	102	102	4							
Pennsylvania	75		97						1		4
EAST NORTH CENTRAL											
Ohio	71	128	128	1							4
Indiana	58	15	10								
Illinois	55	55	55	7			4				11
Michigan [3]	59	189	101	1							4
Wisconsin	79	126	97								3
WEST NORTH CENTRAL											
Minnesota	14	6	7								3
Iowa	6	6	6				1				
Missouri	21	13	17			1					3
North Dakota	3		2								
South Dakota	9	1	1								2
Nebraska	5	12	7	3	1						2
Kansas	45	9	31								
SOUTH ATLANTIC											
Delaware	4	2	2								
Maryland [3]	9	58	58								
District of Columbia	5	5	6								
Virginia	43	63	63			97				1	1
West Virginia	23	25	34								
North Carolina	43	45	151	1							
South Carolina	110	67	67	1	4				1		1
Georgia	15	13	16						2		2
Florida	18	51	19							1	1
EAST SOUTH CENTRAL											
Kentucky	15	18	18		3						
Tennessee	21	28	28	7		1			1		7
Alabama	22	103	52	1					1	2	4
Mississippi [3]	3	15		7					4	1	2
WEST SOUTH CENTRAL											
Arkansas	37	19	9	2		2			1		
Louisiana	4	8	3	2							
Oklahoma	58	9	10	1					3		
Texas	481	418	253	5	220	43			5	6	6
MOUNTAIN											
Montana	9	2	7								
Idaho	9	13	2								
Wyoming			1								
Colorado	59	28	28								5
New Mexico	30	3	7								
Arizona	54	23	24			13					
Utah [3]	14	9	25								3
Nevada		1									
PACIFIC											
Washington	29	56	34								2
Oregon	20	19	19	8							2
California	90	176	176	9	5						
Total	2,019	2,349	2,349	69	243	157	7	0	19	13	86
Same week: 1947	2,349			28	158	176	1	0	21	17	93
Median, 1943–47	2,349			28	221	69	6	0	10	42	[6] 89
14 weeks: 1948	30,757			897	3,516	2,756	126	6	254	200	1,269
1947	35,487			655	4,425	3,025	93	12	494	578	1,465
Median, 1943–47	34,076			405	3,991	1,455	112	4	256	654	[6] 1,184

[3] Period ended earlier than Saturday.

[6] 3-year median 1945–47.

Anthrax: New York 1; New Jersey 1. *Leprosy:* Texas 1.

Alaska: Chickenpox 1, influenza 16, measles 1, whooping cough 8, pneumonia 10, scarlet fever 1, septic sore throat 1.

Territory of Hawaii: Rabies 0, bacillary dysentery 2, measles 2, scarlet fever 1, whooping cough 18, typhoid fever 1.

WEEKLY REPORTS FROM CITIES*

City reports for week ended Apr. 3, 1948

This table lists the reports from 89 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	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	1	0	3	0	1	0	0	6
New Hampshire:												
Concord	0	0	------	0	------	0	0	0	0	0	0	------
Massachusetts:												
Boston	5	0	------	1	333	2	12	0	34	0	1	10
Fall River	0	0	------	0	13	0	1	0	7	0	0	14
Springfield	0	0	------	0	1	0	1	0	0	0	0	1
Worcester	0	0	------	0	1	0	5	0	6	0	0	7
Rhode Island:												
Providence	0	0	------	0	------	0	1	0	16	0	0	------
Connecticut:												
Bridgeport	0	0	------	0	------	0	0	0	3	0	0	------
Hartford	0	0	------	0	3	0	0	0	2	0	0	------
New Haven	0	0	------	0	1	0	0	0	0	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	19	0	1	0	1	0	0	7
New York	7	0	7	0	1,699	3	72	0	102	0	2	36
Rochester	0	0	------	0	1	0	1	0	11	0	0	3
Syracuse	0	0	------	0	8	1	4	0	7	0	0	5
New Jersey:												
Camden	0	0	------	0	57	0	3	0	2	0	0	------
Newark	0	0	2	0	152	0	5	0	9	0	0	12
Trenton	0	0	2	0	4	0	1	0	1	0	0	------
Pennsylvania:												
Philadelphia	3	1	4	1	714	2	31	0	36	0	0	15
Pittsburgh	0	0	2	1	1	1	9	0	25	0	0	11
Reading	0	0	------	0	7	0	2	0	7	0	0	1
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	0	43	2	13	0	14	0	0	3
Cleveland	1	0	------	0	22	0	8	0	25	0	0	8
Columbus	1	0	------	0	102	0	2	0	0	0	0	------
Indiana:												
Fort Wayne	0	0	------	0	19	0	1	0	5	0	0	------
Indianapolis	1	0	------	0	176	0	2	0	9	0	0	11
South Bend	0	0	------	0	2	0	0	0	0	0	0	------
Terre Haute	1	0	------	0	3	0	2	0	1	0	0	1
Illinois:												
Chicago	1	0	2	0	961	2	27	0	48	0	0	22
Springfield	0	0	------	0	74	0	4	0	7	0	0	------
Michigan:												
Detroit	2	0	1	2	298	1	11	0	49	0	0	19
Flint	0	0	------	0	------	0	3	0	3	0	0	------
Grand Rapids	0	0	------	1	85	0	2	0	2	0	0	4
Wisconsin:												
Kenosha	0	0	------	0	95	0	0	0	0	0	0	------
Milwaukee	0	0	------	0	39	1	2	0	19	0	0	5
Racine	0	0	------	0	194	1	1	1	2	0	0	1
Superior	0	0	------	0	266	0	0	0	0	0	0	------
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	146	0	1	0	3	0	0	------
Minneapolis	1	0	------	0	63	1	0	0	7	0	0	9
St. Paul	0	0	------	0	59	0	1	0	0	0	0	1
Missouri:												
Kansas City	0	0	------	1	43	0	6	0	2	0	1	5
St. Joseph	0	0	------	0	------	0	0	0	0	0	0	------
St. Louis	3	1	1	0	269	2	13	0	13	0	0	3

*In some instances the figures include nonresident cases.

City reports for week ended Apr. 3, 1948—Continued

Division, State, and city	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	0	0	------	0	135	0	3	0	0	0	0	1
Kansas:												
Topeka	0	0	------	0	24	0	2	0	1	0	0	2
Wichita	0	0	------	0	2	0	2	0	1	0	0	9
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	34	0	2	0	0	0	0	------
Maryland:												
Baltimore	3	0	1	1	49	0	5	0	4	0	0	6
Cumberland	0	0	------	0	------	0	0	0	1	0	0	------
Frederick	0	0	------	0	------	0	0	0	0	0	0	------
District of Columbia:												
Washington	0	0	------	0	122	0	10	0	5	0	1	1
Virginia:												
Lynchburg	1	0	------	0	------	0	1	0	0	0	0	3
Richmond	0	0	------	0	------	0	4	0	1	0	0	3
Roanoke	0	0	------	0	2	0	0	0	2	0	0	------
West Virginia:												
Charleston	0	0	------	0	3	0	2	0	0	0	0	------
Wheeling	0	0	------	0	19	0	3	0	1	0	0	------
North Carolina:												
Raleigh	0	0	------	0	------	0	3	0	1	0	0	------
Wilmington	0	0	------	0	------	0	0	0	0	0	0	4
Winston-Salem	0	0	------	0	------	0	2	0	0	0	0	------
South Carolina:												
Charleston	1	0	63	0	4	0	3	0	1	0	0	6
Georgia:												
Atlanta	1	0	------	0	------	1	1	0	6	0	0	1
Brunswick	0	0	------	0	------	0	0	0	0	0	0	------
Savannah	0	0	3	3	1	0	0	0	0	0	0	------
Florida:												
Tampa	2	0	1	1	19	0	2	0	0	0	0	1
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	191	0	6	0	1	0	0	2
Nashville	1	0	------	0	1	1	2	0	2	0	0	2
Alabama:												
Birmingham	0	0	1	0	1	0	1	0	0	0	0	------
Mobile	0	0	------	0	------	1	0	0	1	0	0	------
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	5	0	4	0	2	0	1	0	0	------
Louisiana:												
New Orleans	0	0	5	0	4	0	1	0	3	0	0	6
Shreveport	0	0	------	0	------	0	6	0	0	0	0	------
Oklahoma:												
Oklahoma City	0	0	35	0	2	0	2	0	0	0	0	3
Texas:												
Dallas	0	0	------	0	142	0	6	0	7	0	0	6
Galveston	0	0	------	0	1	0	0	0	0	0	0	------
Houston	1	0	------	0	3	0	6	1	4	0	0	5
San Antonio	0	0	------	0	7	0	10	0	2	0	0	1
MOUNTAIN												
Montana:												
Billings	0	0	------	0	------	0	2	0	1	0	0	------
Great Falls	0	0	------	0	6	0	1	1	1	0	0	1
Helena	0	0	------	0	------	0	0	0	0	0	0	------
Missoula	0	0	------	0	------	0	0	0	1	0	0	------
Idaho:												
Boise	0	0	------		------	0	1	0	0	0	0	------
Colorado:												
Denver	1	0	1	0	566	0	0	0	5	0	0	12
Pueblo	0	0	------	0	19	0	1	0	2	0	0	3
Utah:												
Salt Lake City	0	0	------	0	17	0	2	0	1	0	0	1

City reports for week ended Apr. 3, 1948—Continued

Division, State, and city	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	1	0	------	0	49	0	5	0	8	0	0	10
Spokane	0	0	------	0	3	0	2	0	0	0	0	1
Tacoma	0	0	------	0	38	0	0	0	5	0	0	------
California:												
Los Angeles	3	0	12	1	290	0	6	0	20	0	0	7
Sacramento	0	0	------	0	7	0	1	0	1	0	0	4
San Francisco	4	0	4	1	264	0	8	0	9	0	0	4
Total	46	2	152	14	8,003	22	366	2	578	0	5	326
Corresponding week, 1947 [1]	73	------	955	63	1,547	------	553	------	797	0	12	559
Average 1943-47 [1]	70	------	238	[2] 33	[3] 7,056	------	[2] 420	------	1,601	1	11	635

[1] Exclusive of Oklahoma City.
[2] 3-year average, 1945–47.
[3] 5-year median, 1943–47.

Rates (annual basis) per 100,000 population, by geographic groups, for the 89 cities in the preceding table (latest available estimated population, 34,593,800)

	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	Tyhpoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	13.1	0.0	0.0	2.6	927	5.3	60.4	0.0	181	0.0	2.6	102
Middle Atlantic	4.6	0.5	7.9	0.9	1,232	3.2	59.7	0.0	93	0.0	0.9	42
East North Central	4.9	0.0	1.8	1.8	1,447	4.3	47.4	0.6	112	0.0	0.0	45
West North Central	8.0	2.0	2.0	2.0	1,490	6.0	56.3	0.0	54	0.0	2.0	60
South Atlantic	13.1	0.0	111.1	8.2	414	1.6	62.1	0.0	36	0.0	1.6	41
East South Central	5.9	0.0	5.9	0.0	1,139	11.8	53.1	0.0	24	0.0	0.0	24
West South Central	2.5	0.0	114.3	0.0	414	0.0	83.8	0.0	43	0.0	0.0	53
Mountain	7.9	0.0	7.9	0.0	4,829	0.0	55.6	7.9	87	0.0	0.0	135
Pacific	12.7	0.0	25.3	3.2	1,030	0.0	33.2	0.0	68	0.0	0.0	41
Total	7.0	0.3	23.0	2.1	1,210	3.3	55.3	0.3	87	0.0	0.8	49

Dysentery, amebic.—Cases: New York, 10; St. Louis, 2; New Orleans, 3; Los Angeles, 3; San Francisco, 1.
Dysentery, bacillary.—Cases: New York, 1; Los Angeles, 1.
Dysentery, unspecified.—Cases: Baltimore, 1; San Antonio, 3.
Tularemia.—Cases: Memphis, 2.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—Two rats found dead in the Hamakua District, Island of Hawaii, T. H., one on January 9, 1948, the other on January 21, 1948, have proved positive for plague.

FOREIGN REPORTS

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From consular reports, international health organizations, medical officers of the Public Health Service, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January-December 1947	January-February 1948	March 1948—week ended— 6	13	20	27
AFRICA							
Egypt	C	21,920	1				
Alexandria	C	253					
Cairo	C	140	1				
Ismailiya	C	111					
Port Said	C	37					
Suez	C	26					
ASIA							
Arabia: Amirate of Dubay	C	1					
Burma	C	263	1				
Moulmein	C	66					
Rangoon	C	4					
China:							
Anhwei Province	C	6					
Chekiang Province	C	288					
Pingyang	C	150					
Wenchow	C	1					
Formosa (Island of)	C	14					
Fukien Province	C	16					
Foochow	C	2					
Honan Province	C	936					
Hunan Province	C	16					
Kiangsi Province	C	102					
Kiangsu Province	C	738					
Chinkiang	C	8					
Shanghai	C	53					
Tsingkiang	C	9					
Kwangtung Province	C	6					
Hong Kong	C	6					
Suiyuan Province	C	52					
Szechwan Province	C	5					
India	C	151,248	18,243				
Ahmadabad	C	27	1			1	
Allahabad	C	70					
Alleppey	C		1				
Bombay	C	114					
Calcutta	C	4,716	1,326	158	208	182	306
Cawnpore	C	332			3	3	8
Chittagong (See also Pakistan)	C	32					
Cocanada	C		2				
Cuddalore	C	4	12				
Kilakarai	C		7	3	3		
Lahore (See also Pakistan)	C	2,173					
Lucknow	C	288	6	2	1		
Madras	C	27	7	3	3	4	1
Nagpur	C	38				1	
Negapatam	C	19	13	1	1	1	
New Delhi	C	35					
Tuticorin	C	13	14	1	1		
Vizagapatam	C	5					
India (French):							
Chandernagor	C	39	12				
Karikal	C	155	284				
Pondicherry	C	42	26				
India (Portuguese)	C	51					

CHOLERA—Continued

Place		January-December 1947	January-February 1948	March 1948—week ended— 6	13	20	27
ASIA—continued							
Indochina (French):							
Annam	C	37					
Cambodia	C	1,173	611		[1] 76	[2] 56	
Cochinchina	C	541	54		[1] 41	[2] 38	
Bien Hoa	C	7					
Chaudoc	C	5	1				
Cholon	C	33	1				
Giadinh	C	11					
Longxuyen	C	36			[1] 5		
Mytho	C	6	4				
Rachgia	C	22	11		[1] 32		
Saigon	C	136	11	2	2	2	6
Vinh-long	C	8					
Laos	C	55	[3] 12				
Tonkin	C	67					
Pakistan	C		5,436				
Chittagong	C		5	1	6	4	
Lahore	C				13	2	
Siam (Thailand)	C	3,451	24		1		
Bangkok	C	789					
Straits Settlements: Penang	C	[4] 1					
Syria	C	45	3				

[1] For the period Mar. 1-10, 1948.
[2] For the period Mar. 11-20, 1948.
[3] Deaths.
[4] Imported.

PLAGUE

[C indicates cases; D, deaths]

Place		January-December 1947	January-February 1948	March 1948—week ended— 6	13	20	27
AFRICA							
Belgian Congo	C	[1] 21	2			1	
British East Africa:							
Kenya	C	60	8	3	1		
Tanganyika	C		11	40			
Uganda	C	1					
Egypt: Alexandria	C	24					
Madagascar	C	[2] 276	107	[3] 11	1		
Mananjary	C	8					
Tananarive	C	48			1		
Rhodesia, Northern	C		5	8			
Union of South Africa	C	[4] 42	[5] 28	3	[5] 4		
ASIA							
Burma	C	1,362	296	30	35	26	15
Bassein	C	[6] 2					
Mandalay	C	17	5	1			
Rangoon	C	19	[7] 10		1		
China:							
Chekiang Province	C	150					
Wenchow	C	14		1			
Formosa (Island of)	C	1					
Fukien Province	C	779	22				
Amoy	C	13					
Foochow	C	49					
Kiangsi Province	C	454	8				
Nanchang	C	46					
Kiangsu Province	C	30					
Shanghai	C	28					
Kwangtung Province	C	164					
Yunnan Province	C	[8] 791	20				
India	C	75,647	8,432				
Indochina (French):							
Annam	C	89	106		[3] 10	[9] 11	
Cambodia	C	1					
Cochinchina	C	31	9		[3] 1		
Laos State	C	2				[9] 1	[10] 1
Java	C	39	4				
Korea	C	22					
Manchuria	D	[11] 100					
Palestine	C	43					
Siam (Thailand)	C	67	88	3	1		1
Syria	C	6					
Turkey: Akcakale	C	19					
EUROPE							
Germany: East Prussia.[12]							
Portugal: Azores	C	6	4				
Turkey (see Turkey in Asia).							

See footnotes at end of table.

PLAGUE—Continued

Place		January-December 1947	January-February 1948	March 1948—week ended— 6	13	20	27
NORTH AMERICA							
Canada.[13]							
SOUTH AMERICA							
Argentina:							
Buenos Aires Province	C		5				
Cordoba Province	C	1					
Santa Fe Province	C	3					
Brazil: [14]							
Alagoas State	C	2					
Bahia State	C	1					
Ceara State	C	2					
Minas Geraes State	C	7					
Parahyba State	C	4					
Pernambuco State	C	16					
Ecuador:							
Chimborazo Province	C	5	1				
Loja Province	C	22	1				
Peru:							
Ancash Department	C	1					
Huacho Department	C		1				
Lambayeque Department	C	11					
Libertad Department	C	20					
Lima Department	C	56	5				
Piura Department	C	[15] 79					
OCEANIA							
Hawaii Territory: Plague-infected rats [16]		[17] 8	[17] [18] 4				

[1] Includes 5 cases of pneumonic plague.
[2] Includes 78 cases of pneumonic plague.
[3] For the period Mar. 1–10, 1948.
[4] Includes 4 cases of pneumonic plague.
[5] Includes 2 cases of pneumonic plague.
[6] Imported.
[7] Includes 2 imported cases.
[8] Includes 12 cases of pneumonic plague.
[9] For the period Mar. 11–20, 1948.
[10] For the period Mar. 21–31, 1948.
[11] Period not specified.
[12] During the month of June 1947, an outbreak of plague with high mortality occurred in Königsberg, East Prussia, Germany.
[13] For the period July 5 to Sept. 20, 1947, 6 lots of plague-infected fleas from squirrels were reported in Alberta and Saskatchewan Provinces, Canada.
[14] In addition, 7 cases of plague were reported in Brazil for the period Jan. 1 to May 31, 1947, specific localities not being given.
[15] In addition 82 cases with 65 deaths in Ayabaca Province and 58 cases with 48 deaths in Huancabamba Province, all unconfirmed, were reported for the period September 1946 to March 1947.
[16] Plague infection was also reported in Hawaii Territory as follows: On Jan. 9, 1947, in a pool of 31 rats, on Mar. 20, 1947, in a pool of 32 fleas collected from 59 rats; under date of Feb. 27, 1948, in a mass inoculation of tissue from 19 rats.
[17] Re-allocation of dates.
[18] Includes 1 mouse.

SMALLPOX

[C indicates cases; P, present]

AFRICA							
Algeria	C	287	72		[1] 12		
Angola	C	282					
Basutoland	C	1	3				
Bechuanaland	C	38					
Belgian Congo	C	[2] 2,605	[2] 387	[2] 101	[2] 46		[2] 13
British East Africa:							
Kenya	C	471	48				
Nyasaland	C	2,198	831	56	80	75	
Tanganyika	C	2,806	82				
Uganda	C	614	81				
Cameroon (French)	C	139			[1] 1		
Dahomey	C	161	76		[1] 54	[3] 31	[4] 21
Egypt	C	496	82	39	29		
Ethiopia	C	32					
French Equatorial Africa	C	12	10				
French Guinea	C	427	48		[1] 5		
French West Africa: Haute-Volta	C		245		[1] 6	[3] 22	
Gambia	C	6	15	1			

See footnotes at end of table.

SMALLPOX—Continued

Place		January-December 1947	January-February 1948	March 1948—week ended—6	13	20	27
AFRICA—continued							
Gold Coast	C	969	283				
Ivory Coast	C	2,913	164		[1] 13	[3] 10	
Liberia	C	37					
Libya	C	2,312	54	4	4		3
Mauritania	C	23	1				
Morocco (French)	C	61	11				
Morocco (Int. Zone)	C	12					
Morocco (Spanish)	C	30					
Mozambique	C	28	17				
Nigeria	C	5,238	316				
Niger Territory	C	2,685	147		[1] 16		
Portuguese Guinea	C	3					
Rhodesia:							
Northern	C	171	103	3			
Southern	C	557					
Senegal	C	17	3				
Sierra Leone	C	422	74				
Sudan (Anglo-Egyptian)	C	[2] 940	[2] 291	[2] 19	[2] 22	[2] 24	
Sudan (French)	C	395	8		[1] 2	[3] 1	
Swaziland	C	11					
Togo (French)	C	88	12		[1] 11	[3] 4	
Tunisia	C	1,192	399		[1] 29		
Union of South Africa	C	538	P	P	P		
ASIA							
Arabia	C	1					
British North Borneo	C		1				
Burma	C	2,880	682	131	137	149	
Ceylon	C	1			[5] 6		
China	C	3,442	1,436	89	153	186	110
India	C	53,800	15,108	2,215	2,178	1,163	385
India (French)	C	10					
India (Portuguese)	C	12					
Indochina (French)	C	4,905	1,024		[1] 138	[3] 247	
Iran	C	408	287	17		15	
Iraq	C	67	174	52	43	44	37
Japan	C	391	6				
Korea	C	125					
Lebanon	C	22	57				
Malay States (Federated)	C	4,160	264				
Manchuria	C	8	30				
Netherlands East Indies	C	4					
Pakistan	C		4,240				
Palestine	C		8				
Portuguese Timor	C	32					
Siam (Thailand)	C	1,369	304	11	32		7
Straits Settlements	C	99					
Syria	C	27	15			14	
Turkey. (See Turkey in Europe.)							
EUROPE							
Belgium	C	[2] 23					
France	C	48			[1] 2		
Germany	C	12					
Great Britain: England and Wales	C	77					
Greece	C	10					
Irish Free State	C	[5] 1					
Italy	C	68					
Luxemburg	C	[2] 3					
Portugal	C	220	26	2			
Spain	C	32	17				
Canary Islands	C		9				
Switzerland	C	[5] 1					
Turkey	C	3					
NORTH AMERICA							
Guatemala	C	12	1				
Honduras	C	2					
Mexico	C	1,133	138				
Panama (Republic)	C	[5] 1					
SOUTH AMERICA							
Argentina	C	46					
Bolivia	C		16				
Brazil	C	571					
Chile	C				3		
Colombia	C	3,989	1,018		39	33	
Ecuador	C	[3] 3,003	[2] 1,083				

See footnotes at end of table.

SMALLPOX—Continued

Place		January-December 1947	January-February 1948	March 1948—week ended— 6	13	20	27
SOUTH AMERICA—continued							
Paraguay	C	[2] 1,797	[2] 49				
Peru	C	457				[6] 20	
Uruguay	C	[2] 319					
Venezuela	C	[2] 5,365	[2] 886	[2] 173	[2] 73	[2] 25	

[1] For the period Mar. 1–10, 1948.
[2] Includes alastrim.
[3] For the period Mar. 11–20, 1948.
[4] For the period Mar. 21–31, 1948.
[5] Imported.
[6] For the period Mar. 1–15, 1948.

TYPHUS FEVER[7]

[C indicates cases; P, present]

Place		January-December 1947	January-February 1948	March 1948—week ended— 6	13	20	27
AFRICA							
Algeria	C	257	54		[1] 16		
Basutoland	C	15	2				
Bechuanaland	C	1					
Belgian Congo	C	393	43	4	5		
British East Africa:							
Kenya [2]	C	32	11				
Uganda	C	2					
Egypt	C	138	23	3			
Eritrea	C	747	13				
Ethiopia	C	360					
French West Africa [2]	C	2					
Gold Coast	C	6					
Libya	C	333	46	9	2	6	11
Morocco (French)	C	128	22		[1] 8	[4] 10	
Morocco (International Zone)	C	27					
Morocco (Spanish)	C	88					
Nigeria [2]	C	18	2				
Rhodesia:							
Northern	C	1					
Southern	C	1					
Senegal	C	2					
Sierra Leone	C	3	[2] 1				
Sudan (Anglo-Egyptian)	C	1					
Tunisia [2]	C	694	112		[1] 39		
Union of South Africa [2]	C	443	P	P	P		
ASIA							
Arabia [2]	C	2					
Burma	C	3	5				
Ceylon	C	4					
China [2] [5]	C	105	33	1			
India	C	8					
Indochina (French)	C	79	3		[1] 1		
Iran	C	263	41	3			
Iraq	C	305	32		2	8	9
Japan	C	1,115	182		2		
Java	C	1					
Korea	C	1,261					
Malay States (Federated) [2]	C	50					
Manchuria	C	12	5				
Palestine [2]	C	238	12				
Siam (Thailand)	C	4					
Straits Settlement [2]	C	11	1	1			
Syria [2]	C	33	2	10		1	
Trans-Jordan	C	20	18	1			
Turkey (see Turkey in Europe)							
EUROPE							
Austria [2]	C	8					
Bulgaria	C	879	91	23	37		
Czechoslovakia	C	44	1	1			
France	C	4					
Germany	C	27	4				
Great Britain: Malta and Gozo [2]	C	25	7	1			
Greece [2]	C	396	35			6	6
Hungary	C	607	22	5	1	2	
Italy	C	76	9				
Sicily	C	39					
Luxemburg [2]	C	5	10	2			
Netherlands [2]	C	3	1				
Norway [2]	C	1					
Poland	C	542	53				
Portugal	C	4					

See footnotes at end of table.

TYPHUS FEVER—Continued

Place		January-December 1947	January-February 1948	March 1948—week ended—			
				6	13	20	27
EUROPE—continued							
Rumania [2]	C	34,624	12,209				
Spain	C	188					
Switzerland [3]	C	6					
Turkey	C	665	117	11	12	6	6
Yugoslavia	C	215	107	22	38	27	
NORTH AMERICA							
Costa Rica [3]	C	102	1				
Cuba [3]	C	11	4				
Guatemala	C	399	18				
Jamaica [3]	C	42	2				
Mexico	C	2,135	220	10	4		12
Nicaragua	C	2					
Panama Canal Zone	C	15	1				
Panama (Republic)	C	[6] 24					
Puerto Rico [3]	C	57	5	1	1		
Virgin Islands [3]	C	2					
SOUTH AMERICA							
Argentina [2]	C	18					
Bolivia	C			3			
Brazil	C	86	56	5	1		
Chile [2]	C	538	10	1	1		
Colombia	C	2,354	561				
Curacao [3]	C	1	4				
Ecuador [2]	C	606	92				
Peru	C	1,527					
Venezuela [2]	C	193	13		2		
OCEANIA							
Australia [3]	C	172	26	2			
Hawaii Territory [3]	C	46					

*Reports from some areas are probably murine type, while others probably include both murine and louse-borne types.

[1] For the period Mar. 1–10, 1948.

[2] Includes murine type.

[3] Murine type.

[4] For the period Mar. 11–20, 1948.

[5] Information dated Dec. 10, 1947, stated that 100 deaths from typhus fever daily had occurred in Sinkiang Province, China, and spreading in Tihwa.

[6] Includes imported cases.

YELLOW FEVER

[C indicates cases; D, deaths]

AFRICA							
Belgian Congo: Orientale Province [1]	C	1					
Ivory Coast	C				1		
Nigeria:							
Ossiomo Leper Settlement	C	[2] 1					
Lagos Island	C			[2] 1			
Sudan (French): Bamako	C	3					
SOUTH AMERICA							
Brazil:							
Bahia State	D	1					
Para State	D	1					
Colombia:							
Antioquia Department	C	[3] 8	[3] 5				
Boyaca Department	D	4	1				
Caldas Department	D	9	2				
Cundinamarca Department	D	2	7				
Intendencia of Meta	D	10	3				
North Santander Department	D	1					
Santander Department	D	29					
Tolima Department	D	3					
Peru: Huanuco Department	D	3					

[1] The case of yellow fever in Orientale Province, Belgian Congo, reported on p. 232 of the PUBLIC HEALTH REPORTS for Feb. 13, 1948, and also on p. 296 of the PUBLIC HEALTH REPORTS for Feb. 27, 1948, in the column for week ended Jan. 17, has not been confirmed.

[2] Suspected.

[3] Includes deaths used as cases.