mcwa reports

EPIDEMIOLOGICAL DATA FOR MURINE TYPHUS CONTROL ACTIVITIES

Medical Division
Office of Malaria Control in War Areas
U. S. Public Health Service
Atlanta, Georgia
June, 1945

EPIDEMIOLOGICAL DATA FOR MURINE TYPHUS CONTROL ACTIVITIES

Murine typhus fever is a disease of increasing public health importance. From figures reported to the U. S. Public Health Service the annual number of cases of typhus has increased nearly 1600% in the period from 1931 when 332 cases were reported to 1944 when 5258 cases were reported. Table I page 4 of the attached "Epidemiological Data for Murine Typhus Control Activities" illustrates three major points.

1. Typhus fever is increasing rapidly in number of cases being reported annually.

2. Typhus fever is being reported each year from additional areas which have not formerly reported cases. During the 7 year period from 1938 to 1944 the total number of counties in 9 States reporting typhus fever cases increased 52%. By years this increase was as follows: 1938 - 305, 1939 - 373, 1940 - 328, 1941 - 380, 1942 - 408, 1943 - 437, 1944 - 465. These figures are summarized in Table II page 5.

3. Typhus fever is a serious problem at present in the 9 States which report nearly all of the cases reported in the United States.

While the reporting of cases has greatly increased, it is difficult to say what portion of increment is due to better reporting and what is due to an actual increase of the disease. Regardless of what has caused the increased number of reported cases typhus fever today presents a very important public health problem.

In considering plans for intensifying and expanding typhus control activities, certain problems are encountered. Among these are (1) what areas are considered important enough to warrant control procedures and (2) what is the relative importance of the problem between the 9 States involved.

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In the five year period 1940-1944 inclusive there were 17,464 cases reported from 652 counties in the 9 States. Limitations of funds, equipment, supplies, and personnel make it necessary to consider operations initially in only those areas where the severest problem exists.

There are two approaches which can be made in delineating the problem: (1) morbidity rates, or (2) total reported cases. There is a good argument against using rates alone as the criterion, because certain urban areas though reporting large numbers of cases annually have lower rates than many rural districts. If rates alone are used for selection of areas to be worked, many rural areas with relatively high rates, but comparatively lower number of cases would have to be considered in order to fairly include the important urban areas. For instance, Fulton County, Georgia, the county in which Atlanta is located is an important area from the point of view of 275 cases reported in five years, yet it has a five year average annual rate of only 14.0 per 100,000. Table IV page 6 shows that to include Fulton County in the areas chosen the dividing line would have to be set at all counties with a rate of 10 or more. In this case it would be necessary to operate in 281 counties. This number of counties cannot be effectively worked with funds available.

On the other hand, if a criterion of total number of cases reported is used there are relatively few counties having high rates which are not included.

It has been suggested that limitations on funds, supplies, equipment, and personnel make a goal of 100 counties as a reasonable one for the first year. On this basis Table X page 10 shows what percentage of each State's problem would be under attack if these 100 counties were chosen. Table XI page 11 and Table XII page 12 show the distribution of the 652 counties respectively in regard to the percentage of the counties, the percentage of cases, and the percentage of population involved. The 6 percentages from Tables XI and XII are combined into a single Table XIII page 13 These percentages are arithmetically averaged in order to obtain an index. This index is based on the number of counties in each State which reported cases, the number of cases reported in these counties, and the population involved, both for 652 counties and for 100 counties. Thus consideration is given to each State's total problem as well as to its comparative portion of the problem as expressed by its share of the 100 counties. These counties are listed beginning on page 14.

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To any rule there are generally valid exceptions. It has occured to us that the following exceptions might be made to supplement the above mentioned method of selecting the counties to be worked, and allow States to include additional counties in their operations or to substitute counties.

1. Since the morbidity case reports are used to obtain a five year average for the years 1940-1944 it is possible to have a low average in a county because no cases were reported during 1940-1943 and yet with a sharp outbreak in 1944 it might well be advantageous to consider working in that county in spite of the low five year average. Table XIV page 17 shows 37 of these not included in the "100" counties. These counties are listed on page 18.

2. Similarly, a county which reported no cases at all in the five year period may suddenly have a sharp outbreak during the present season and properly require some form of emergency operation. Table XIV page 18 shows three of these counties so far in 1945 one of which is included in the list of 1944 counties, but none of which are included in the "100" counties. These three are listed on page 18.

3. Finally, a county may not be able to justify work on the basis of human typhus and yet a study may show a large rat population with a high rate of typhus fever and infected fleas. This type of exception would be a rare one we believe.

Epidemiological evidence offered by the State along the above and possibly along other lines will be carefully considered by the Medical Division as basis for inclusion of counties not otherwise eligible. For all practical purposes, proposed projects for the 140 counties will be considered as pre-approved by the Medical Division of MCWA.

In integrating the typhus control program into the MCWA organization it has been stated that areas involved are coterminous. Table XV page 19 illustrates this point. It shows that of the 100 counties 45 actually have MCWA control activities at the present time. Of the remaining 56 counties one is under routine inspection and 43 have some type of control in one or more adjacent counties. This makes a total of 88 counties or 88% with some type of readily accessible MCWA administrative setup in the neighborhood.

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TABLE I

MURINE TYPHUS FEVER
REPORTED CASES IN THE UNITED STATES, 1931 - 1944

Year	Total	N. C.	S. C.	Ga.	Fla.	Miss.	La.	Tex.	Tenn.	Ala.	Total Nine States Cases	Total Nine States %	Total in Remaining States*
1931	332	6	13	127	28	--	1	43	1	80	299	90.1	33
1932	955	24	24	308	42	1	17	227	2	237	882	92.4	73
1933	2,068	46	54	625	54	--	11	398	1	823	2,012	97.3	56
1934	1,372	23	38	414	35	5	18	496	--	287	1,316	95.9	56
1935	1,287	51	57	485	27	6	20	276	8	294	1,224	95.1	63
1936	1,732	33	57	815	55	15	12	327	6	369	1,689	97.5	43
1937	2,393	70	101	1,046	121	18	23	453	22	480	2,334	97.5	59
1938	2,273	81	146	1,017	75	13	27	497	24	336	2,216	97.5	57
1939	2,982	122	232	1,131	152	33	117	538	100	474	2,899	97.2	83
1940	1,845	65	132	589	111	12	118	410	36	287	1,760	95.4	85
Total 10 yr. 1931-1940	17,239	521	854	6,557	700	103	364	3,665	200	3,667	16,631	96.5	608
1941	2,749	78	105	923	196	61	194	733	47	297	2,634	95.8	115
1942	3,702	96	197	1,136	313	55	161	1,204	58	377	3,597	97.2	105
1943	4,473	157	194	1,236	317	95	222	1,439	57	637	4,354	97.3	119
1944	5,258**	238	171	1,142	483	166	283	1,729	87	871	5,170	98.9	58
Total 4 yr. 1941-1944	16,152	569	667	4,437	1,309	377	860	5,105	249	2,182	15,755	97.5	397
GRAND TOTAL	34,140	1,109	1,548	11,289	2,096	480	1,225	8,791	451	5,988	32,977	96.5	1,163
Yearly Average 1931-40	1,724	52	85	657	70	10	36	367	20	367	1,663		61
Yearly Average 1941-44	4,038	142	167	1,109	327	94	215	1,276	62	546	3,939		99

*Cases have been reported from a total of 37 states and the District of Columbia.
**The total reported to the Division of Public Health Methods was 5,337.

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TABLE II

MURINE TYPHUS FEVER

Total Number of Counties in 9 States Reporting Cases
During 7 years 1938 - 1944, Inclusive

	1938	1939	1940	1941	1942	1943	1944
Alabama	35	41	35	42	36	40	45
Florida	15	28	24	27	44	39	40
Georgia	87	95	89	94	98	104	103
Louisiana	10	29	25	36	34	37	35
Mississippi	6	13	7	26	22	25	32
North Carolina	25	39	22	24	19	26	34
South Carolina	24	32	29	28	29	36	27
Tennessee	12	6	8	8	11	16	12
Texas	91	90	89	95	115	114	137
TOTAL	305	373	328	380	408	437	465

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TABLE III

MURINE TYPHUS FEVER

Distribution of 652 Counties in 9 States Reporting Cases During The Five Year Period 1940 - 1944 : By Average Annual Morbidity rates per 100,000.

Average Annual Rate Per 100,000 Population 1940 - 1944	Number of Counties	Per Cent of Counties
100 and over	24	3.7
80 - 99	17	2.6
60 - 79	23	3.5
40 - 59	27	4.1
20 - 39	80	12.3
15 - 19	38	5.8
10 - 14	72	11.0
5 - 9	118	18.1
0.2 - 4	253	38.8
	652	99.9

TABLE IV

MURINE TYPHUS FEVER

Cumulative Distribution of 652 Counties Reporting Cases During the Five Year Period 1940 - 1944 By Average Annual Morbidity Rates Per 100,000

Average Annual Rate Per 100,000 Population "More Than"	Number of Counties	Per Cent of Counties
100	24	3.7
80	41	6.3
60	64	9.8
40	91	14.0
20	171	26.2
15	209	32.0
10	281	43.1
5	399	61.2
0.2	652	100.0

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TABLE V

MURINE TYPHUS FEVER

Distribution of Counties Reporting Cases For the Five Year Period 1940 - 44: By Number of Cases

Total Number of Typhus Cases 1940 - 1944	Number of Counties	Per Cent of Counties
100 and over	41	6.3
80 - 99	18	2.8
60 - 79	28	4.3
40 - 59	28	4.3
20 - 39	80	12.3
15 - 19	41	6.3
10 - 14	59	9.0
5 - 9	97	14.9
0.2 - 4	260	39.9
	652	100.1

TABLE VI

MURINE TYPHUS FEVER

Cumulative Distribution of Counties Reporting Cases For the Five Year Period 1940 - 1944.

Number of Typhus Cases "More Than"	Number of Counties	Per Cent of Counties
100	41	6.3
80	59	9.0
60	87	13.3
40	115	17.6
20	195	29.9
15	236	36.2
10	295	45.2
5	392	60.1
0.2	652	100.0

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TABLE VII

MURINE TYPHUS FEVER

Distribution of Counties According to Total Number Of Cases Reported 1940 - 1944

No. of States	Number of Cases Reported 1940 - 44	Number of Counties	% of 652 Counties	Number of Cases	% of 17464 Cases
9	50 or more	100	15.3%	11804	67.6%
9	45 or more	107	16.4%	12132	69.5%
9	40 or more	115	17.6%	12471	71.4%
9	35 or more	128	19.6%	12960	74.2%
9	30 or more	145	22.2%	13515	77.4%
9	25 or more	172	26.4%	14235	81.5%
9	20 or more	195	29.9%	14737	84.4%
9	15 or more	236	36.2%	15434	88.4%
9	10 or more	295	45.2%	16143	92.4%
9	5 or more	392	60.1%	16804	96.2%
9	0.2 or more	652	100.0%	17464	100.0%

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TABLE VIII

MURINE TYPHUS FEVER

Average Annual Morbidity Rates in 100 Counties Reporting 50 or More Cases During the Five Year Period 1940 - 1944

Average Annual Morbidity Rate Per 100,000 Population 1940 - 1944	Number of Counties
100 and over	22
80 - 90	13
60 - 79	14
40 - 59	13
20 - 39	21
15 - 19	5
10 - 14	9
5 - 9	3
0 - 4	0
TOTAL	100

TABLE IX

MURINE TYPHUS FEVER

Cumulative Distribution of Average Annual Morbidity Rates in 100 Counties Reporting 50 or more cases During the Five Year Period 1940-1944

Average Annual Morbidity Rate per 100,000 Population "more than"	Number of Counties
100	22
80	35
60	49
40	62
20	83
15	88
10	97
5	100

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TABLE X

MURINE TYPHUS FEVER

Distribution of Counties in 9 States Reporting Cases in the Five Year Period 1940 - 1944

STATE	Number of Cos. Reporting Typhus During 1940 - 1944	Number of Counties in Selected "100" Reporting 50 or more cases	Per Cent of Counties Reporting Typhus that are included in "100"	Number of Cases Recorded in State in 1940 - 44	Number of Cases Occurring in "100" Counties	Per Cent of Cases Occurring in "100" Counties
Alabama	61	13	21.3%	2481	2015	81.2%
Florida	56	7	12.5%	1416	972	68.6%
Georgia	132	34	25.8%	5021	3799	75.7%
Louisiana	54	2	5.7%	943	314	33.3%
Mississippi	50	1	2.0%	388	72	18.6%
North Carolina	49	4	8.2%	630	293	46.5%
South Carolina	45	2	4.4%	799	279	34.9%
Tennessee	31	1	3.2%	277	165	59.6%
Texas	174	36	20.7%	5509	3895	70.7%
Total	652	100	15.3%	17464	11804	67.6%

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TABLE XI

MURINE TYPHUS FEVER

Distribution of 652 Counties in 9 States Reporting Cases During 5 Year Period 1940 - 1944

State	Number of Counties Out of 652	% of 652 Counties	Number of Typhus Cases 1940 - 1944	% of Total Cases in 652 Counties	Population Involved	% of Population in 652 Counties
Alabama	61	9.4%	2481	14.2%	2679754	11.8%
Florida	56	8.6%	1416	8.1%	1814873	8.0%
Georgia	132	20.2%	5021	28.8%	2818473	12.5%
Louisiana	54	8.3%	943	5.4%	2190295	9.7%
Mississippi	50	7.7%	388	2.2%	1536758	6.8%
North Carolina	49	7.5%	630	3.6%	2280426	10.1%
South Carolina	45	6.9%	799	4.6%	1866233	8.2%
Tennessee	31	4.8%	277	1.6%	1661692	7.3%
Texas	174	26.7%	5509	31.5%	5763512	25.5%
Total	652	100.1%	17464*	100.0%	22612016	99.9%

* These 17464 cases in 9 States represent 97.4% of the 17923 Cases reported from 34 States and the District of Columbia. The other 459 cases or 2.6% were reported from the following Areas: Arizona 4, Arkansas 49, California 145, Colorado 1, Connecticutt 2, District of Columbia 5, Illinois 2, Indiana 4, Kansas 7, Kentucky 2, Maine 1, Maryland 15, Massachusetts 7, Michigan 2, Missouri 1, New Jersey 8, New Mexico 3, New York 103, Ohio 9, Oklahoma 14, Pennsylvania 11, Rhode Island 1, Virginia 57, Washington 1, West Virginia 4, Wisconsin 1.

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TABLE XII

MURINE TYPHUS FEVER

Distribution of 100 Counties in 9 States Reporting 50 or More Cases During the Five Year Period 1940 - 1944

State	Number of Counties out of 100	Number of Typhus Cases 1940 - 1944	% of Typhus Cases in 100 Cos.	Population Involved	% of Population in 100 Counties
Alabama	13	2015	17.1%	1054253	14.4%
Florida	7	972	8.2%	948333	13.0%
Georgia	34	3799	32.2%	1363636	18.7%
Louisiana	2	314	2.7%	551045	7.5%
Mississippi	1	72	0.6%	50899	0.7%
North Carolina	4	293	2.5%	176892	2.4%
South Carolina	2	279	2.4%	184812	2.5%
Tennessee	1	165	1.4%	257267	3.5%
Texas	36	3895	33.0%	2717464	37.2%
Total	100	11804*	100.1%	7304599	99.9%

* These 11804 cases represent 67.6% of the 17464 cases reported in the 9 states and 65.8% of the total cases (17923) reported in the U.S.A. (from 34 States and the District of Columbia).

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TABLE XIII

MURINE TYPHUS FEVER

Index of Relative Importance of Typhus Problem in 9 States Based on Reported Cases

STATE	652 Counties Reporting Typhus			100 Counties Reporting 50 or More Cases			INDEX
	% of Counties	% of cases	% of Pop.	% of Counties	% of cases	% of Pop.	
Alabama	9.4%	14.2%	11.8%	13.0%	17.1%	14.4%	13.3%
Florida	8.6%	8.1%	8.0%	7.0%	8.2%	13.0%	8.8%
Georgia	20.2%	28.8%	12.5%	54.0%	32.2%	18.7%	24.4%
Louisiana	8.3%	5.4%	9.7%	2.0%	2.7%	7.5%	5.9%
Mississippi	7.7%	2.2%	6.8%	1.0%	0.6%	0.7%	3.2%
North Carolina	7.5%	3.6%	10.1%	4.0%	2.5%	2.4%	5.0%
South Carolina	6.9%	4.6%	8.2%	2.0%	2.4%	2.5%	4.4%
Tennessee	4.8%	1.8%	7.3%	1.0%	1.4%	3.5%	3.3%
Texas	26.7%	31.5%	25.5%	36.0%	33.0%	37.2%	31.6%
	100.1%	100.0%	99.9%	100.0%	100.1%	99.9%	99.9%

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TABLE XIV

MURINE TYPHUS FEVER

Rank Order of "100" Counties According to Total Cases Reported in Five Year Period 1940 - 1944, Inclusive, Showing Present MCWA Work in County or in Adjacent Counties

A L A B A M A

COUNTY	RANK ORDER	NO. OF CASES	CONTROL	ADJACENT CONTROL
1. Houston	4	344	0	X
2. Mobile	5	277	X	-
3. Covington	13	196	0	X
4. Geneva	14	192	0	X
5. Coffee	16	188	0	X
6. Jefferson	17	167	0	X
7. Dale	20	146	0*	0
8. Pike	25	127	0	X
9. Barbour	57	82	0	X
10. Montgomery	58	82	X	-
11. Henry	59	80	0	X
12. Dallas	71	71	X	-
13. Crenshaw	79	63	0	X
		Total	3	9

*Has inspection in the county.

F L O R I D A

1. Duval	9	254	X	-
2. Dade	11	211	X	-
3. Hillsborough	15	191	X	-
4. Escambia	31	113	X	-
5. Volusia	65	75	X	-
6. Pinellas	73	67	0	X
7. Orange	86	61	0	X
		Total	5	2

G E O R G I A

1. Chatham	1	503	X	-
2. Fulton	6	275	0	X
3. Bibb	7	274	X	-
4. Appling	24	139	0	0
5. Dodge	27	118	0	X
6. Colquitt	29	114	X	-
7. Tift	32	112	0	X

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TABLE XIV (CON'T.)
MURINE TYPHUS FEVER

COUNTY	RANK ORDER	NO. OF CASES	CONTROL	ADJACENT
		(Georgia con't.)		
8. Bullock	33	112	0	X
9. Dougherty	34	111	X	-
10. Decatur	37	104	0	X
11. Mitchell	38	104	0	X
12. Grady	39	102	0	X
13. Early	42	97	0	X
14. Glynn	43	96	X	-
15. Crisp	44	96	0	X
16. Telfair	45	96	0	X
17. Terrell	47	94	X	-
18. Thomas	49	93	X	-
19. Richmond	50	92	X	-
20. Seminole	51	91	X	-
21. Sumter	52	91	0	X
22. Laurens	53	91	X	-
23. Screven	56	86	X	-
24. Ware	62	78	0	0
25. Worth	66	73	X	-
26. Coffee	67	73	0	0
27. Tattnall	72	68	0	X
28. Pierce	74	66	0	0
29. Jenkins	76	65	X	-
30. Calhoun	83	61	X	-
31. Brooks	84	61	0	X
32. Toombs	90	57	0	0
33. DeKalb	92	53	0	X
34. Burke	97	51	X	-
		Total	16	13
		L O U I S I A N A		
1. Orleans	8	255	X	-
2. Calcasieu	89	59	X	-
		Total	2	0
		M I S S I S S I P P I		
1. Harrison	70	72	X	-
		Total	1	0
		N O R T H C A R O L I N A		
1. Craven	35	110	X	-
2. New Hanover	69	72	X	-
3. Wilson	91	57	0	X
4. Sampson	94	54	0	X
		Total	2	2

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TABLE XIV (CON'T.)

MURINE TYPHUS FEVER

COUNTY	RANK ORDER	NO. OF CASES	CONTROL	ADJACENT CONTROL
		S O U T H C A R O L I N A		
1. Charleston	10	213	X	-
2. Orangeburg	75	66	X	-
		Total	2	0
		T E N N E S S E E		
1. Davidson	19	165	X	-
		Total	1	0
		T E X A S		
1. Lavaca	2	465	0	X
2.. Harris	3	417	X	-
3. Bexar	12	209	X	-
4. Webb	18	166	0	0
5. Nueces	21	144	X	-
6. Tarrant	22	142	X	-
7. Jefferson	23	141	X	-
8. Waller	26	120	0	X
9. Fayette	28	115	0	X
10. Dallas	30	114	X	-
11. Gonzales	36	107	0	0
12. Howard	40	102	0	0
13. McLennan	41	102	X	-
14. Wharton	46	96	X	-
15. Jasper	48	93	0	X
16. Erath	54	89	0	X
17. Runnels	55	87	0	0
18. Jones	60	79	0	0
19. Bee	61	78	0	0
20. San Patricio	63	76	0	X
21. Comal	64	75	0	X
22. Madison	68	72	0	X
23. Milam	77	65	0	X
24. Galveston	78	65	X	-
25. Washington	80	62	0	X
26. DeWitt	81	62	0	X
27. Cameron	82	62	X	-
28. Gaudalupe	85	61	0	X
29. Henderson	87	60	0	X
30. Wilson	88	59	0	X
31. Taylor	93	54	0	0
32. Travis	95	54	X	-
33. Victoria	96	51	X	-
34. Houston	98	51	0	X
35. Lampasas	99	50	0	X
36. Jim Wells	100	50	0	X
		Total	12	17

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TABLE XV

MURINE TYPHUS FEVER

Number of Counties Reporting an Average Annual Total of 10 or More Cases During 1940-1944 ("100" Counties) plus Counties Reporting 10 or More Cases in 1944 or 1945.

State	100 Counties	1944	1945	Total
Alabama	13	4	0	17
Florida	7	3	1	11
Georgia	34	5	0	39
Louisiana	2	2	0	4
Mississippi	1	4	1	6
North Carolina	4	3	0	7
South Carolina	2	2	0	4
Tennessee	1	1	0	2
Texas	36	13	1*	50
TOTAL	100	37	3	140

*Also reported more than 10 cases for 1944.

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Rank Order of 40 Counties Not Included in the "100" Counties, But Which Have More Than 10 Cases Reported During 1944 or 1945

	COUNTY	1944	1945	RANK ORDER 101 -
		ALABAMA		
1.	Calhoun	27		103
2.	Escambia	16		109
3.	Talladega	12		128
4.	Hale	10		136
		FLORIDA		
1.	Nassau	14		114
2.	Marion	12		125
3.	Polk		12	127
4.	Welton	10		139
		GEORGIA		
1.	Schley	16		110
2.	Dooly	13		115
3.	Peach	13		117
4.	Wayne	13		119
5.	Evans	10		135
		LOUISIANA		
1.	Acadia	15		111
2.	Saint Martin	13		118
		MISSISSIPPI		
1.	Hinds	21		106
2.	Forrest	11		130
3.	Jones	11		132
4.	Hancock		11	131
5.	Pike	10		137
		NORTH CAROLINA		
1.	Mecklenburg	14		113
2.	Forsyth	12		120
3.	Grenville	12		121
		SOUTH CAROLINA		
1.	Marion	12		126
2.	Beaufort	10		134
		TENNESSEE		
1.	Knox	12		123
		TEXAS		
1.	Lee	31		102
2.	Hidalgo	28	34	101
3.	Caldwell	23		104
4.	Orange	22		105
5.	Bastrop	19		107
6.	Brown	17		108
7.	Williamson	15		112
8.	Limestone	13		116
9.	Gray	12		122
10.	Lubbock	12		124
11.	Fisher	11		129
12.	Live Oak	11		133
13.	Smith	10		138
14.	Wilbarger	10		140

Medical Division
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Atlanta, Georgia
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TABLE XVII

MURINE TYPHUS FEVER

Distribution of Present MCWA (Regular, Extended, and Aegypti) Control in "100" Typhus Counties

STATE	CONTROL IN COUNTY	CONTROL IN ADJACENT COUNTIES	TOTAL
Alabama	3	9	13*
Florida	5	2	7
Georgia	16	13	34**
Louisiana	2	0	2
Mississippi	1	0	1
North Carolina	2	2	4
South Carolina	2	0	2
Tennessee	1	0	1
Texas	12	17	36**
	44	43	100

* One county has routine inspection.

** Georgia has 5 and Texas has 7 with no control in the county or in adjacent counties

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