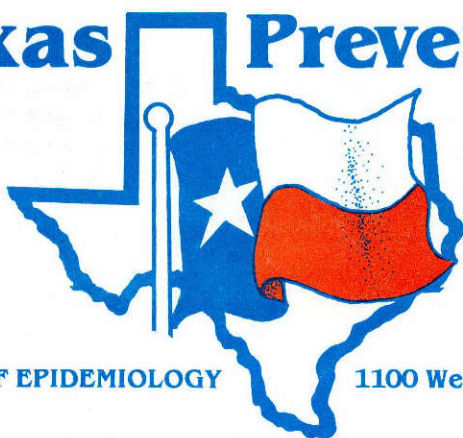


Texas Preventable Disease



NEWS

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contents:

Serological Evidence of Subclinical or Unrecognized
Rocky Mountain Spotted Fever Infections
Viral Isolates for February 1984

BUREAU OF EPIDEMIOLOGY

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SEROLOGICAL EVIDENCE OF SUBCLINICAL OR UNRECOGNIZED ROCKY MOUNTAIN SPOTTED FEVER INFECTIONS

BACKGROUND

In March 1983, an 8-year-old girl residing in Johnson County, Texas, died of Rocky Mountain spotted fever (RMSF). This was the third death from RMSF in Johnson County in the past three years. During the two months following this death, seven additional RMSF cases occurred among individuals who live near this girl's residence; none of these cases died. All eight 1983 cases resided within a 24-square-mile area near Burleson-Mansfield in Johnson and Tarrant Counties. This high number of cases suggested the possibility that a large number of unrecognized or unreported RMSF cases had occurred in this area in past years.

To address this question, the Zoonosis Control Division, Public Health Region 5, Texas Department of Health (TDH), Arlington, and the Bureau of Epidemiology and Bureau of Laboratories, TDH, Austin, in cooperation with the Fort Worth Department of Public Health and the Tarrant County Health Department, carried out a serological survey of children residing in the Burleson (Johnson County) and Mansfield (Tarrant County) communities.

Burleson and Mansfield are located approximately 15 miles south-southeast of the city of Fort Worth. In 1983, Burleson and Mansfield had populations of 12,573 and 10,073, respectively. Both communities are surrounded by agricultural land and are considered suburbs of Fort Worth.

INVESTIGATION

Because the highest incidence of RMSF infections occurs in persons less than 20 years of age (primarily 5- to 9- year-olds) and six of the eight 1983 cases were 12 years of age or younger, the sixth grade students at five area schools were considered to be the most appropriate cohort for study. Permission to conduct the study was granted by the superintendents of the Mansfield Independent School District (MISD) and Burleson Independent School District (BISD). Burleson ISD has a combined student enrollment of 5,192 in six schools, while Mansfield ISD has a total of 4,257 in seven schools. Informed parental consent for participation in the study was obtained for 368 of 748 sixth grade students in five different schools.

Seven milliliters of venous blood were drawn by public health nurses from each participating student. Sera were separated by centrifugation and stored at -20°C until tested. Sera were screened by the indirect fluorescent antibody (IFA) method at a titer of 1:32. Sera with titers $\geq 1:32$ were titered to end-point. The latex agglutination test to *Rickettsia rickettsii* was performed on sera with IFA titers $\geq 1:32$. Sera with IFA titers $\geq 1:64$ were considered positive evidence of past exposure to *R. rickettsii*. Sera with IFA titers of 1:32 and $\leq 1:32$ were considered borderline and negative evidence of past exposure respectively.

Basic demographic data were obtained from each student by a self-administered questionnaire. Historical data on each child with an IFA titer $\geq 1:32$ were obtained from parents and physicians by telephone or personal interview. Information obtained included: any history of illness characterized by either a fever and rash or fever and headache, hospital admissions, illnesses associated with attached ticks, and a history of RMSF.

RESULTS

The percentages of sixth grade students participating in the study ranged from 39.1% at Mansfield Intermediate School to 72.5% at Nola Dunn Elementary School. Single serum specimens were drawn from 368 students (185 males, 183 females), the majority (89.7%) of whom were white. Of the 368 specimens obtained, 352 were satisfactory for testing; 16 could not be tested due to insufficient quantity.

The children had lived in the Burleson-Mansfield area for a mean of 6.3 years. Sixty-one percent were born in Johnson or Tarrant Counties. Seventy-five percent of the students recalled an attached tick sometime in their life, and 30.7% recalled a tick attachment after January 1, 1983. More than three-fourths (77.0%) of the students owned at least one dog, and about half (46.3%) owned at least one cat. A majority (68.2%) of students had removed ticks from their pets at least once.

Table 1 presents the IFA titers to R. rickettsii for each school. Forty-two (11.9%) students had IFA titers of 1:32, 32 (9.1%) students had IFA titers $\geq 1:64$. Only one student had a latex agglutination titer of 1:32. Eight of the 32 students with IFA titers $\geq 1:64$ experienced an illness with fever and rash or fever and headache within the preceding year. One of these students had the latex agglutination titer of 1:32. The latex agglutination test measures IgM antibodies and is suggestive of a recent infection. None of the 32 students had ever been hospitalized or treated for a diagnosed RMSF illness.

Students with IFA titers $\geq 1:64$ were more likely to have been born in Tarrant or Johnson County than students with IFA titers $< 1:32$ ($p < 0.1$). Owning a dog or cat, known tick attachment in the last four months, removing ticks from pets, and longer residence in the area were not associated with elevated IFA titers.

DISCUSSION

The indirect fluorescent antibody test is the most specific and sensitive test available for confirming a Rocky Mountain spotted fever infection. The sensitivity of the test at 1:32 and 1:64 has been determined to be 97.4% and 84.6%, respectively.¹ At a titer of 1:32, 0.2% false positives would be expected.² Levels of IFA antibodies to R. rickettsia remain elevated for over a year.²

Previous serological surveys have been performed in RMSF endemic areas.^{3,4} Five of 508 (0.98%) sixth graders studied in 1978 from Forsyth County, North Carolina, had IFA titers $\geq 1:64$; 49 (9.6%) had IFA titers of 1:32.³ IFA titers to R. rickettsii of $\geq 1:8$ were found in 75 of 181 residents of Cabarrus and Rowan Counties, North Carolina.⁴ These individuals had lived in the counties for 40 or more years. Incidence rates of 55 to 1,035 cases per 100,000 population per year were estimated for these two counties.

The present Texas study found 9.1% of sixth grade students with IFA titers $\geq 1:64$ and 11.9% with titers of 1:32. Since a false positivity of 0.2% is expected with the IFA test, results suggest that 9% to 21% of the sixth graders living in the Burleson-Mansfield area had prior exposures to R. rickettsii resulting in undiagnosed or subclinical infections. Assuming that 21% of the 748 sixth graders in this area had exposure to R. rickettsii during the first twelve years of life, it is surmised that

157 RMSF infections occurred in this population. Parental consent procedures may have biased this number in that children who frequently had contact with ticks may have been more likely to participate.

The data presented suggest that R. rickettsii infections may involve a much larger population than has been previously suspected. Serious clinical infections requiring antibiotic treatment and hospitalization may represent only a small fraction of all infections. If this proves to be the case, there will be a need to distinguish between RMSF infection and RMSF disease, a concept which has several analogies in the realm of communicable diseases.

This report was submitted by Wiley B. Tanner, DVM, Public Health Region 5 and Jeffery P. Taylor, MPH, Bureau of Epidemiology, Texas Department of Health.

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Table 1.
Indirect Fluorescent Antibody Titers to Rickettsia rickettsii
Determined from a Single Serum Specimen, Sixth Grade Students
Burleson and Mansfield, Texas - May 1983

ELEMENTARY SCHOOL						
IFA TITER	FRAZIER	MANSFIELD	MOUNDS	NOLA DUNN	NORWOOD	TOTAL (%)
<1:32	37	110	58	37	36	278 (79.0)
1:32	8	10	17	3	4	42 (11.9)
1:64	6	7	6	2	3	24 (6.8)
1:128	2	3	0	2	0	7 (2.0)
1:256	0	0	1	0	0	1 (0.3)
TOTAL	53	130	82	44	43	352 (100.0)

VIRAL ISOLATES FOR FEBRUARY 1984

<u>Adenoviruses</u>	Bexar(3), Dallas(1)
<u>Cytomegalovirus</u>	Bell(4), Galveston (6)
<u>Echo</u> (20)	Bell(1)
<u>Influenza A</u> (H1N1)	Bexar(1), Hale(1), Travis(3), Harris(159), Brazos(6)
<u>Influenza A</u> (H3N2)	Nueces(1), Harris(2)
<u>Influenza B</u>	Bexar(2), Nueces(2), Tom Green(1), Travis (11) Harris(114), Brazos(11)
<u>Parainfluenza</u> (2)	Bell(3)
<u>Rotavirus</u>	Bell(1), Bexar(2), Dallas(5), El Paso(1), Lubbock(1)
<u>Respiratory</u> <u>Syncytial Virus</u>	Bell(5), Dallas(1)
<u>Chlamydia trach.</u>	Bell(1), Dallas(1), Travis(7), Harris(1)

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