

Epi Report

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January 2010, Issue No. 4

The Most Severe of the Rickettsiae: Rocky Mountain Spotted Fever

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On June 1, a child aged 3 years presented to a physician with a 4-day history of rash and a temperature of 101.3 F. On clinical examination, the patient had a fine red-purple rash on the cheeks, trunk, upper extremities, and palms, thrombocytopenia, and a normal white blood cell count. The patient's mother reported that she recently had found a tick on the patient's scalp. The patient was diagnosed with a viral exanthem. On June 2, the patient was still febrile but the rash had faded, and the patient was given an oral cephalosporin-class antibiotic. On June 5, the patient developed vomiting, decreased appetite, persistent crying, and disorientation. The patient's mother reported that she had removed a second tick that day. Clinical examination revealed generalized petechiae, hepatosplenomegaly, dry mucous membranes, and pallor. Laboratory findings included thrombocytopenia, an elevated white blood cell count, hyponatremia, elevated aspartate aminotransferase (AST 7.20 $\mu\text{kat/L}$) (normal range: 0.17--0.67 $\mu\text{kat/L}$), and alanine aminotransferase (ALT 1.63 $\mu\text{kat/L}$) (normal range: 0.17--0.92 $\mu\text{kat/L}$). The patient was admitted to a hospital, and within several hours the patient became cyanotic, developed seizures, and died. Using an IHC stain, tissue samples obtained at autopsy revealed spotted fever group rickettsiae. Using a polymerase chain reaction assay, a whole blood sample was positive for DNA of *Rickettsia rickettsii*.

(Edited excerpt from Morbidity and Mortality Weekly Report 49(39);885-8 October 6, 2000)



Image from CDC
website at: <http://www.cdc.gov>

What is Rocky Mountain Spotted Fever (RMSF)? The most severe tick-borne disease in the United States, and occurs worldwide.

What organism causes RMSF? The bacteria *Rickettsia rickettsii*.

How is the infection acquired? Through the bite of an infected tick. The American dog tick (*Dermacentor variabilis*) and Rocky Mountain wood tick (*Dermacentor andersoni*) are the primary vectors in the United States. The brown dog tick *Rhipicephalus sanguineus* has also been implicated as a vector as well as the tick *Amblyomma cajennense* in countries south of the United States.

Incubation period? 5-10 days.

Symptoms? Early clinical presentation of RMSF is often nonspecific and may resemble many other infectious and non-infectious diseases. Initial symptoms of Rocky Mountain Spotted Fever may include: fever, nausea, vomiting, muscle pain, lack of appetite, and severe headache. Later signs and symptoms include: rash, abdominal pain, joint pain and diarrhea.



Image from CDC
website at: <http://www.cdc.gov>

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How severe can it be? The majority of patients are hospitalized. Case fatality rate in untreated cases is 25%; with treatment case fatality rate is 4%. RMSF illness can last as long as three weeks. A significant portion of the mortality likely is due to delay in diagnosis and treatment.

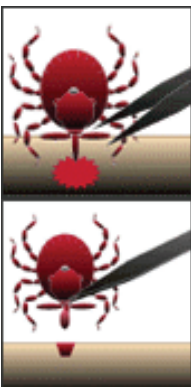
Diagnosing RMSF: A combination of clinical signs and symptoms and specialized confirmatory laboratory tests will help diagnose the infection. A fourfold or greater rise in IgG-specific antibody titer to the spotted fever group antigen or *R. rickettsii* antigen by IFA, between paired serum (one sample taken in the first week of illness and a second 2-4 weeks later) is diagnostic. Other diagnostic tools are detection of *R. rickettsii* DNA in a clinical specimen via PCR assay, or demonstration of spotted fever group antigen in a biopsy or autopsy specimen by IHC, or isolation of *R. rickettsii* from clinical specimen in cell culture. Other common laboratory findings suggestive of RMSF include thrombocytopenia, hyponatremia, and elevated liver enzyme levels.

Treating RMSF: Because laboratory confirmation is generally not available during acute illness, treatment is initiated based on clinical and epidemiological information. RMSF is best treated by using a tetracycline antibiotic, usually doxycycline.

RMSF in Arizona: More than 80 cases of RMSF were reported from 2003 through 2009 in Eastern Arizona tribal lands (Navajo County, Gila County, and Graham County). Nine cases were fatal and more than 50% of cases were children (less than 18 years old).

Most recently, nine cases reported in 2009 and 2010 had onset during 2009 and all were associated with tribal lands (seven in Eastern Arizona and two in Pinal County). One pediatric case in Eastern Arizona was fatal in 2009. One case was imported African Tick Fever from travel to Gambia.

In an investigation on cases reported from 2002 through 2004, dense populations of *Rhipicephalus sanguineus* ticks (common brown dog ticks) were found on dogs and in the yards of cases' home sites. All cases with confirmed RMSF had contact with tick-infested dogs, and 25% had a reported history of tick bite preceding the illness. *R. rickettsii* DNA was detected in non-engorged *R. sanguineus* collected at one home, and *R. rickettsii* isolates were cultured from these ticks.



Is it preventable? Yes! Controlling ticks is the most effective strategy. Use appropriate spot-on treatments, tick collars, sprays, or dips to control ticks on pets. Apply appropriate pesticides to control ticks in yards (either pest control or do-it-yourself). Be sure to follow label instructions for the pesticide product. Repeated applications may be indicated. Remove tick habitats on your property, including leaf litter, brush, and yard clutter (boards, mattresses, old furniture, etc.). Enter wooded areas with proper clothing.

Know where to expect ticks. Ticks like to live in or near wooded or grassy areas. During outdoor activities in these areas use a repellent with DEET (on skin or clothing) or permethrin (on clothing) and wear long sleeves, long pants and socks. Wear light-colored clothing, which allows you to see ticks crawling on your clothing. Tuck your pant legs into your socks so that ticks cannot crawl up inside of your pant legs. Some ticks can crawl down into shoes and are small enough to crawl through most socks.

Proper tick removal. Images from CDC website at: <http://www.cdc.gov>

If you suspect that your patient may have the Rocky Mountain Spotted Fever, please notify the Pima County Health Department immediately, Monday through Friday, from 8am to 5pm at (520) 243-7797; after hours (520) 743-7987. For more information on RMSF, please visit Centers for Disease Control and Prevention at: http://www.cdc.gov/ticks/diseases/rocky_mountain_spotted_fever/.

References:

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2. Demma, L. J., et al. Rocky Mountain Spotted Fever from an Unexpected Tick Vector in Arizona. New England Journal of Medicine, August 2005, Volume 353: 587-594, Number 6.
3. Centers for Disease Control and Prevention, Tickborne Rickettsial Diseases, Rocky Mountain Spotted Fever, accessed web Jan. 26, 2010, http://www.cdc.gov/ticks/diseases/rocky_mountain_spotted_fever/faq.html
4. Arizona Department of Health Services, Office of Infectious Disease Services, Vector Borne and Zoonotic Diseases, Rocky Mountain Spotted Fever; accessed web Jan. 26, 2010, http://www.azdhs.gov/phs/oids/vector/rmsf/rocky_mountain.htm

Acknowledgements:

Thanks to Craig Levy at ADHS for information on RMSF in Arizona.

Sentinel Site Providers: Monitoring Influenza-like Illness in Our Community

By Anissa Taylor, CDI

January is typically the month when healthcare providers start to see more patients with influenza-like illness (ILI), which is a temperature of 100° F or greater, a cough and/or sore throat in the absence of another known cause. However, influenza activity was prominent as early as October of 2009 due to the Novel Influenza H1N1 strain affecting many early in the season. Influenza activity in Arizona during October was considered widespread because there were “increases in cases of ILI and outbreaks of influenza with recent laboratory-confirmed cases in at least half of the regions of the state” (CDC). Currently, influenza activity has dropped down to local activity where it was this time last year in January of 2009. Local activity is defined as “increased ILI cases or influenza outbreaks and recent laboratory-confirmed influenza in a single region of the state” (CDC). ILI reports in Pima County have also decreased since October 2009.

The State of Arizona is part of Region Nine within the ILI surveillance for the Centers for Disease Control and Prevention’s US Outpatient Influenza-like Illness Surveillance Network (ILINet). Region Nine includes California, Guam, Hawaii, and Nevada. Within the State of Arizona, Pima County is grouped within the Southern Region along with Cochise, Graham, Greenlee and Santa Cruz Counties. Pima County’s ILI sentinel site reporters are from a selected group of medical providers in the community ranging from pediatric offices to community health centers. We would like to thank our existing sentinel sites for their continued reporting of ILI within their practices. Their efforts have helped the Arizona Department of Health Services and the CDC monitor ILI activity which has been useful in developing clinical guidance for healthcare providers.

The Pima County Health Department has recently recruited four additional sentinel sites to report ILI in the community. We would like to welcome Sonora Family Practice, Velo Med Urgent Care, University Physicians Hospital provider-based clinics and Desert Senita Community Health Center in Ajo, Arizona. There are now a total of ten sentinel sites in Pima County, who will be reporting ILI amongst their patients. These providers will also be included in a special grant project for ILI surveillance during the 2009-2010 influenza season because of the need for heightened surveillance with introduction of the novel H1N1 strain to the seasonal influenza strains. The sentinel sites are also encouraged to send in a limited number of specimens at peak season, severe ILI in off season or when a new influenza strain is found in the community. We are pleased that with more actively reporting providers we will have a better indicator of influenza activity in our community.



Thank you to all of our providers for all of your support!

Summary of Selected Reportable Diseases for Pima County (Year to Date)

Enteric Diseases:	January- December 2009	January- December 2008
Amebiasis	8	2
Campylobacter	137	148
Shigella	75	125
Salmonella	249	218
Hepatitis A	17	14
Giardia	51	56
Vaccine Preventable Diseases:		
Pertussis	28	5
Measles	0	18
Mumps	9	0
Rubella	0	0
Tetanus	0	0
H. Influenzae, serotype b (<5 years of age)	0	0
Invasive Diseases:		
Streptococcus pneumoniae	150	176
Streptococcus Group A	42	25
Streptococcus Group B (in infants <90 days old)	11	12
MRSA	195	267
Diseases Involving Central Nervous System:		
Meningococcal Infection	1	3
Aseptic Meningitis	32	36
HIV & Sexually Transmitted Diseases:		
HIV	114	96
Chlamydia	3807	3763
Gonorrhea	368	525
Syphilis	38	65
Granulomatous Infections:		
Tuberculosis	25	26
Coccidioidomycosis	1328	764
Vector-Borne & Zoonotic Diseases:		
West Nile Virus	0	13
Animal Rabies	86	65

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Please contact Francelli Lugo at telephone number (520) 243-7797 or by fax at (520) 791-0366 to update your current contact information.

Statistical data for the years 2008-2009 reflects communicable disease reports of confirmed, probable, and suspect cases received via the Medical Electronic Disease Surveillance Intelligence System (MEDSIS) from 01/01/2008 to 12/31/2008 and 01/01/2009 to 12/31/2009, respectively. TB data provided by Tuberculosis Control Program. STD data extracted from the NATP database. Data are provisional and subject to change.
Report generated on 01/29/2010.