Emerging and Re-emerging Tick-Transmitted Rickettsial and Ehrlichial Infections

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KEYWORDS

- Rocky Mountain spotted fever
- Human monocytotropic ehrlichiosis • *Rickettsia parkeri*
- *Ehrlichia ewingii* • Human granulocytotropic anaplasmosis
- Typhus

Recently in the field of rickettsiology, an explosion of new isolates of pathogens have received species designation[1–5] and new disease names, all of which have been relatively neglected by primary care and infectious disease physicians.[6,7]

Rickettsial and ehrlichial diseases are remarkable for their uniform susceptibility to doxycycline but are clinically difficult to distinguish from many viral infections and each another, and therefore misdiagnosis and failure to treat have unfortunate and sometimes tragic outcomes. Rocky Mountain spotted fever (RMSF) and human monocytotropic ehrlichiosis (HME) have substantial case-fatality rates. In North America, at least five well-established tick-borne, obligately intracellular bacterial pathogens (*Rickettsia rickettsii, R parkeri, Ehrlichia chaffeensis, E ewingii,* and *Anaplasma phagocytophilum*) and four other pathogens exist (*R massiliae, R prowazekii, R felis,* and *E canis*) that have been identified in ticks elsewhere in the world, but remain to be definitively identified as tick-transmitted infections in the United States. Finally, a broad group of other tick-associated rickettsial and ehrlichial agents of unknown pathogenicity exist (eg, *R amblyommii*) that may cause confusion in interpreting serologic surveys or a single elevated antibody titer. Globally, many of these bacteria have been named (**Table 1**)

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Table 1
Epidemology of tick-borne rickettsial infections

Agent	Disease	Tick Vector	Geographic Distribution
Rickettsia rickettsii	Rocky Mountain spotted fever	*Dermacentor variabilis*	Eastern two thirds of United States and Pacific Coast
		D andersoni	Rocky Mountain states
		Rhipicephalus sanguineus	Arizona, northern Mexico
		Amblyomma cajennense, A aureolatum	Central and South America
Rickettsia conorii	Boutonneuse fever	*Rh sanguineus*	Southern Europe, Africa, western and southern Asia
		Rh pumilio	Southern Russia
Rickettsia africae	African tick bite fever	*A hebraeum*	Southern Africa
		A variegatum	Central, east, and west Africa, West Indies
Rickettsia sibirica	North Asia tick typhus and lymphangitis-associated rickettsiosis	*D nuttallii, D silvarum, Haemaphysalis concinna, Hyalomma asiaticum,* other species	Eurasia and Africa
Rickettsia australis	Queensland tick typhus	*Ixodes holocyclus*	Eastern Australia
Rickettsia honei	Flinders Island spotted fever	*Bothrocroton hydrosauri*, other species	Australia and southeastern Asia
Rickettsia japonica	Japanese spotted fever	Vector status not established for ticks that are hosts of the agent (*H flava, H longicornis, I ovatus, D taiwanensis*)	Japan and Korea
Rickettsia slovaca	Tick-borne lymphadenopathy	*D marginatus, D. reticularis*	Europe
Rickettsia parkeri	*R parkeri* rickettsiosis	*A maculatum*	United States,
		A triste, A dubitatum	Brazil, Uruguay, Argentina
Rickettsia aeschlimannii	Unnamed disease	*H marginatum*	Africa
Rickettsia prowazekii	Not characterized	*A imitator, H truncatum*	North America, Africa