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Describes the tick identification service available from the Medical Entomology Section, Epidemiology Division, USAF School of Aerospace Medicine, and discusses the information that is furnished to health care providers to assist in formulation of diagnoses, prognoses, and recommendations for prevention of tickborne diseases for the USAF population.

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The US Air Force Tick Identification Service

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INTRODUCTION

Ticks are second only to mosquitoes in the number of disease agents transmitted to man (1). Tickborne diseases have become increasingly important during the past decade (2). Lyme disease is now the most important vectorborne disease in the US (3), and with the emergence of cases of human ehrlichiosis (4), which may be transmitted by a tick vector, medical concern over tick bites is on the increase.

Military personnel who train in, or are deployed into, areas where ticks occur are at high risk for contact with ticks (5). In the USAF, security policemen, combat controllers, and tactical air control teams may be especially susceptible because their missions require them to spend more time in the field than most other specialties (6). However, all members of the USAF population, including retirees and dependents, are at risk to some degree through exposure to tick habitat in recreational activities and at home (7). The diseases that are transmitted by the most commonly encountered species of ticks are summarized in Table 1.

IDENTIFICATION SERVICE SUPPORTS HEALTH CARE PROVIDERS

Tick identification furnishes health care providers information that they can use in diagnosis, for prioritizing subsequent health care actions, and for formulating recommendations for prevention of tickborne diseases in the USAF population.

Diagnosis of tickborne disease relies upon clinical suspicion, recognition of the characteristic signs and symptoms, and appropriate utilization of serologic tests (8). Clinical suspicion is based primarily upon exposure to ticks or tick habitat, and identification of the ticks to species defines a key element of the risk involved in that exposure. Serologic tests alone are insufficient for laboratory diagnosis of Lyme disease, because of the variability in results (9). Whenever possible, clinical diagnosis should take priority over serologic findings alone (10).

Screening for pathogens in ticks does not give a definitive answer about disease transmission, because persons bitten by infected ticks may not contract the disease (11). Lyme disease spirochete levels in ticks vary with age and stage of the tick and may not be at an infectious level at the time the patient was bitten (12). Also, the tick may not have transmitted any pathogens during the time it was attached. Infection with the Lyme disease spirochetes increases with duration of tick attachment: in one study, infection was rare in tick attachments lasting 24 hours, but approached 100% at 72 hours of attachment (13).

Knowledge of the risk involved to the patient can also assist the health care provider in prioritizing follow-up care. And, if a significant number of individuals appear to be at risk, he or she may be able to provide the members or their commander with recom-

mendations that would help minimize risks.

If the risk of exposure to a tickborne disease is suspected to be significant, the patient should be briefed by the health care provider about the symptoms of tickborne illness and to be observant of any symptoms, such as flulike illness or a rash on the extremities or at the site of the tick attachment. Presumptive antibiotic therapy may be indicated, based upon the patient's history, season of the year, vector information, etc., because early serologic evidence of infection is rarely reliable. If illness develops, the attending health care provider should be informed of the tick attachment, species, vector potential, and the date of exposure, to aid in decision making. The best way to ensure that this information is available to the health care provider is to document the tick information on a Standard Form 513 (Consultation Sheet), or similar form, and place it in the patient's medical record.

MEDICAL ENTOMOLOGISTS PROVIDE CONSULTATION SERVICE

At the Medical Entomology Section of the Epidemiology Division (EKEN), USAF School of Aerospace Medicine (USAFSAM), Brooks Air Force Base, Texas, professional medical entomologists provide tick identification as one of our many duties. Currently, four entomologists (three uniformed and one civilian) are assigned to this section.

The entomologists identify the ticks to species and respond by telephone to the submitting agency, usually the same day the specimen is received. A completed consultation sheet (if submitted) or letter with the specimen identification and other pertinent data is also sent to the submitting agency. Information about the case is analyzed and compiled into our records for reference, and the specimens are maintained in a reference collection.

Currently, screening of ticks for pathogens is not available from us. Because of the relative unreliability of screening tests, and the uncertainty of pathogen transmission, pathogen screening alone is of limited value. Pathogen screening may be available through state health departments or the Centers for Disease Control, on a limited basis. But to be sure, contact the agency in advance to determine that they have the capability and are willing to perform the screening.

We also provide a consultant service to assist Environmental Health personnel in identifying ticks and tick habitat in operational areas. Section medical entomologists provide guidance for initiating and accomplishing tick surveillance, and identify the ticks that are collected. Surveillance can identify areas where people may be at greatest risk, enabling operational commanders to plan accordingly and pest management technicians to take appropriate measures if control is deemed necessary. Medical entomologists

also provide guidance for management and control of tick infestations, such as current availability and use of arthropod repellents, avoidance strategies, and control measures.

SAMPLE SUBMISSION

Ticks removed from patients should be preserved and forwarded by Environmental Health personnel to us. Ticks should be preserved in 70% isopropyl or ethyl alcohol, or in formalin. Plastic, screw-top blood sample vials make excellent shipping containers, although any leakproof container may be used, if packaged properly. The container should be wrapped in a paper towel secured with a rubber band or piece of tape, and packed in a small box with padding. It is not necessary to have live ticks for species identification, which eliminates the need for a shipping permit and allows them to be mailed through the US Postal Service. The package should be addressed to us as follows: USAFSAM/EKEN, Brooks AFB TX 78235-5301.

Complete tick collection data should always accompany a specimen, to help characterize the case. A copy of a completed Standard Form 513 is best, but if that is not available, the patient treatment slip, or a 3 in. x 5 in. card with the following information will suffice: Date of removal of the tick; base where removed; patient's age, sex, status (AD, Dep, Ret), residence, and exposure to ticks (through outdoor activity, pets, etc.). Also, recent travel outside the base area (if any), disease symptoms (if any),

and any other available demographic data will be appreciated. An AUTOVON number and point of contact will facilitate the reply.

VOLUNTARY PARTICIPATION ADDS TO KNOWLEDGE

The identification program is a response to specimens voluntarily submitted by Environmental Health and medical treatment facility personnel. The importance of physician, nurse, technician, and medical staff awareness of the availability of this service is critical, because most of the ticks removed from patients are collected by primary care practitioners during duty hours, and by technicians in the emergency room after normal duty hours.

During 1988, we identified 185 ticks of 7 species from 19 bases, and in 1989 we identified 139 ticks of 8 species from 28 bases. The data collected from the identification service have made a significant impact on the body of knowledge concerning the threat of ticks to humans, by documenting that brown dog ticks bite people in the US more commonly than previously thought (14, 15). Continued participation will help add to that knowledge.

If you have questions or comments, contact one of the medical entomologists at USAFSAM/EKEN, Brooks AFB TX 78235-5301, AUTOVON 240-3471.

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Table 1. Medically important ticks and the diseases they may transmit (2).

	Disease:[a]								
Tick species :	LD	RMSF	CTF	TU	TBRF	TP	BF	TBE	Other
Amblyomma									
americanum	M[b]	Y[c]	-[d]	Y	-	-	-	-	-
cajennense	-	Y	-	-	-	-	-	-	-
hebraeum	-	-	-	-	-	-	Y	-	-
Dermacentor									
andersoni	-	Y	Y	Y	-	Y	-	-	-
marginatus	-	-	-	-	-	-	-	Y	STT, OHF?
nuttalli	-	-	-	Y	-	-	-	-	STT
occidentalis	-	Y	Y	Y	-	Y	-	-	-
silvarum	-	-	-	-	-	-	-	Y	STT
variabilis	M	Y	-	Y	-	Y	-	-	-
Haemaphysalis									
concinna	-	-	-	-	-	-	-	Y	STT
leachi	-	-	-	-	-	-	Y	-	-
spinigera	-	-	-	-	-	-	-	-	KFD
Hyalomma									
anatolicum	-	-	-	-	-	-	-	-	CCHF
asiaticum	-	-	-	-	-	-	-	-	STT
marginatum	-	-	-	-	-	-	-	-	CCHF
Ixodes									
dammini	Y	-	-	-	-	-	-	-	AB
holocyclus	M	-	-	-	-	Y	-	-	-
pacificus	Y	-	-	-	-	-	-	-	-
persulcatus	Y	-	-	-	-	-	-	-	RSSE
ricinus	Y	-	-	-	-	-	-	Y	-
scapularis	M	Y	-	-	-	-	-	-	-
Ornithodoros									
hermsi	-	-	-	-	Y	-	-	-	-
moubata	-	-	-	-	Y	-	-	-	-
rudis	-	-	-	-	Y	-	-	-	-
talaje	-	-	-	-	Y	-	-	-	-
turicata	-	-	-	-	Y	-	-	-	-
Rhipicephalus									
appendiculatus	-	-	-	-	-	-	Y	-	-
sanguineus	-	Y	-	-	-	Y	Y	-	HE?

[a] AB = American babesiosis, BF = boutonneuse fever, CTF = Colorado tick fever,

TU = tularemia, CCHF = Crimean-Congo hemorrhagic fever, HE = human ehrlichiosis, KFD = Kysanur forest disease, LD = Lyme disease (erythema migrans), OHF = Omsk hemorrhagic fever, RMSF = Rocky Mountain spotted fever, RSSE = Russian spring-summer encephalitis, STT = Siberian tick typhus, TBE = tickborne encephalitis, TBRF = tickborne relapsing fever, TP = tick paralysis.

[b] M = May be a vector (transmits the agent, but positive evidence of transmission to humans is lacking).

[c] Y = Is a known vector to humans.

[d] - = Is not a vector, or its status is unknown because the species does not occur in the geographic area where the disease occurs.

AUTHOR INFORMATION

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