

## Vector-borne Infectious Diseases in Afghanistan

Dr. Michael K. Faulde

Regierungsdirektor, Zentrales Institut des Sanitätsdienstes der Bundeswehr

Laborgruppe Medizinische Zoologie

Postfach 7340

56065 Koblenz, GERMANY

Translated by TRS Translation Services, Washington, DC

Edited by Dr. Richard G. Robbins and Major Sharon L. Spradling, AFPMB, Washington, DC

Vector-borne Disease:	Incubation Period:	Agents:	Mode of Transmission/ Vector:	Epidemiology:	Remarks:
Crimean-Congo Hemorrhagic Fever		Crimean-Congo hemorrhagic fever virus, <i>Nairovirus</i> , Bunyaviridae	<b>Transmission:</b> Bite or exposure to hard tick cell material, mostly in the genus <i>Hyalomma</i> <b>Primary vector:</b> <i>Hyalomma marginatum</i> <b>Secondary vectors:</b> <i>H. anatolicum</i> , <i>H. detritum</i> , <i>H. dromedarii</i> , <i>H. impeltatum</i> , <i>H. schulzei</i> , <i>H. asiaticum</i> ; also, argasid (soft) ticks, such as <i>Ornithodoros lahorensis</i>	<b>Transmission period:</b> Primary transmission (ticks) mainly from May-Oct. <b>Incidence and seroprevalence:</b> Nationwide evidence of CCHF viral antibodies; at least 15 cases of death from CCHF epidemic in May-Nov 2000 in Baluchistan (Afghanistan), near the Iranian border; approx. 20 cases in March 1998 in Rustaq (northeastern Takhar Province) <b>Habitat:</b> Dry areas, animal stables	<b>Preventive measures:</b> - Avoidance of old animal stables, etc. - Use of insect repellent and permethrin-treated uniform (for ticks, permethrin is a more effective repellent than DEET) - Search/removal of hard ticks from self and companions - Never crush <i>Hyalomma</i> ticks, even attached ones (contact infection) - During outbreaks, never handle dead animals, especially those with hemorrhages, without

				<p>and trails, former pastures</p> <p><b>Bite properties:</b>  Hard ticks of the genus <i>Hyalomma</i> feed at one spot for several days on the same host and fall off freely after feeding. Larvae and nymphs bite small mammals and are two-host ticks; adults prefer larger mammals or humans and are not at all host specific. Fasting adult ticks survive up to 4 years; they are not easily brushed off and actively seek out hosts. <i>Hyalomma marginatum</i> serves as both a vector and reservoir of the virus, which is transmitted transovarially, transtadially and venereally</p>	protection
Dengue Fever, Dengue Hemorrhagic Fever (DHF)		Dengue fever virus, <i>Flavivirus</i> , Flaviviridae	<p><b>Transmission:</b> Bite of <i>Aedes aegypti</i> or other <i>Aedes</i> species</p> <p><b>Primary vector:</b> <i>Aedes aegypti</i> (yellow fever mosquito)</p>	<p><b>Transmission period:</b> May-Oct.</p> <p><b>Incidence and seroprevalence:</b> Evidence of dengue fever and DHF in lowlands around Kandahar; <i>Aedes aegypti</i> has spread to nearly all of the</p>	<p><b>Preventive measures:</b></p> <ul style="list-style-type: none"> <li>- Larval mosquito control and abatement</li> <li>- Use insect repellent and permethrin-treated uniform</li> <li>- Install mosquito screens on windows and doors and treat with permethrin or</li> </ul>

				<p>neighboring dengue-endemic regions in the southeast; no epidemiological data are available at this time</p> <p><b>Bite properties:</b>  <i>Aedes</i> species bite during the day; however, <i>Aedes aegypti</i> also bites at dusk and in buildings (endophilic, endophagic); extremely aggressive, urban biter; flight radius up to approx. 500 meters</p> <p><b>Breeding properties:</b>  <i>Aedes aegypti</i> and <i>Ae. albopictus</i> breed in any available natural bodies of water, as well as in flowerpots, automobile tires, cans, etc.</p>	other long-lasting pyrethroid
Sand Fly Fever (Papatasi Fever)		Sand fly fever virus, <i>Phlebovirus</i> , Bunyaviridae, Sicilian and Naples serotypes	<p><b>Transmission:</b> Sand fly bite</p> <p><b>Primary vector:</b>  <i>Phlebotomus papatasi</i> (nationwide)</p> <p><b>Secondary vectors:</b>  <i>P. sergenti</i> (nationwide), <i>P. major</i> (nationwide except in the extreme northeast)</p>	<p><b>Transmission period:</b>  April-Sept. (peaks in early June and August); transovarial transmission possible</p> <p><b>Incidence and seroprevalence:</b>  Sicilian and Naples serotypes are endemic nationally; no epidemiological data are</p>	Same as cutaneous leishmaniasis ( <i>L. t. minor</i> )

				available at this time <b>Breeding grounds:</b> See <i>L. t. major</i> ; <b>Bite properties:</b> Same as <i>L.t. major</i>	
West Nile Fever		West Nile fever virus, <i>Flavivirus</i> , Flaviviridae	<b>Transmission:</b> Bite of domestic <i>Culex</i> mosquitoes <b>Primary vector:</b> Unknown <b>Secondary vectors:</b> various mosquitoes, such as <i>Culex modestus</i> ; also, the tick <i>Hyalomma marginatum</i> <b>Reservoir:</b> Birds	<b>Transmission period:</b> May-Nov. <b>Incidence and seroprevalence:</b> Disease is probably endemic nationally except in desert environments; the Caucasus region accounts for approx. ¼ (23%) of "summer flu" arboviruses, of which 53% are West Nile infections; epidemiological data for Afghanistan are not available at this time <b>Bite properties:</b> <i>Culex pipiens</i> bites at dawn and dusk as well as indoors (endophilic, endophagic); infectious females overwinter in buildings, cellars, and animal stables, sometimes in large numbers <b>Breeding grounds:</b> With some variation	<b>Preventive measures:</b> <b>- Indoors:</b> Permethrin-treated mosquito net or insect repellent <b>- Outdoors:</b> Larval mosquito control; use insect repellent combined with permethrin-treated uniform

				depending on species ( <i>Cx. pipiens</i> , <i>Cx. modestus</i> ), West Nile vectors thrive in small bodies of stagnant or polluted water (cisterns, buckets, cans, old tires, etc.) in urban environments	
Sindbis Fever		Sindbis fever virus, <i>Alphavirus</i> , <i>Togaviridae</i>	<p><b>Transmission:</b> Mosquito bite</p> <p><b>Primary vector:</b> <i>Culex modestus</i></p> <p><b>Secondary Vector:</b> Other mosquitoes, such as <i>Aedes communis</i></p> <p><b>Reservoir:</b> Birds, rarely rodents (rats and mice)</p>	<p><b>Transmission period:</b> May-Sept.</p> <p><b>Incidence and seroprevalence:</b> At least in the north, but probably endemic nationwide; epidemiological data are not available at this time</p> <p><b>Bite properties:</b> <i>Culex</i> mosquitoes bite at dawn and dusk and also indoors; females winter in basements, etc.</p> <p><b>Breeding grounds:</b> Vectors thrive in small bodies of stagnant or polluted water (cisterns, buckets, cans, old tires, etc.) in urban environments</p>	<p><b>Preventive measures:</b></p> <p>- <b>Indoors:</b> Permethrin-treated mosquito net or insect repellent</p> <p>- <b>Outdoors:</b> Larval mosquito control; use insect repellent combined with permethrin-treated uniform</p>
Japanese Encephalitis		Japanese encephalitis virus, <i>Flavivirus</i> ,	<p><b>Transmission:</b> Bite of <i>Culex</i> and <i>Anopheles</i> mosquitoes</p>	<p><b>Transmission period:</b> May-Oct.</p> <p><b>Incidence and</b></p>	<p><b>Preventive measures:</b></p> <p>- <b>Indoors:</b> Permethrin-treated mosquito net or</p>

		Flaviviridae	<p><b>Primary vector:</b> <i>Culex tritaeniorhynchus</i>,</p> <p><b>Secondary vector:</b> <i>Anopheles hyrcanus</i></p>	<p><b>seroprevalence:</b> Incidence of disease mirrors the range of the endemic JE vectors, <i>Cx. tritaeniorhynchus</i> and <i>An. hyrcanus</i>; infections may occur nationwide; 1995 cases in neighboring Pakistan have been confirmed; no epidemiological data for Afghanistan are available at this time</p> <p><b>Bite properties:</b> Female <i>Culex</i> and <i>Anopheles</i> mosquitoes bite at dawn and dusk as well as indoors; <i>Culex</i> females winter in basements etc.; flight radius up to 2 km</p> <p><b>Breeding grounds:</b> <i>Culex</i> spp. thrive in small stagnant or polluted bodies of water (cisterns, buckets, cans, old tires, etc.) in urban environments; <i>Anopheles hyrcanus</i> breeds in valley rice paddies</p>	<p>insect repellent</p> <p><b>- Outdoors:</b> Larval mosquito control; use insect repellent combined with permethrin-treated uniform</p>
Boutonneuse (Mediterranean) Fever		<i>Rickettsia conorii</i>	<p><b>Transmission:</b> Bite of various hard ticks</p> <p><b>Primary vector:</b></p>	<p><b>Transmission period:</b> May-Oct., year-round in cases of building</p>	<p><b>Preventive measures:</b> - Avoid contact with dogs, other house pets, and</p>

			<p><i>Rhipicephalus sanguineus</i> (brown dog tick)  <b>Secondary vectors:</b>  <i>Dermacentor</i> spp.,  <i>Haemaphysalis</i> spp.,  <i>Hyalomma</i> spp., <i>Boophilus</i> spp., <i>Rhipicephalus</i> spp.,  <b>Reservoir:</b>  Wild rodents, other mammals</p>	<p>infestations or chronic infestations in dogs and other house pets  <b>Incidence and seroprevalence:</b>  Endemic, at least in the southeast along the entire Pakistani border as well as in the east and southeast; no epidemiological data are available at this time  <b>Bite properties:</b>  Vector ticks also afflict humans; they feed at one spot for several days; the female lays up to 2,000 eggs (depending on species) in residential buildings, where the larvae hatch and attack humans, their pets, and other animals</p>	<p>livestock  - Use insect repellent and permethrin-treated uniform  - For infestations indoors, use an acaricide or barrier spray (e.g., Propoxur=B5), since ticks actively seek out humans</p>
Siberian Tick Typhus		<i>Rickettsia sibirica</i>	<p><b>Transmission:</b> Bite of hard ticks, especially sheep ticks in the genera <i>Dermacentor</i> and <i>Haemaphysalis</i>  <b>Primary vectors:</b>  <i>Dermacentor silvarum</i> and <i>D. marginatus</i></p>	<p><b>Transmission period:</b>  March-Oct.  <b>Incidence and seroprevalence:</b> No epidemiological data from Afghanistan are available at this time; endemic along the borders with Pakistan and China  <b>Bite properties:</b></p>	<p><b>Preventive measures:</b>  - Avoidance of sheep stables, sheep pastures, etc.  - Search/removal of hard ticks from self and companions  - Use insect repellent and permethrin-treated uniform</p>

				<p>Sheep ticks also afflict humans; they feed at one spot for several days; adults linger near sheep stables, pastures, etc., where they can fast for 2 to 3 years; sheep ticks cannot reproduce in heated living quarters</p>	
<p>Mite-borne Typhus (Tsutsugamushi Fever)</p>		<p><i>Orientia</i> (formerly <i>Rickettsia tsutsugamushi</i>)</p>	<p><b>Transmission:</b> Bite of larval red (trombiculid) mites (about 0.1mm in size)  <b>Primary vector:</b> <i>Leptotrombidium deliense</i>, <i>L. akamushi</i>, possibly other species  <b>Reservoirs:</b> Rodents and red mites (transovarial transmission)</p>	<p><b>Transmission period:</b> April-Oct.  <b>Incidence and seroprevalence:</b> Disease is strongly localized (“hot-spots”) in mountainous regions (chiefly on southern slopes); transovarial transmission is possible; occurs on mountains up to 3,200 m in Kondo, Takhar and Badakshan Provinces; current epidemiological data are not available  <b>Bite properties:</b> The tiny larval mites are six-legged, very small (ca. 0.1mm), fast, and light to dark red in color; bite at any opportunity, day or night; bites may not be</p>	<p><b>Preventive measures:</b></p> <ul style="list-style-type: none"> <li>- Use insect repellent and permethrin-treated uniform; permethrin is a more effective repellent than skin protectants with the active ingredient DEET</li> <li>- Minimize exposed skin (long pants)</li> <li>- Avoidance of known red mite habitat (grassy savannahs)</li> <li>- Due to their small size, larval mites are very hard to see; conduct surveys by placing a sheet of white paper on the ground</li> </ul>

				noticed for a few hours. Scratching itchy, bitten skin may lead to secondary infections	
Louse-borne Typhus, Epidemic Typhus		<i>Rickettsia prowazekii</i>	<p><b>Transmission:</b> Intake of infectious body louse material</p> <p><b>Primary vector:</b> <i>Pediculus humanus</i> (body louse)</p> <p><b>Reservoir:</b> Humans (Brill-Zinsser disease)</p>	<p><b>Transmission period:</b> predominantly during the winter months from Dec. - April.</p> <p><b>Incidence and seroprevalence:</b> Chiefly endemic in the eastern and central regions of the country, where seropositivity rates are up to 13% (1996)</p> <p><b>Bite properties:</b> Lice live in human clothing, where they deposit their eggs; they reach sexual maturity 2-3 weeks after hatching and require a blood meal at least every 6 days; transmission of the agent occurs via inhalation (louse feces) or by scratching infected louse material (crushed louse tissue) into the bite wound. Louse-borne typhus is highly dependent on the socio-economic environment (i.e.,</p>	<p><b>Preventive measures:</b></p> <p><b>- In endemic and epidemic regions:</b></p> <ul style="list-style-type: none"> <li>- Report every case of louse infestation</li> <li>- Since insecticidal powders for the mass control of body lice are no longer available NATO-wide, treatment of clothing is the only available recourse</li> <li>- Never “break off” body lice; this is one of the primary modes of infection (by scratching into the wound infectious louse cells under the fingernails)</li> <li>- Resistance: DDT</li> </ul>

Trench Fever, Five-Day Fever, Wolhynia Fever		<i>Bartonella quintana</i>	<p><b>Transmission:</b> Intake of infectious body louse material</p> <p><b>Primary vector:</b> <i>Pediculus humanus</i> (body louse)</p> <p><b>Reservoir:</b> Humans</p>	<p>refugees, refugee camps)</p> <p><b>Transmission period:</b> Predominantly in mountain regions, during the winter months of Dec.- April</p> <p><b>Incidence and seroprevalence:</b> Endemic, at least in the east and central mountain areas, although at unknown levels; epidemiological data are not available at this time</p> <p><b>Bite properties:</b> Lice live in human clothing, where they deposit their eggs (nits); they reach sexual maturity 2-3 weeks after hatching and require a blood meal at least every 6 days; transmission occurs via inhalation (louse feces) or by scratching infected louse material (crushed louse tissue) into the bite wound. Louse-borne typhus is highly dependent on the socio-economic environment (i.e., refugees, refugee camps)</p>	<p><b>Preventive measures:</b></p> <p><b>- In endemic and epidemic regions:</b></p> <ul style="list-style-type: none"> <li>- Report every case of louse infestation</li> <li>- Since insecticidal powders for the mass control of body lice are no longer available NATO-wide, treatment of clothing is the only available recourse</li> <li>- Never “break off” body lice; this is one of the primary modes of infection (by scratching into the wound infectious louse cells under the fingernails)</li> <li>- Resistance: DDT</li> </ul>
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Murine Typhus, Endemic Typhus Fever		<i>Rickettsia typhi</i> (formerly <i>R. mooseri</i> )	<p><b>Transmission:</b> Intake of infectious rodent flea material (cellular or fecal)</p> <p><b>Primary vectors:</b> <i>Xenopsylla astia</i> (rat flea), <i>Pulex irritans</i> (human flea)</p> <p><b>Secondary Vectors:</b> Other flea species</p> <p><b>Reservoir:</b> Rats harboring the enzootic vector <i>Polyplax spinulosa</i> (rat louse), <i>Ornithonyssus bacoti</i> (tropical rat mite)</p>	<p><b>Transmission period:</b> Year-round in cases of rat infestation</p> <p><b>Incidence and seroprevalence:</b> Endemic nationally; seropositivity rates in the population up to 5% (1996)</p> <p><b>Bite properties:</b> Rat fleas are nest specific, not host specific; all animal fleas also bite humans; fleas survive approx. 10 days without a blood meal, up to two months in low temperatures; transmission of the agent occurs by inhalation or by scratching of infectious flea material (crushed fleas, flea feces) into wounds</p>	<p><b>Preventive measures:</b></p> <ul style="list-style-type: none"> <li>- <b>Indoors:</b> Consistent eradication of rats and cleaning of buildings</li> <li>- <b>Outdoors:</b> Flea control with subsequent rat and rodent control (urban rodent plague)</li> </ul>
Epidemic Relapsing Fever		<i>Borrelia recurrentis</i>	<p><b>Transmission:</b> Absorption (via scratching) of infected body louse matter</p> <p><b>Primary vector:</b> <i>Pediculus humanus</i> (body louse)</p>	<p><b>Transmission period:</b> Predominantly during the winter months of Dec.- April</p> <p><b>Incidence and seroprevalence:</b> Endemic nationally at a low, but rising level; epidemiological data not available at this time</p>	<p><b>Preventive measures:</b></p> <ul style="list-style-type: none"> <li>- <b>In endemic and epidemic regions:</b></li> <li>- Report every case of louse infestation</li> <li>- Since insecticidal powders for the mass control of body lice are no longer available NATO-wide, treatment of clothing</li> </ul>

				<p><b>Bite properties:</b> Lice live in human clothing, where they deposit their eggs (nits); they reach sexual maturity 2-3 weeks after hatching and require a blood meal at least every 6 days. Transmission of the agent occurs by scratching infected louse material (crushed louse tissue) into the bite wound; epidemic louse-borne relapsing fever is extremely dependent on the socio-economic environment (i.e., refugees, refugee camps)</p>	<p>is the only available recourse</p> <ul style="list-style-type: none"> <li>- Never “break off” body lice; this is one of the primary modes of infection (by scratching into the wound infectious louse cells under the fingernails)</li> <li>- Resistance: DDT</li> </ul>
Plague		<i>Yersinia pestis</i>	<p><b>Transmission:</b> (only urban rodent plague): Fleas</p> <p><b>Primary vector:</b> Unknown</p> <p><b>Secondary vectors:</b> <i>Ctenocephalides canis</i> (dog flea), <i>C. felis</i> (cat flea), <i>Pulex irritans</i> (human flea), various rodent fleas</p> <p><b>Urban reservoir:</b> House rats (<i>Rattus rattus</i>)</p> <p><b>Sylvatic reservoirs:</b></p>	<p><b>Transmission period:</b> Essentially year-round in cases of house rat infestation</p> <p><b>-Incidence and seroprevalence:</b> Enzootic sylvatic rodent plague is endemic in the northeast (Badakshan, Konar) along the Pakistani border; isolated cases of human bubonic plague occur, particularly along the Pakistani border;</p>	<p><b>Preventive measures:</b></p> <ul style="list-style-type: none"> <li>- Indoors: Permethrin-treated mosquito net (flea defense), insect repellent, rat control</li> <li>- <b>Outdoors:</b> Use insect repellent and permethrin-treated uniform</li> <li>- <b>In urban plague focus:</b> First, rat flea control with nondispersive insect powder (e.g., Nexion powder, active agent: Bromophos), then rat</li> </ul>

			<p><i>Meriones</i> ssp. (gerbils), various Microtinae (meadow mice)</p>	<p>epidemiological data are not available at this time  <b>Breeding grounds:</b> Fleas are "nest specific," meaning they live chiefly in the nests and resting places of their hosts  <b>Bite properties:</b> Rat fleas are nest specific, not host specific; all animal fleas also bite humans; fleas survive approx. 10 days without a blood meal, up to 2 months in low temperatures; a plague-infested flea lives an average of 3.2 days, since fleas inject adjuvant into the wound when they bite, and plague-infected fleas experience a "blood thrombus" in the esophagus because of the coagulase activity of <i>Y. pestis</i>; fleas take a test bite that strongly increases the probability of transmission of the plague agent to humans</p>	<p>eradication using rodenticides  <b>- Flea monitoring:</b> If more than 5 rat fleas per rat are found in a rodent plague-endemic region (accumulation on the surviving rodents), a rodent plague epidemic is to be assumed</p>
Tick-borne Relapsing Fever		<i>Borrelia persica</i>	<p><b>Transmission:</b> Bites of soft ticks or fluid from coxal glands of male or</p>	<p><b>Transmission period:</b> May-Oct., year-round in cases of building</p>	<p><b>Preventive measures:</b>  <b>- Indoors:</b> Soft tick monitoring and control</p>

			<p>female <i>Ornithodoros</i> spp. )  <b>Primary vectors:</b>  <i>Ornithodoros tholozani</i>  (nationwide)  <b>Secondary vectors:</b>  other <i>Ornithodoros</i>  species  <b>Reservoir:</b>  Wild rodents</p>	<p>infestation  <b>Incidence and seroprevalence:</b>  Apart from the extreme north and south, endemic nationally in a band running across Afghanistan; epidemiological data are not available at this time; cases tend to be sporadic  <b>-Habitat:</b> Soft ticks live hidden in walls, cracks, animal stables, the walls of wells, and other protected areas, often to a depth of 1 m  <b>Bite properties:</b>  Soft ticks (all stages) bite chiefly at night for 5-10 min.; due to the release of a neurotoxin, the bite is unnoticed; life cycle may exceed 10 years, depending on species and living conditions; capable of fasting (in infectious state) for several years</p>	<p>with acaricide barrier spray. Use treated mosquito nets  - Never camp in houses where livestock are kept  - <b>Outdoors:</b> Use insect repellent and permethrin-treated uniform; acaricide barrier (Propoxur=B5); avoidance of old animal stables, caravansaries, etc.</p>
Leptospirosis		<p><i>Leptospira icterohaemorrhagiae</i>,  <i>L. hebdomadis</i>,</p>	<p><b>Transmission:</b> Via contaminated water through active skin penetration by the bacteria</p>	<p><b>Transmission period:</b>  year-round  <b>Incidence and seroprevalence:</b> Endemic</p>	<p><b>Preventive measures:</b>  - Avoid contaminated waters  - Rat control over large</p>

		<p><i>L. tarassovi</i>, <i>L. grippotyphosa</i>, <i>L. pomona</i>, <i>L. javanica</i>, <i>L. canicola</i>, <i>L. ballum</i>, <i>L. bataviae</i></p>	<p>(agrarian mode of transmission), as well as through contact with infectious rodent urine and animal material (rural/urban by rodent infestation or infected livestock)</p> <p><b>Primary vectors:</b> Brown rat, <i>Rattus norvegicus</i>, hogs, mice, livestock</p> <p><b>Secondary vectors:</b> Other mammals</p> <p><b>Reservoirs:</b> Rats, other mammals</p>	<p>nationally; no epidemiological data for humans are available at this time; within livestock populations: water buffalo up to 55%, camels up to 30%, cows up to 25%, sheep 2.3%, goats 3.2%</p> <p><b>Mode of transmission:</b> - special note: micromicturition of infected synanthropic rodents, such as rats, which constantly emit urine in tiny droplets. Leptospiral reservoirs spread the agent very efficiently over large areas; therefore, after rodents have been successfully cleared from an area, disinfection of the entire area must be considered</p>	<p>areas around encampments, with subsequent surface disinfection</p> <p>- Minimize contact with livestock as much as possible</p>
Cutaneous Leishmaniasis (zoonotic)		<i>Leishmania tropica major</i>	<p><b>Transmission:</b> Sand fly bite</p> <p><b>Primary vectors:</b> - <i>Phlebotomus papatasi</i> (human transmission cycle), <i>P. caucasicus</i>, <i>P. papatasi</i> (zoonotic transmission cycle)</p>	<p><b>Transmission period:</b> April-Oct. (peaks in June and Sept.)</p> <p><b>Incidence and seroprevalence:</b> Endemic over the entire country except for the extreme eastern region</p>	<p><b>Preventive measures:</b></p> <p>- <b>Indoors:</b> Use permethrin-treated mosquito net; move to second floor (out of range)</p> <p>- <b>Outdoors:</b> Use insect repellent and permethrin-treated uniform; don't</p>

			<p><b>Secondary vectors:</b> <i>P. sergenti</i>, <i>P. major</i>, <i>P. longiductus</i> (only in the north),</p> <p><b>Reservoirs:</b> Wild rodents such as <i>Rhombomys opimus</i> (gerbil), <i>Meriones erythrourus</i>, <i>M. hurricanae</i>, <i>M. meridianus</i></p>	<p>(Pakistani border); no epidemiological data are available at this time, but increasing rapidly and contributing to widespread epidemics</p> <p><b>breeding grounds:</b> Sand flies breed in decaying matter; larvae develop in moist, dark places, especially in the nests of reservoir rodents</p> <p><b>Bite properties:</b> Female sand flies bite at dusk and dawn and are poor fliers, active only when no wind is present, though they readily enter structures to bite (endophilic, endophagic) and regularly penetrate mosquito nets due to their small size; generation time 5-7 weeks; prefer to bite in calf region</p>	<p>wear shorts; eliminate breeding grounds through rodent control and the removal of bushes and shrubs in camp areas (greater clearance)</p>
Cutaneous Leishmaniasis (anthroponotic)		<i>Leishmania tropica major</i> , <i>L. t. minor</i>	<p><b>Transmission:</b> Sand fly bite</p> <p><b>Primary vectors:</b> <i>Phlebotomus sergenti</i>, <i>P. papatasi</i></p> <p><b>Secondary vectors:</b> <i>P. ansarii</i>, <i>P. causicus</i> (only in northern half of</p>	<p><b>Transmission period:</b> Same as <i>L. tropica major</i></p> <p><b>Incidence and seroprevalence:</b> Endemic in the entire northwest half of the country, with evidence of a tendency to spread; epidemic in large</p>	<p>As with <i>L. tropica major</i>; do not keep dogs in camp areas</p>

			the country) <b>Reservoirs:</b> dogs and humans	cities; 1998/99: among Afghani refugees in Pakistan, 38% with active infections and an additional 13% with healed scars (agent contact); 1997 epidemic in Kabul estimated >100,000 cases/year; no further epidemiological data are available at this time	
Visceral Leishmaniasis		<i>Leishmania donovani</i> , <i>L. infantum</i>	<b>Transmission:</b> Sand fly bite <b>Primary vector:</b> <i>Phlebotomus major</i> (except in the extreme northeast) <b>Secondary vectors:</b> <i>P. papatasi</i> , <i>P. caucasicus</i> , <i>P. longiductus</i> <b>Reservoirs:</b> Canidae (jackals, foxes, dogs)	<b>Transmission period:</b> Same as <i>L. tropica major</i> <b>Incidence and seroprevalence:</b> Possibly endemic nationally in at least the western half of the country with sporadic cases; epidemiological data are not available at this time	As with <i>L. tropica major</i> ; do not keep dogs in camp areas
Malaria		<i>Plasmodium vivax</i> , <i>P. falciparum</i> , <i>P. malariae</i>	<b>Transmission:</b> <i>Anopheles</i> mosquito bite <b>Primary vectors:</b> - <i>An. fluviatilis</i> (nationwide), <i>An. superpictus</i> (except in the extreme northeast), <i>An. stephensi</i> (southeast only), <i>An. culicifacies</i>	<b>Transmission period:</b> June-Sept. in the Afghan highlands, May-Nov. in southern areas <b>Incidence and seroprevalence:</b> Endemic nationally (reports that Kabul is malaria free are	<b>Preventive measures:</b> - <b>Indoors:</b> Use permethrin-treated mosquito nets; do not use ultraviolet lamps - <b>Outdoors:</b> Use insect repellent and permethrin-treated uniform; minimize exposed skin

			<p>(southeastern half only), <i>An. hyrcanus</i> (southern Iran), <i>An. pulcherrimus</i> (nationwide)</p> <p><b>Secondary vectors:</b> other <i>Anopheles</i> species</p>	<p>questionable), hyper-endemic in all rice producing areas; 298,000 official cases in 1991; 115,000 cases in northwestern Afghanistan alone in 1999; there are still 2-3 million new cases/year in this region; approx. 40% of the population is currently <i>Plasmodium</i>-positive; approx. 10% <i>Pl. falciparum</i> with evidence of increase; increasing chloroquine resistance, particularly in the country's southern region</p> <p><b>Breeding grounds:</b> Residual water in urban areas (cans, buckets, old tires, etc.) (<i>An. stephensi</i>), large, slowly flowing ponds with water plants, or rice paddies (<i>An. hyrcanus</i>), and mountain lakes (<i>An. superpictus</i>)</p> <p><b>Bite properties:</b> Females bite at dawn and dusk; <i>An. superpictus</i> and <i>An. fluviatilis</i> do not bite in enclosed areas (exophilic,</p>	<p>- Continuous larval control and abatement in camp areas; elimination of breeding grounds</p> <p>- Resistance: <i>An. stephensi</i>, <i>An. culicifacies</i>, <i>An. hyrcanus</i>, <i>An. pulcherrimus</i>: DDT and dieldrin; <i>An. stephensi</i>, <i>An. culicifacies</i>: lindane</p>
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				exophagic); other species actively migrate indoors and bite there (endophilic, endophagic); very small species, such as <i>An. stephensi</i> , penetrate untreated mosquito nets; flight radius 1-2km	
Filariasis		<i>Wuchereria bancrofti</i>	<p><b>Transmission:</b> Bite of <i>Culex</i> and <i>Aedes</i> mosquitoes</p> <p><b>Primary vectors:</b> <i>Culex pipiens molestus</i>, <i>Culex quinquefasciatus</i></p>	<p><b>Transmission period:</b> May-Oct.</p> <p><b>Incidence and seroprevalence:</b> Current epidemiological status is uncertain; primary vectors are endemic nationally</p> <p><b>Breeding grounds:</b> Any small, stagnant or polluted bodies of water in urban areas</p> <p><b>Bite properties:</b> Both <i>Culex</i> species bite at dawn and dusk and migrate indoors to bite (endophilic, endophagic); infectious adult females overwinter in houses, animal stables, etc.; flight radius up to 2km</p>	<p><b>Preventive measures:</b></p> <ul style="list-style-type: none"> <li>- <b>Indoors:</b> Use permethrin-treated mosquito nets; do not use ultraviolet lamps</li> <li>- <b>Outdoors:</b> Use insect repellent and permethrin-treated uniform; minimize exposed skin</li> <li>- continuous larval control in camp areas (urban vectors); eliminate breeding grounds</li> </ul>

### Endemic Venomous Animals in Afghanistan

Venomous Animal Group:	Name:	Toxicity:	Remarks:
Poisonous Snakes	<i>Naja naja oxiana</i> , spectacled or Indian cobra (Elapidae)	Extremely toxic; large quantity of poison injected	Occurs throughout Afghanistan; up to 1.5 m long, brown with black zigzag band; avoids desert regions; prevalent in mountains up to 1800 m; species antivenom available
	<i>Agkistrodon halys</i> , pit viper (Crotalidae)	Mildly toxic	Prevalent in northern Afghanistan; 0.6 to 0.8 m long, triangular head, hornnail on end of tail, base coloring (back) is sand yellow to brown with unevenly formed horizontal stripes; occurs in high mountain meadows and riverbanks; moves slowly, rarely bites; mild toxin, no serious systemic intoxications reported, no antivenom available
	<i>Agkistrodon intermedius</i> ( <i>Gloydius intermedius</i> , <i>Agkistrodon halys intermedius</i> ), Asian pit viper (Crotalidae)	Probably mildly toxic	Occurs in northern Afghanistan; 0.6-0.8 m long, triangular head, base coloring (back) is grayish, brownish, olive or reddish with unevenly formed light horizontal stripes that are dark on the borders, dark cheek stripes; in grassy and bushy areas in mountain regions; behavior largely unknown; rarely bites, toxin is probably mild, no serious

		systemic intoxications reported, no antivenom available
<i>Echis multisquamatus</i> ( <i>E. carinatus multisquamatus</i> ), Central Asian sand viper (Viperidae)	Extremely toxic	Highly prevalent in Afghanistan and probably the most dangerous poisonous snake there; very aggressive; 40-60 cm long with grayish, greenish or yellow-brown base coloring with a lateral light and dark zigzag stripe and black and white marks on back, belly is brown with brown or dark marks; lives in dry sandy and bushy habitats as well as rocky regions; nocturnal in hot weather, diurnal in cool weather; emits a rattling sound when in danger by rubbing its scales against each other (with body in a figure-8-like position); very aggressive, bites quickly; mortality rate up to 36%, severe injuries in 30% of all bite cases, specific antivenom available (Institut d'Etat des Serums et Vaccines, Iran)
<i>Echis sochureki</i> , Sochurek's or Eastern saw-scaled viper (Viperidae)	Extremely toxic	Up to 0.8 m in length, base coloring on back gray-beige, belly is whitish with larger gray spots, light dorsal black-rimmed rows of spots that may form a zigzag pattern, grayish, cruciform pattern on top side of head; varied habitats, but prevalent in sandy, rocky, and populated areas, usually avoids humid areas, primarily nocturnal and terrestrial; venom is a potent hemotoxin, pains and swelling begin shortly after bite, systemic bleeding begins 6 hours after bite, deaths have been recorded, specific antivenom not available, partial neutralization with <i>Echis</i> antivenom is debatable
<i>Eristocophis macmahoni</i> , Macmahon's or leaf-nosed viper, Asian sand viper (Viperidae)	Moderately to extremely toxic	Prevalent in desert regions of Afghanistan up to 1200 m; maximum length 0.6-0.7 to 1m; base coloring is reddish brown with dark rows of spots on the sides, narrow white lines over the eyes, tail

			tip is yellowish without spot markings; active nocturnally and at dawn, buries itself in the sand during the day, "sidewinder" movements when fleeing, hisses loudly and raises its head noticeably, very aggressive when disturbed; toxin is extremely hemorrhagic, fatalities reported, antivenom not available
	<i>Pseudocerastes persicus persicus</i> , Persian horned viper (Viperidae)	Moderately toxic	Particularly prevalent in the southern half of Afghanistan; 0.5 to 0.7 (max 0.9) m long; base coloring is light gray or brownish-gray to khaki with darker spots on the back, tail tip is always black, head is wide and triangular with scaly horns over each eye; lives underground in sandy rocky areas up to 2000 m, nocturnal, rarely bites during the day, very aggressive at night, hisses loudly when disturbed; venom is primarily neurotoxic with systemic paralysis, specific antivenom is available
	<i>Vipera lebetina turanica</i> , Levantine viper (Viperidae)	Extremely toxic	Prevalent in all of Afghanistan, most common poisonous snake there; inhabits rocky areas; very aggressive when disturbed; mortality rate 6.6%, severe injury in 28% of bite cases, specific antivenom available
Arachnids	<i>Lycosa</i> spp., as well as other species of wolf spider	Mildly toxic	Mobile predator spider, wasp-like bite, usually only local symptoms
	Sun spiders (Solifugae)	Nontoxic	Very large (up to 10 cm) spider-like animals with crablike jaws, but without poison glands; display pedipalps (pincers), when endangered emit a hissing sound by rubbing jaws, actively jump at humans from up to 30 cm away; bites painfully, bite has cruciform appearance and high secondary infection rate
	Several species of scorpion are	Mildly toxic	The venom of most Iranian scorpions works

	prevalent; not all are deadly poisonous		hemolytically, with local symptoms, swelling and necrosis; systemic poisoning is usually acute; no deaths in Afghanistan have been reported to date; the extremely toxic Saharan wide-tailed scorpion ( <i>Androctonus australis</i> ) and related species do not occur in Afghanistan
Centipedes	<i>Scolopendra cingulata</i> , megarian banded centipede, as well as other large species	Mildly toxic	An aggressive predator common in populated places, living among humans; up to 10 cm long, some endemic species are even longer, front pair of legs transformed into jaws with poison glands; systemic symptoms are generally acute, rarely last longer than a day; a bite mark from a large centipede is rarely distinguishable from that of a mid-sized viper