

Vector-borne Infectious Diseases in Tajikistan

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Vector-borne Disease:	Incubation Period:	Agent:	Mode of Transmission/Vector:	Epidemiology:	Remarks:
Bunya Fever		<i>Bunyavirus</i> , Bunyaviridae	Transmission: Bite from different species of <i>Haemaphysalis</i> (hard tick) Primary Vectors: <i>Haemaphysalis cornupunctata</i> , <i>H. sulcata</i> , <i>H. kashmirensis</i> , <i>H. spp.</i> (sheep ticks) Reservoir: Sheep	Transmission period: March-Oct. Incidence and seroprevalence: Disease is endemic, no epidemiological data are available at this time Bite properties: Sheep ticks belong to the hard tick family Ixodidae and also afflict people; they feed at one spot for several days; the adults live near sheep stables, sheep pastures, etc., where they can fast for 2 to 3 years; life span can exceed 4 years	Preventive measures: - Avoidance of sheep stables, sheep pastures, etc. - Search/removal of hard ticks from self and companions - Use skin repellent and permethrin-treated uniform
Issyk-Kul Fever		Issyk-Kul virus, unclassified, Bunyaviridae	Transmission: Bite from different species of hard and soft ticks Primary vectors: Hard ticks: <i>Hyalomma anatolicum</i> , <i>H. detritum</i> , <i>H. dromedarii</i> , <i>H. marginatum</i> ,	Transmission period: March–Oct. with peak in July/Aug. Incidence and seroprevalence: Outbreak in southern Tajikistan from March to August 1982, seropositivity rate in humans there up to 8% Bite properties:	Preventive measures: - Avoidance of sheep stables, sheep pastures, etc. - Search/removal of hard ticks from self and companions

			<p><i>H.</i> spp. (sheep ticks); soft ticks: <i>Argas vespertilionis</i>; <i>A.</i> spp.; gnats: <i>Culicoides schultzei</i></p>	<p>Hard ticks (<i>Ixodes</i> and <i>Hyalomma</i> spp.) feed at one spot for several days; life cycle is 2-4 years. Soft ticks, family Argasidae, live in animal stables (active or deserted), wall cracks, nests, etc., and may fast up to 4 years; they bite for short periods, mostly at night for 5 to 10 minutes; depending on the species of soft tick, severe bite reactions are possible. Gnats are small, 1-1.5mm in size, bite at dusk and dawn as well as indoors, and occasionally occur in swarms</p>	<p>- Use insect repellent and permethrin-treated uniform - For transmission by soft ticks and gnats in lodging or camps, use treated mosquito nets - Soft tick control of the local area by spray/aerosol of acaricide (e.g., 1-2% Propoxur)</p>
Japanese Encephalitis	Japanese encephalitis virus, <i>Flavivirus</i> , Flaviviridae	<p>Transmission: Bite of <i>Culex</i> or <i>Anopheles</i> mosquito Primary vector: <i>Culex tritaeniorhynchus</i> Secondary vector: <i>Anopheles hyrcanus</i></p>	<p>Transmission period: May to Oct. Incidence and seroprevalence: Antibodies in animal reservoirs (e.g., birds) were verified in the late 1970s; up to that time, human cases had not been reported; range similar to that of the endemic JE vectors, <i>Culex tritaeniorhynchus</i> and <i>Anopheles hyrcanus</i>, with the result that infection is possible country-wide Bite properties: Female <i>Culex</i> and <i>Anopheles</i> mosquitoes bite at dawn and dusk as well as indoors; <i>Culex</i> females overwinter in basements, etc., flight radius up to 2 km Breeding grounds: <i>Culex</i>: thrives in small, stagnant or polluted bodies of water (cisterns, buckets, cans, old tires, etc.) in urban</p>	<p>Preventive measures: - Indoors: Permethrin-treated mosquito net, insect repellent - Outdoors: Larval mosquito control; use insect repellent combined with permethrin-treated uniform</p>	

				environments <i>Anopheles hyrcanus</i> : breeds in valley rice paddies	
Crimean-Congo Hemorrhagic Fever		Crimean-Congo hemorrhagic fever virus <i>Nairovirus</i> , Bunyaviridae	Transmission: Bite or exposure to hard tick cell material, mostly <i>Hyalomma</i> spp.; or soft ticks in the genus <i>Ornithodoros</i> Primary vector: <i>Hyalomma marginatum</i> (sheep tick) Secondary vectors: <i>H. anatolicum</i> , <i>H. detritum</i> , <i>H. dromedarii</i> , <i>H. impeltatum</i> , <i>H. schulzei</i> , <i>H. asiaticum</i> , <i>H. marginatum</i> , <i>Haemaphysalis pospelovashstromae</i>	Transmission period: March-Oct. Incidence and seroprevalence: Endemic nationally, occurring mostly in sheep shearers; up to 40% of sheep ticks (<i>Hyalomma</i> spp.) in endemic regions carry the virus; seroprevalence in humans is unknown at this time Habitat: Dry areas, animal stables and trails, former pastures Bite properties: 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; larger nymphs and adults favor large mammals or humans and are not host specific; fasting adult ticks survive up to 4 years	Preventive measures: - Avoidance of old animal stables, etc. - Use of insect repellent or permethrin-treated uniform (for ticks, permethrin is a more effective repellent than DEET) - Search/removal of hard ticks from self and companions - For soft tick vectors in lodging: treated mosquito nets with simultaneous soft tick control using 1-2% Propoxur (acaricide)
Sand Fly Fever (Papatasi Fever)		Sand fly fever virus, <i>Phlebovirus</i> , Bunyaviridae, Sicilian, Naples, and Karimabad serotypes identified	Transmission: Sand fly bite Primary vector: <i>Phlebotomus papatasi</i>	Transmission period: April-Oct. (peaks in early June and August) transovarial transmission possible Incidence and seroprevalence: No epidemiological data are available at this time; urban modes of transmission exist Breeding grounds: see Cutaneous Leishmaniasis	Same as cutaneous leishmaniasis (<i>L. tropica</i>)

				Bite properties: same as <i>L. tropica</i> (see CL)	
Sindbis Fever		Sindbis fever virus, <i>Alphavirus</i> , Togaviridae	Transmission: Mosquito or hard tick bite Primary vectors: <i>Culex pipiens</i> , <i>Cx. bitaeniorhynchus</i> , <i>Cx. tritaeniorhynchus</i> ; <i>Hyalomma anatolicum</i> Reservoir: Birds	Transmission period: March-Oct. Incidence and seroprevalence: No epidemiological data are available at this time Bite properties: <i>Culex</i> mosquitoes bite at dawn and dusk and also indoors; females overwinter in basements, etc. Sheep ticks live in dry areas, animal stables and trails, and former pastures Breeding grounds: <i>Culex</i> mosquitoes thrive in small, stagnant or polluted bodies of water (cisterns, buckets, cans, old tires, etc.) in urban environments; 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; larger nymphs and adults favor large mammals or humans and are not host specific; fasting adult ticks survive up to 4 years	Preventive measures: - Indoors: Permethrin-treated mosquito net, insect repellent - Outdoors: Larval mosquito control; insect repellent combined with permethrin-treated uniform; observe proper waste disposal (water collecting in empty food containers, tires, etc.) - Search/removal of hard ticks from self and companions
Dengue Fever		Dengue fever virus, <i>Flavivirus</i> , Flaviviridae	Transmission: Bite from <i>Aedes aegypti</i> or other <i>Aedes</i> species Primary vector: <i>Aedes aegypti</i> (yellow fever	Transmission period: May-Sept. Incidence and seroprevalence: No epidemiological data are available at this time; confirmed cases in northern Pakistan as well as in China along the	Preventive measures: - Larval mosquito control and abatement - Use insect repellent and permethrin-treated

			mosquito), <i>Ae. albopictus</i> (Asian tiger mosquito)	Tajikistan border Bite properties: Female <i>Aedes aegypti</i> and <i>Ae. albopictus</i> bite outdoors during the day, but also at dusk and indoors; flight radius approx. 500 m Breeding properties: <i>Aedes aegypti</i> and <i>Ae. albopictus</i> breed in any available bodies of water in urban areas, also in drainage dishes of flowerpots, automobile tires, cans, etc.	uniform - Mount fly screens on openings in buildings
Hissar Virus		Hissar virus fever, Bunyaviridae	Transmission: Bite or coxal fluids from soft ticks of the genus <i>Argas</i> (nymphs and adults) Primary vectors: <i>Argas vulgaris</i>	Transmission period: April-Oct., year-round in building infestations Incidence: Endemic throughout the northern part of the country Habitat: Walls, cracks, animal stables, well walls and other protected areas, often up to 1 m deep Bite properties: Soft ticks bite chiefly at night for 5-10 minutes; due to injection of a neurotoxin, the bite is not noticed for a few hours; life span may exceed 10 years, depending on species and living conditions; capable of fasting (while remaining infectious) for several years	Preventive measures: - Indoors: Soft tick monitoring and control with acaricide barrier spray, or use of treated mosquito nets - Outdoors: Use insect repellent or permethrin-treated uniform - Acaricide treatment - Avoidance of old animal stables, caravansaries, etc.
Isfahan Virus		Isfahan virus fever, Rhabdoviridae	Transmission: Sand fly bite Primary vector: <i>Phlebotomus papatasi</i>	Transmission period: April-Oct., with peaks in early June and in August; transovarial transmission	Same as cutaneous leishmaniasis (<i>L. tropica</i>)

				possible Incidence and seroprevalence: No epidemiological data are available at this time Breeding grounds: See Cutaneous Leishmaniasis Bite properties: Same as <i>L. tropica</i> (see CL)	
Tahyna Fever		Tahyna fever virus, <i>Bunyavirus</i> , Bunyaviridae	Transmission: Bite of <i>Aedes</i> mosquitoes Primary vectors: <i>Aedes vexans</i> , <i>Ae. cantans</i> , <i>Ae. sticticus</i> (forest and meadow mosquitoes), <i>Ae.</i> spp. Reservoir: Small mammals	Transmission period: May-Oct. Incidence and seroprevalence: No epidemiological data are available at this time; evidence of this virus has been found in <i>Aedes</i> mosquitoes in urban areas (downtown Dushanbe) Bite properties: <i>Aedes</i> mosquitoes bite outdoors during the day and somewhat at dusk; they don't actively enter homes (exophilic, exophagic). The bite response to <i>Ae. vexans</i> can be especially unpleasant, over 200 human bites per minute having been documented during swarms (be alert for bite reactions); flight radius of this species is up to 20 km Breeding grounds: Floodwater mosquitoes can emerge in large quantities in forests (they may breed in tree cavities) and/or in meadows in spring or after heavy rains; overwintering occurs in the egg stage. Eggs are capable of hatching year-round.	Preventive measures: - Eliminate breeding grounds in camp areas - Use insect repellent and permethrin-treated uniform

West Nile Fever		West Nile fever virus, <i>Flavivirus</i> , Flaviviridae	<p>Transmission: Bite of <i>Culex pipiens</i> (house mosquito)</p> <p>Primary vector: <i>Culex pipiens</i></p> <p>Reservoir: Birds</p>	<p>Transmission period: May-Nov.</p> <p>Incidence and seroprevalence: No data are available at this time</p> <p>Bite properties: <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</p> <p>Breeding grounds: Thrives in small, stagnant or polluted bodies of water (cisterns, buckets, cans, old tires, etc.) in urban areas</p>	<p>Preventive measures:</p> <ul style="list-style-type: none"> - Indoors: Permethrin-treated mosquito net, or insect repellent - Outdoors: Larval mosquito control; insect repellent combined with permethrin-treated uniform; reduction of breeding grounds by proper waste management
Hemorrhagic Fever with Renal Syndrome		Hantaviruses of the Seoul, Hantaan, Dobrava, and Puumala serotypes, Bunyaviridae	<p>Transmission: Contact with infectious dust or aerosols (rodent excrement, rodent urine), contact with infectious rodent feces and urine, rodent bites, secondarily by vectors such as hematophagous mites</p> <p>Primary vectors/reservoirs (nationwide incidence)</p> <ul style="list-style-type: none"> - Seoul serotype: house and brown rats - Hantaan/Dobrava serotypes: <i>Apodemus sylvaticus</i> (field mouse), <i>A. agrarius</i> (striped field mouse), <i>A. flavicollis</i> (yellow-necked field mouse) - Puumala serotype: 	<p>Incidence and seroprevalence: Hantavirus diseases have been confirmed at low levels in southern Tajikistan since 2001. HFRS is a serious problem in neighboring Kazakhstan and especially in China, with more than 100,000 cases/year and incidence rates over 200/100,000. All rodent reservoirs occurring there, especially rats, striped field mice (<i>Apodemus agrarius</i>), and prairie voles (<i>Microtus</i> spp.) are endemic nationally.</p> <p>Transmission period: Peaks in spring and fall, year-round transmission possible in synanthropic rodents (rats)</p> <p>Modes of transmission:</p> <ul style="list-style-type: none"> - Behavior patterns of reservoir 	<p>Preventive measures:</p> <ul style="list-style-type: none"> - In urban/camp areas: eradication of synanthropic rodents (rats and mice) by the combined implementation of rodenticide (poison-baiting) with structural preventive measures, including hygienic measures (optimized waste disposal, for example); cleansing of all affected areas of rodent excrement, including upstream - In rural and sylvatic areas, use pourable poison bait for epidemic control

			<p><i>Clethrionomys glareolus</i> (red bank vole), <i>Microtus</i> spp. (prairie voles), <i>Ondatra zibethicus</i> (muskrat)</p>	<p>species and their level of synanthropy combine to render disease sylvatic, rural, or urban</p> <p>- Reservoir rodents release urine in tiny droplets (micromicturition) to mark territory; virus transmission via aerosol or dust is therefore very efficient</p>	<p>of prairie voles and field mice</p>
Siberian Tick Typhus		<i>Rickettsia sibirica</i>	<p>Transmission: Hard tick bite, especially sheep ticks of the genera <i>Dermacentor</i> and <i>Haemaphysalis</i></p> <p>Primary vectors: <i>Dermacentor silvarum</i> and <i>D. marginatus</i>, <i>Hyalomma marginatum</i></p>	<p>Transmission period: March-Oct.</p> <p>Incidence and seroprevalence: No epidemiological data from Tajikistan are available at this time; endemic in Kazakhstan and the border areas of Pakistan and China</p> <p>Bite properties: 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 spaces</p>	<p>Preventive measures:</p> <ul style="list-style-type: none"> - Avoidance of sheep stables, sheep pastures, etc. - Search/removal of hard ticks from self and companions - Use of insect repellent and permethrin-treated uniform
Louse-borne Typhus, Epidemic Typhus		<i>Rickettsia prowazekii</i>	<p>Transmission: Intake of infectious body louse material</p> <p>Primary vector: <i>Pediculus humanus</i> (body louse)</p> <p>Reservoir: Humans (Brill-Zinsser disease)</p>	<p>Transmission period: Predominantly during the winter months of Dec.-April</p> <p>Incidence and seroprevalence: Endemic in the border areas of Afghanistan, seroprevalence there up to 13%; incidence in Tajikistan likely, but epidemiological data are not available at this time</p> <p>Bite properties: Lice live in human clothing and deposit their eggs (nits)</p>	<p>Preventive measures:</p> <p>- In endemic and epidemic regions:</p> <ul style="list-style-type: none"> - Report every case of louse infestation - Since insecticidal powders for the mass control of body lice are no longer available NATO-wide, treatment of clothing is the only

				there; they reach sexual maturity 2-3 weeks after hatching. Lice require a blood meal at least every 6 days. Transmission of the agent occurs by inhalation (louse feces) or by scratching of infected louse material (crushed louse tissue) into the bite wound. A louse-borne typhus epidemic is extremely dependent on the socio-economic environment (i.e., refugees, refugee camps)	available recourse - 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)
Mediterranean Fever (Boutonneuse Fever)		<i>Rickettsia conorii</i>	<p>Transmission: Bite from various hard ticks</p> <p>Primary vector: <i>Rhipicephalus sanguineus</i> (brown dog tick)</p> <p>Secondary vectors: <i>Hyalomma marginatum</i>, <i>H. anatolicum</i>, <i>Rhipicephalus turanicus</i></p> <p>Reservoirs: Wild rodents, dogs, other mammals</p>	<p>Transmission period: March to Nov., year-round in cases of building infestations or chronic infestations in dogs</p> <p>Incidence and seroprevalence: Present but at unknown epidemiological levels; regional occurrence of the disease is strongly localized (“hot-spots”)</p> <p>Bite properties: Brown dog ticks also afflict humans; they feed at one spot for several days, after which the female lays up to 2,000 eggs, even in residential buildings, where larvae may attack people as well as dogs</p>	<p>Preventive measures:</p> <ul style="list-style-type: none"> - Avoidance of old animal stables etc. - Use insect repellent combined with permethrin-treated uniform (permethrin is a more effective repellent than DEET) - Search/removal of hard ticks from self and companions - For infestations in housing: use treated mosquito nets with simultaneous tick control, e.g., 1-2% Propoxur (acaricide)
Mite-borne Typhus (Tsutsugamushi Fever)		<i>Orientia</i> (formerly <i>Rickettsia</i>)	<p>Transmission: Bite from larval red (trombiculid) mites (about 0.1 mm in size)</p>	<p>Transmission period: April-Oct.</p> <p>Incidence and seroprevalence: Presented at unknown</p>	<p>Preventive measures:</p> <ul style="list-style-type: none"> - Use insect repellent and permethrin-treated

		<i>tsutsugamushi</i>	<p>Primary vector: <i>Leptotrombidium deliense</i>, <i>L. akamushi</i></p>	<p>epidemiological levels; regional occurrence of the disease is strongly localized (“hot-spots”) Reservoir: Rodents and larval red (trombiculid) mites, the latter by transovarial transmission; endemic on mountainsides up to 3,200 m Bite properties: The larval mites are six-legged (but are not insects), very small (ca. 0.1mm), very fast, red to dark in color, and bite at any opportunity day or night. Bites may not be noticed for a few hours. Scratching itchy, bitten skin may lead to secondary infections</p>	<p>uniform; permethrin is a more effective repellent than skin protectants with the active ingredient DEET - Minimize exposed skin (long pants) - Strict avoidance of known red mite habitat (grassy savannahs). - Due to their small size, larval mites are very hard to see; conduct surveys by placing a sheet of white paper on the ground</p>
Murine Typhus, Endemic Typhus Fever		<i>Rickettsia typhi</i> (formerly <i>R. mooseri</i>)	<p>Transmission: Intake of infectious rodent flea material (cellular or fecal) Primary vector: <i>Xenopsylla</i> spp. (rat fleas) Secondary vectors: <i>Ctenocephalides felis</i> (cat flea), other rodent fleas Reservoir: Rats harboring the enzootic vector <i>Polyplax spinulosa</i> (rat louse)</p>	<p>Transmission period: Year round in cases of rat infestation Seroprevalence: Current data for Tajikistan are not available. Seropositivity rate within the population of neighboring Afghanistan is 5%. Bite properties: 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 at low temperatures; transmission of the agent occurs by inhalation or by scratching of dust containing infectious flea material (crushed fleas, flea feces) into wounds</p>	<p>Preventive measures: - Indoors: Consistent eradication of rats and rodents and cleaning of buildings - Outdoors: Flea control with subsequent rat and rodent control</p>
Plague		<i>Yersinia pestis</i>	Transmission: (only urban	Transmission period: Possible year-	Preventive measures:

			<p>rodent plague): fleas Primary vector: <i>Ctenocephalides canis</i> (dog flea), <i>C. felis</i> (cat flea), <i>Pulex irritans</i> (human flea), other rodent fleas Urban reservoir: House rats (<i>Rattus rattus</i>) Sylvatic reservoirs: <i>Meriones persicus</i>, <i>M. lybicus</i>, <i>M. vinogradoni</i>, various Dipodidae (gerbils), various Microtinae (meadow mice), European ground squirrel (<i>Citellus suslicus</i>), etc. The rat fleas <i>Xenopsylla cheopis</i> and <i>X. astia</i>, which do <u>not</u> occur nationwide</p>	<p>round in cases of house rat infestation Incidence and seroprevalence: Enzootic rodent plague is endemic in border regions of Afghanistan and China, with sporadic human cases there; no further details on incidence and seroprevalence in humans in Tajikistan Breeding grounds: Fleas are nest specific, remaining primarily in the resting places of their rodent hosts Bite properties: Rodent 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 (quarantine!); a plague- infected 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> (thus clotting blood); fleas take a test bite that strongly increases the probability of transmission of the plague agent to humans</p>	<p>- Indoors: Permethrin-treated mosquito net (flea defense), insect repellent, rat control in accordance with health regulations - Outdoors: Use insect repellent and permethrin-treated uniform - In urban plague focus: First, rat flea control with nondispersive insect powder, then rat eradication using rodenticides - Flea monitoring: 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>
Lyme Disease		<i>Borrelia burgdorferi</i> , s.l.	<p>Transmission: Hard tick bite Primary vector: <i>Ixodes</i> spp. Secondary Vector:</p>	<p>Transmission period: March-Oct. Incidence and seroprevalence: Incidence of Lyme disease in Tajikistan is uncertain; the Asiatic primary vector, <i>Ixodes persulcatus</i>, is</p>	<p>Preventive measures: - Use insect repellent and permethrin-treated uniform - Search for attached ticks</p>

			Other <i>Ixodes</i> species.	not endemic nationally; confirmed cases in northern Kazakhstan; no epidemiological data on prevalence Bite properties: <i>Ixodes</i> species readily attack humans; all stages suck blood and are vectors (transovarial and transstadial transmission occurs); life cycle approx. 3-4 years; live predominantly on forest edges and along animal trails, where they quest from low shrubbery - <i>Borrelia</i> activation occurs after a human is bitten. The pathogen then flows through the salivary glands, from which it is transmitted to the host. Therefore, ticks are infective for <i>Borrelia</i> after a minimum of 24 hrs.	on self and companions - Remove feeding hard ticks as quickly and carefully as possible in order to avoid infection
Tick-borne Relapsing Fever		<i>Borrelia persica</i>	Transmission: Bites of soft ticks or fluid from coxal glands of male or female <i>Ornithodoros</i> spp. Primary vectors: <i>Ornithodoros tholozani</i> Reservoir: Wild rodents	Transmission period: April-Oct., year-round in cases of building infestation Incidence and seroprevalence: Endemic nationally and somewhat highly so (for example, in the western Pamir region); no seroepidemiological data are available at this time; frequency of disease is primarily associated with the spatial proximity of animal stables and living quarters Habitat: Soft ticks hide in walls, cracks, animal stables, well walls and	Preventive measures: - Indoors: Soft tick monitoring and control with acaricide barrier spray; use treated mosquito nets - Outdoors: Use insect repellent and permethrin-treated uniform; acaricide barrier; avoidance of old animal stables, caravansaries, etc.

				<p>other protected areas, often up to 1 m deep</p> <p>Bite properties: Soft ticks chiefly bite at night for 5-10 min.; due to the release of a neurotoxin, the bite is seldom noticed; life cycle may exceed 10 years, depending on species and living conditions; capable of fasting (in infectious state) for several years</p>	
Epidemic Relapsing Fever		<i>Borrelia recurrentis</i>	<p>Transmission: By scratching of infected body louse material into wounds</p> <p>Primary vector: <i>Pediculus humanus</i> (body louse)</p>	<p>Transmission period: Predominantly during the winter months from Dec.-April</p> <p>Incidence and seroprevalence: Low-level national occurrence; seroepidemiological data are not available at this time</p> <p>Bite properties: Lice live in human clothing and deposit their eggs (nits) there; they reach sexual maturity 2-3 weeks after hatching; they require a blood meal at least every 6 days; transmission of the agent occurs by scratching infected louse material (crushed louse tissue) into bite wounds. A louse-borne relapsing fever epidemic is highly dependent on the socio-economic environment (i.e., refugees, refugee camps)</p>	<p>Preventive measures:</p> <p>- In endemic and epidemic regions:</p> <ul style="list-style-type: none"> - Report every case of louse infestation - Since insect powders for the mass control of body lice are no longer available NATO-wide, treatment of clothing is the only recourse - 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)
Trachoma		<i>Chlamydia trachomatis</i>	<p>Transmission: Approx. 75% of <i>C. trachomatis</i> cases result from passive</p>	<p>Transmission period: Primarily May-Oct.</p> <p>Incidence and seroprevalence:</p>	<p>Preventive measures:</p> <ul style="list-style-type: none"> - Fly and maggot control - Proper and professional

			transmission by flies	Trachoma is moderately to highly endemic, especially in urban areas Mode of transmission: Transmission chiefly (up to 75%) by contact with flies, which transfer the agent by touch or defecation	disposal of organic waste, including feces; to inhibit fly infestation and reproduction: - install fly screens on all building openings - use ultraviolet light traps - use flytraps - Resistance: house flies (<i>Musca domestica</i>) are resistant to chlorpyrifos, permethrin, fenvalerate and ethofenprox
Cutaneous Leishmaniasis		<i>Leishmania tropica</i> (Kabul strain)	Transmission: Sand fly bite Primary vectors: - human transmission cycle: <i>Phlebotomus caucasicus</i> , <i>P. sergenti</i> - zoonotic transmission cycle: <i>P. caucasicus</i> , <i>P. papatasi</i> Secondary vector: <i>P. longiductus</i> Reservoirs: Wild rodents such as <i>Rhombomys opimus</i> (gerbil), <i>Meriones erythourus</i> , <i>M. hurricanae</i> , <i>M. meridianus</i>	Transmission period: April-Oct., with peaks in June and Sept. Incidence and seroprevalence: Focally endemic nationally; due to sharply rising frequency, no case numbers are available at this time; since 1998, an urban outbreak in Kabul has produced more than 300,000 cases annually, at least partly because of introduction of the parasite by refugees from Pakistan, who have infection rates up to 40%; current indications point to spread of an epidemic due to refugee migration Breeding grounds: Breeds in decaying matter, larvae develop in dark, moist places, especially the nests of reservoir rodents Bite properties: Females bite at dusk	Preventive measures: - Indoors: Use permethrin-treated mosquito nets; move to second floor (out of range) - Outdoors: Use insect repellent and permethrin-treated uniform; don't wear shorts/sandals; eliminate breeding grounds through rodent control and the removal of bushes and shrubs in camp areas (greater clearance)

				and dawn but are poor fliers, active only on windless days, when they readily enter buildings to bite (endophilic, endophagic) and regularly penetrate untreated mosquito nets due to their small size; generation time 5-7 weeks; prefer to bite in calf region	
Visceral Leishmaniasis		<i>Leishmania donovani</i>	<p>Transmission: Sand fly bite</p> <p>Primary vector: <i>P. caucasicus</i></p> <p>Secondary vectors: <i>P. longiductus</i>, <i>P. argentipes</i>, <i>P. chinensis</i>, <i>P. tobbi</i>, <i>P. kandelakii</i>, <i>P. wenyoni</i></p> <p>Reservoir: Canidae (jackals, foxes, dogs)</p>	<p>Transmission period: April-Oct.</p> <p>Incidence and seroprevalence: Focally endemic nationally with sporadic cases; no epidemiological data are available at this time</p>	<p>Breeding grounds: Same as <i>L. tropica</i>; do not keep dogs in camp areas</p>
Leptospirosis		<i>Leptospira icterohaemorrhagiae</i> , <i>Leptospira</i> spp.	<p>Transmission: Via contaminated water through active skin penetration by the bacteria, as well as through contact with infectious rodent urine and animal material</p> <p>Primary vector: Brown rat, <i>Rattus norvegicus</i>, hogs, mice</p> <p>Secondary vectors Other mammals</p> <p>Reservoir:</p>	<p>Transmission period: Year-round</p> <p>Incidence and seroprevalence: Endemic nationally, no epidemiological data available at this time; 1998 epidemic onset in the metropolitan areas of Ust-Kamenogorsk, East Kazakhstan, with over 2000 cases of sickness and >6 deaths; seroprevalence of 6% within the Pakistani military in 1989</p> <p>Mode of transmission: - Special note: micromicturition of infected synanthropic rodents, such as</p>	<p>Preventive measures:</p> <ul style="list-style-type: none"> - Avoid contaminated waters - Rat control over a large area around the camp with subsequent surface disinfection

			Rats, other mammals	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	
Malaria		<i>Plasmodium vivax</i> , <i>P. falciparum</i> , <i>P. malariae</i>	<p>Transmission: <i>Anopheles</i> mosquito bite</p> <p>Primary vectors: <i>An. pulcherrimus</i>, <i>An. superpictus</i>, <i>An. claviger</i></p> <p>Secondary vectors: <i>An. hyrcanus</i>, <i>An. martinius</i></p>	<p>Transmission period: May-Sept.</p> <p>Incidence and seroprevalence: Endemic or epidemic nationally; until 1992, 200-300 cases of <i>P. vivax</i> were reported annually; because of the unstable political climate and the movement of refugees, there has been a drastic increase in vivax malaria, plus introduction of falciparum malaria (since 1997); official case numbers: 1993=619; 1994=2411; 1995=6103; 1996=16568; 1997=30054; 1998=19292; 1999=13492 cases, 335 of which were <i>P. falciparum</i>; 200,000 - 500,000 malaria cases were registered in 1997; professionals estimate that approx. 2 million cases/year are currently present, with increasing frequency in southern Tajikistan, northern Afghanistan and southern Turkmenistan</p> <p>Breeding grounds: A variety of standing waters in urban areas, ranging from small (cans, buckets, old</p>	<p>Preventive measures:</p> <ul style="list-style-type: none"> - Indoors: Use permethrin-treated mosquito nets; do not use ultraviolet lamps - Outdoors: Use insect repellent and permethrin-treated uniform; minimize exposed skin - Continuous larval control and abatement in camp areas; elimination of breeding grounds - Vector resistance status: - <i>Anopheles superpictus</i>: DDT, malathion, fenitrothion, propoxur

				<p>tires, etc.) to large, slowly flowing ponds and rivers, etc.; <i>Anopheles hyrcanus</i> and <i>An. martinius</i> are especially prevalent in rice paddies along the Syr Darya River</p> <p>Bite properties: Females bite at dawn and dusk; <i>Anopheles superpictus</i> does not bite in enclosed areas (exophilic, exophagic), but other species actively migrate indoors and bite there (endophilic, endophagic); very small species penetrate untreated mosquito nets; flight radius 1-2 km</p>	
Diseases of Veterinary Importance Warranting Special Inquiry:					
Sheep Pox				No data concerning Tajikistan available at this time	
Brucellosis		<i>Brucella</i> spp.		Incidence and seroprevalence: Endemic nationally; further details of species distribution and epidemiology are not available at this time	
Q Fever		<i>Coxiella burnetii</i>		Incidence and seroprevalence: Status in Tajikistan uncertain; there have been cases of Q fever in Russian soldiers in Afghanistan; occurrence in Tajikistan is therefore likely	
Anthrax, Splenic Fever		<i>Bacillus anthracis</i>		Incidence and seroprevalence: Increasing occurrence within population since 1999; more detailed epidemiological data not available at this time	

Endemic Venomous Animals in Tajikistan

Venomous Animal Group:	Name:	Toxicity:	Remarks:
Poisonous Snakes, mortality rate 50-100/100,000	<i>Naja naja oxiana</i> , spectacled or Indian cobra, oxus or brown cobra (Elapidae)	Extremely toxic	Up to 1.8 m long, primary color is yellowish, brownish, greyish or black, partial cruciform traces visible on back, two dark bands in neck region, atypical spectacled collar, but neck region is dilatable into a cobra-like hood; prefers rocky, cliffy habitats on mountainsides up to 3000 m; diurnal with maximum activity mornings and evenings; very clever and agile, raises anterior portion of body when it senses danger, does not spit over a distance; poison is primarily neurotoxic, pathology begins approx. 1 hour after bite, symptoms can worsen extremely quickly, with death from respiratory paralysis; antivenom: Centro de Estandarization de Venenos y Antivenenos, Spain; Institut d'Etat des Serums et Vaccines, Iran; Ministry of Public Health, Russia
	<i>Agkistrodon halys</i> , pit viper (Crotalidae)	Mildly toxic	Prevalent in entire country; during the day, hides under rocks, in rodent nests and chasms; rarely bites; 60 to 80 cm long, head flat and angular, hornnail on end of tail, coloring extremely variable, from sand yellow to brown to black, often with unevenly formed horizontal stripes; inhabits varying habitats from steppes to high mountain meadows; no bite complications resulting in death reported to date
	<i>Echis multisquamatus</i> ,	Extremely toxic	Prevalent in the steppe regions in Tajikistan, where

multiscaled or Transcaspian saw-scaled viper, Central Asian sand viper (Viperidae)		it is the most dangerous poisonous snake; very aggressive; up to 80 cm long with brownish base coloring and lateral light and dark zigzag stripe and black and white marks on back; emits a rattling sound when in danger; mortality rate 36%, severe injury 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 long, base coloring grayish beige, underside is whitish and stippled with black, spot-like markings on back, which may run in a zigzag band; habitats are quite varied, including damp areas and plains; swims, climbs on shrubs and trees; very aggressive; possesses a potent hemotoxin causing systemic hemorrhaging 6 hours after bite; fatalities described, no antivenom available
<i>Eristocophis macmahoni</i> , Macmahon's or leaf-nosed viper, Asian sand viper (Viperidae)	Extremely toxic	Length 0.6 to 0.7 m (up to 0.8 m in rare instances); prevalent in desert regions of southern Tajikistan, Afghanistan and Pakistan; burrows in the sand, rarely occurring up to 1,200 m altitude; base coloring reddish brown with dark rows of spots on the back, tail tip with characteristic black horizontal rings; active at night and dusk; aggressive; possesses a potent hemotoxin; fatalities described, no antivenom available
<i>Pseudocerastes persicus persicus</i> , Persian horned viper (Viperidae)	Moderately toxic	Length 0.5 to 0.7 m (max. 0.9 m), base coloring yellow gray or blue gray to beige, brownish gray horizontal stripes on the back, head is very wide and distinct from neck, has a scaly horn over each eye; thrives in sandy, rocky bush habitats up to an altitude of 2000 m; nocturnal, somewhat active

			during the day, extremely aggressive at night; gives a loud hissing sound when in danger, executes characteristic lateral movements (“sidewinder”), hides in rodent nests; venom is primarily neurotoxic, in severe cases victims are conscious, but nonresponsive; antivenom: Centro de Estandarization de Venenos y Antivenenos, Spain; Institut d’Etat des Serums et Vaccines, Iran
	<i>Daboia lebetina obtusa</i> , blunt-nosed viper, Levantine viper (Viperidae)	Extremely toxic	Occurs throughout Tajikistan; length up to 1.7 m, wide head with small scales, eyes have vertical pupils, primary coloring fluctuates between stony gray, light gray and greenish gray to reddish gray, form dissolves to darker horizontal band markings; can be confused with the harmless Münzennatter; inhabits cliffy/rocky areas and mountainsides that lean toward riverbeds, rarely occurs over 2,000 m altitude; very aggressive when disturbed; mortality rate 6.6%, severe trauma/injury in 28% of bite cases, specific antivenom is available
Arachnids	<i>Lycosa</i> spp., as well as other species of wolf spider	Mildly toxic	Active predaceous spiders, wasp-like bite, usually only localized symptoms
	Sun spiders (Solifugae)	Nontoxic	Occur in the country’s steppe regions; very large (up to 10 cm) spider-like arachnids with crablike jaws but without poison glands; display pedipalps (pincers) when endangered and emit a hissing sound by rubbing the jaws; will jump at humans from up to 30 cm away and bite painfully; bite has cruciform appearance and high secondary infection rate
	Scorpions in the genera <i>Mesobuthus</i> and <i>Orthochirus</i> (<i>Mesobuthus eupeus</i> ,	Mildly toxic	Occur throughout the country; the venom in Tajikistani species acts hemolytically, with local pain, swelling, and necrosis; systemic poisoning is

	<i>Orthochirus scrobiculosus</i> , etc.)		generally acute; no cases of death have been recorded in Tajikistan to date (no extremely poisonous species are endemic)
Centipedes	<i>Scolopendra cingulata</i> , megarian banded centipede, as well as other large species	Mildly toxic	Common in areas inhabited by 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; bite marks from large centipedes are almost indistinguishable from those of a mid-sized viper