ANNEX 2 Specific Features of VHFs[14]

Geographical and epidemiological characteristics of VHFs			
Disease	**Geography**	**Vector/Reservoir**	**Human Infection**
Crimean Congo HF	• Africa • Balkans • China (Western) • Former Soviet Union (Southern) • Middle East	**Ticks**. Tick-mammal-tick maintenance.	• Tick bites. • Squashing ticks. • Exposure to aerosols or fomites from slaughtered cattle and sheep (domestic animals do not show evidence of illness but may become infected when transported to market or when held in pens for slaughter). • Nosocomial epidemics have occurred.
Dengue HF, Dengue Shock Syndrome (DHF/DSS)	All Tropic and subtropical Regions	***Aedes aegypti* mosquitoes**. Mosquito-human-mosquito maintenance. Transmission occurs with the frequent geographic transport of viruses by travellers.	Increased world-wide distribution of the mosquito and the movement of dengue viruses in travellers is increasing the areas that are becoming infected.
Ebola HF and Marburg HF	Africa	**Unknown.**	• Virus is spread by close contact with an infected person. • Route of infection of the first case is unknown. • Infected non-human primates sometimes provide transmission link to humans. • Aerosol transmission is suspected in some monkey infections.
Lassa Fever	West Africa	**Mice.** The *Mastomys* genus of the mouse.	• Transmitted by aerosols from rodent to man. • Direct contact with infected rodents or their droppings, urine, or saliva. • Person-to-person contact. Note: The reservoir rodent is very common in Africa and the disease is a major cause of severe febrile illness in West Africa.

14 Peters CJ, Zaki SR, Rollin PE. Viral Hemorrhagic Fevers, Chapter 10 in Atlas of Infectious Diseases, vol 8, vol ed Robert Fekety, book ed GL Mandell. Philadelphia: Churchill Livingstone. 1997: pp10.1-10.26.

Geographical and epidemiological characteristics of VHFs			
Disease	**Geography**	**Vector/Reservoir**	**Human Infection**
Rift Valley Fever	Sub-Saharan Africa	**Floodwater mosquitoes**. Maintained between mosquitoes and domestic animals, particularly sheep and cattle.	• Mosquito bite. • Contact with blood of infected sheep, cattle, or goats. • Aerosols generated from infected domestic animal blood. • No person-to-person transmission observed.
Yellow Fever	• Africa • South America	***Aedes aegypti* mosquitoes.** Mosquito-monkey-mosquito maintenance. Occasional human infection occurs when unvaccinated humans enter forest. In an urban outbreak, virus maintained in infected *Aedes aegypti* mosquitoes and humans.	• Mosquito bite. • In epidemics, mosquitoes amplify transmission between humans. • Fully developed cases cease to be viremic. Direct person-to-person transmission is not believed to be a problem although the virus is highly infectious (including aerosols) in the laboratory.

Common clinical features of VHFs			
Disease	Incubation Period	Case Fatality	Characteristic Features
Crimean Congo HF	3-12 days	15% - 30%	Most severe bleeding and ecchymoses (a purplish patch caused by blood coming from a vessel into the skin) of all the HF.
Ebola HF and Marburg HF	2-21 days	25% - 90%	• Most fatal of all HF. • Weight loss. • Exhaustion and loss of strength. • A maculopapular (a lesion with a broad base) rash is common • Post infection events have included hepatitis, uveitis and orchitis.
Lassa Fever	5-16 days	Approximately 15%	• Exhaustion and loss of strength. • Shock. • Deafness develops during recovery in 20% of cases.
Rift Valley Fever	2-5 days (uncomplicated disease; incubation for HF may differ)	50% of severe cases (about 1.5% of all infections)	• Shock. • Bleeding. • Reduced or no urine production. • Jaundice. • Inflammation of the brain. • Inflammation of the blood vessels in the retina of the eye.
Yellow Fever	3-6 days	20%	• Acute febrile period followed by a brief period of remission. • Toxic phase follows remission with jaundice and renal failure in severe cases.

Specific clinical findings in different VHFs

Disease	haemorrhage	Thrombo-cytopenia[1]	leukocyte count [2]	rash	icterus [3]	renal disease	pulmonary disease	tremor[4], dysarthria[5]	encephalo-pathy[6]	deafness	eye lesions
Crimean Congo HF	+ + +	+ + +	↓↓ ranging to ↑		+ +		+		+		
Ebola HF and Marburg HF	+ +	+ + +	data not available	+ + +	+ +		+		+ +	+	Retinitis
Lassa Fever	+ ranging to S	+	no change	+ +			+	+	+ ranging to S	+ +	
Rift Valley Fever	+ + +	+ + +	data not available		+ +	+	data not available		E		Retinitis
Yellow Fever	+ + +	+ +	no change ranging to ↓↓		+ + +	+ +	+		+ +		

[1] abnormally low number of platelets in the circulating blood

[2] white blood cell count

[3] jaundice

[4] shaking

[5] difficulty speaking and pronouncing words due to problems with the muscles used for speaking

[6] disease of the brain

+	occasional or mild
+ +	commonly seen and may be severe
+ + +	characteristic
S	characteristic and seen in severe cases
↑	occasionally or mildly increased
↓↓	commonly decreased
E	May develop true encephalitis

A summary of prevention and treatment of VHFs		
Disease	Prevention	Treatment
Crimean Congo HF	• Tick avoidance. • Avoid contact with acutely infected animals, especially slaughtering. • Use VHF Isolation Precautions when a case is suspected.	• Ribavirin is effective in reducing mortality. • Ribavirin should be used based on in vitro sensitivity and of limited South African experience.
Dengue HF, Dengue Shock Syndrome (DHF/DSS)	• Mosquito control of *Aedes aegypti*. • Vaccines currently under investigation for probable use in travellers but unlikely to be a solution to hyperendemic dengue transmission that leads to dengue HF.	• Supportive care. It is effective and greatly reduces mortality.
Ebola HF and Marburg HF	• Standard Precautions including needle sterilization in African hospitals are particularly important. • Use VHF Isolation Precautions when a case is suspected. • Avoid unprotected contact with suspected patients or infectious body fluids. • Avoid contact with monkeys and apes.	• None other than supportive care, which may be of limited utility. • Antiviral therapies urgently needed.
Lassa Fever	• Rodent control. • Use VHF Isolation Precautions when a case is suspected.	• Ribavirin is effective in reducing mortality. • Use Ribavirin in higher risk patients, e.g. if aspartate aminotransferase (AST) is greater than 150.
Rift Valley Fever	• Vaccination of domestic livestock prevents epidemics in livestock but not sporadic, endemic infections of humans. • Human vaccine safe and effective, but in limited supply. • Veterinarians and virology workers in sub-Saharan Africa are candidates for vaccine.	• Supportive care. • Use Ribavirin in haemorrhage fever patients (based on studies in experimental animals).
Yellow Fever	• Mosquito control of *Aedes aegypti* would eliminate urban transmission but forest transmission remains. • Vaccine is probably the safest and most effective in the world.	• Supportive care.

History of Viral Haemorrhagic Fevers Seen in Your Area	Major Signs and Symptoms	Transmission Route