

# ***Viral Hemorrhagic Fever (VHF)***

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# *Objectives*

- at the end of the lecture, you will have a knowledge about :
- What is the VHF (s).
- Epidemiology of VHF (s)
- Epidemiology of the commonest types of VHF.

# *What is the VHF's*



- *VHF's refers to a condition of multi- system “syndrome”.*
- *a wide spectrum of clinical manifestations with varying degrees of severity... why??*
- *The overall vascular system may damage and the body's ability to respond is impaired.*

## ***CAUSATIVE MO:***

*VHFs are diseases caused by 5 distinct families of viruses.*

- **Arenaviruses** (*Lassa virus, Lujo virus ...*)
- **Bunyaviruses** (*Crimean-Congo hemorrhagic fever virus, Rift Valley fever virus, Hantavirus..*)
- **Filoviruses** (*Ebola virus and Marburg ..*)
- **Flaviviruses** (*Yellow fever virus, dengue virus.*)
- **Paramyxoviruses** (*Hendra and Nipah virus*).

***“Arbo-viruses”***: *viruses spreads to human by the bite of infected arthropods.*

<b>VHFs .</b>	<b>Disease in humans</b>	<b>Reservoir</b>	<b>Vector</b>	<b>Geography</b>
<b>Dengue 1,2, 3,4 v.</b>	<b>DHF (fever, Hg, rash)</b>	<b>Monkeys</b>	<b>Mosq.</b>	<b>Throughout tropics</b>
<b>Rift-valley</b>	<b>RVF (fever, Hg, enceph.)</b>	<b>Live-stocks</b>	<b>Mosq.</b>	<b>Africa, Arabia</b>
<b>Yellow F v.</b>	<b>Y.F. (fever, Hg, J)</b>	<b>Monkeys</b>	<b>Mosq.</b>	<b>Africa, S. America</b>
<b>Crimean-Congo v.</b>	<b>CCHF (fever, Hg)</b>	<b>Live-stocks</b>	<b>Ticks</b>	<b>Africa, Asia Middle East</b>
<b>Lassa v.</b>	<b>L.F</b>	<b>Rodents</b>	<b>Rodent excreta</b>	<b>Africa</b>
<b>Ebola v.</b>	<b>E.v. diseases</b>	<b>(monkeys?)</b>	<b>Bats, Nosocomial (infected hl)</b>	<b>Africa</b>

# *Common characteristics of Arbo - Viruses....*

- *RNA VIRUSES*
- *Naturally are zoonosis..*
- *Restricted to the geographical areas where the host sp. Live (animals & insects).*
- *Easier to destroy with heat, sunlight, gamma rays, bleach, detergents, solvents.*
- *Highly infectious viruses. (low infective dose)*
- *No cure or established drug treatment for VHF's.*
- *Difficult to prevent VHF Outbreaks since they can occur sporadically and not easily predicted with climate changes.*

# ***Clinical features / VHF***

## ***1. Initial nonspecific (febrile stage):***

Fever, Malaise, Headache , Myalgia/ arthralgia, Abdominal pain, vomiting, Non-bloody diarrhea

## ***2. Clinical multi-system illness associated with:***

- Hemorrhagic manifestations... Bleeding Diathesis ..

- Virus specific manifestations; renal failure (hantaviruses), bruises (C-C HF), hearing loss and shock (Lassa fever), Hepatitis (yellow fever), Encephalitis and retinitis (rift valley fever)

# ***Clinical features / VHF***

## ***3. Then Progresses to more severe symptoms***

- fulminant septic shock,, even death.

### ***What are the indices of disease severity??***

1. Multi organ failure cases,
2. severe generalized Hg.
3. High mortality rates.

***All disease course is ??????***

***4. Convalescent period*** of up to 7 wks. and remains contagious through it.

## ***CFR depends on ??***

Depend on type & subtypes ...

### ***IP:***

- USUALLY 1-6 DAYS
- RANGE up to 21 DAYS

### ***INFECTIVITY :***

Started from “***PRODROMAL STAGE***” and thereafter ...

**What is the benefit of IP and Infectivity period ??**

*Does bleeding in VHF is always life threatening??*

*What is the cause of bleeding in VHF??*

*Clinical Spectrum of VHF diseases??*

*Many .....*

*Some .....*

*Depends on what ???*

# *Mode of Transmission in VHF*

- *Vector-borne transmission; mosquitoes (Rift Valley fever virus, dengue virus) or ticks (CCHF)*
- *Contact with the tissues of infected animals (CCHF, RVF), contact with blood or other body fluids of primates (Marburg virus)*
- *Contact with Excreta of infected rodents as in Lassa fever (fresh or dried excreta).*
- *Person to person transmission ??*
  - *(\*direct contact body fluids) as in Ebola, Marburg, Lassa and Crimean–Congo.*
  - *(\*indirect: syringes and needles) Contaminated objects;*
- *Nosocomial and household transmission ??*
- *Airborne transmission ??*

# *Diagnosis of VHF*

## *WHO Case Definition of VHF:*

Patient must have one or more of the above characteristic clinical illness with

- *Important History within 21 days of:*

1. Patient from or travel to endemic areas
2. History of tick, mosquito bites.
3. History of contact with patient with VHF
4. Contact with sick animals or tissues.

# *Diagnosis of VHF*

## *Investigations :*

- *Serological: antigen or antibody detection by ELISA*
- *RT-PCR;*
- *Viral Isolation in Bd or tissues.*
- *Need Specialized Labs*

# *Treatment of VHF*

- ***No specific treatment.***

***Ribavirin;*** (*Lassa fever, CCHF, RVF*) within 1<sup>st</sup> 4 days, pre-hemorrhagic phase,

***Its action??***

- *Inhibiting viral replication....*
- *Immunomodulation ....*

***Inmazeb and Ebanga:*** *Zaire ebolavirus (2020)*

- ***Supportive treatment:*** (corner stone of Rx) the maintenance of fluid & Electrolyte balance, alleviation of symptoms, mechanical ventilation, dialysis ..
- ***Treatment of Bleeding:*** *Fresh frozen plasma, clotting factor concentrates, and platelets, even heparin ??*
- ***Passive AB...*** *plasma, Whole blood from Ebola survivors*

# *Prognosis OF VHF's*

*Survival depends largely upon:*

- ✓ **the virulence of the virus strain**
- ✓ **Host general condition and**
- ✓ **the quality of treatment.**
- **CFR of VHF is 5% -90%. (Dengue HF 5-15%, Ebola and Marburg outbreaks 50% - 90%)**
- **Full recovery (some) .. Survivors have prolonged convalescence..**
- **Disabilities .. Rift Vally HF ... Blindness 10%**  
*South America HF deafness 25%*

## *Occurrence of outbreak*

- Sporadic (less fatality rate)*
- Epidemic*

*Immunity ??*

*2<sup>nd</sup> attack is it possible??*

# *Prevention of VHF*

## 1. VECTOR CONTROL :

- *vigorous anti-adult and anti-larval measures (e.g., elimination of breeding places) ..... ?*
- *Personal protection (repellents, mosquito nets, fumigation mats..) .....?*

## 2. Vaccines administration

- *Yellow fever (live attenuated 17D vaccine) is only mandatory for travelers to endemic areas of Africa and South America*
- *Dengue HF (Dengvaxia), Live attenuated, (one subtype)..*

## 3. International measures ??

- ***Public Health Measures for Suspected or confirmed VHF cases:***

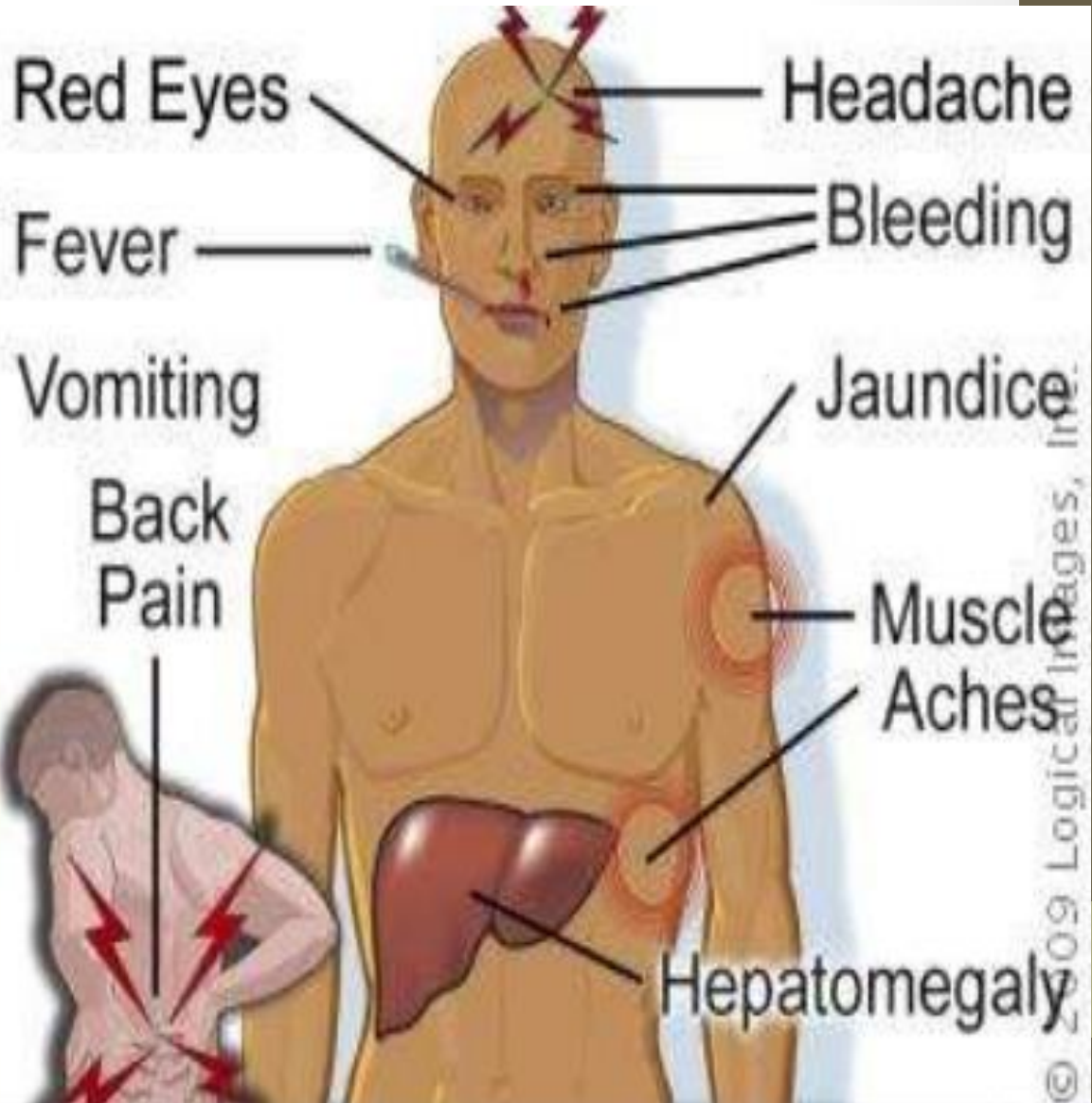
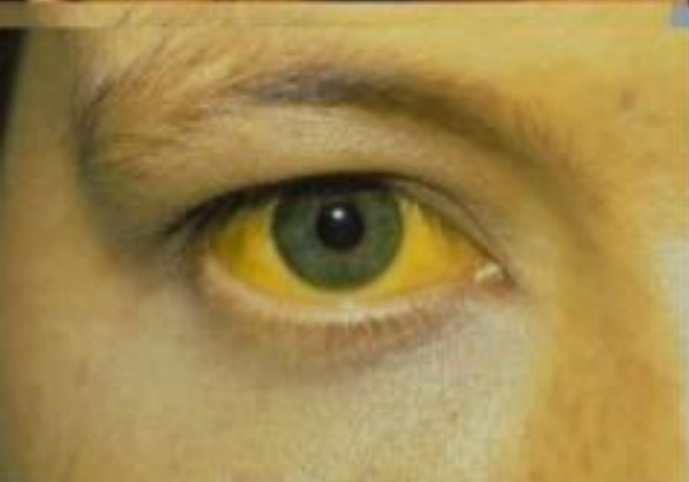
- Reporting (mandatory)
- Isolation of all suspected cases
- Quarantine of close contacts ??
- Protective measures for staff and contacts ..
- Proper hazard labeling, needle precautions ..
- concurrent disinfection ..
- Limited patient-care team.

# Nurses in full protective gear in Gabon,



Nurses in  
full  
protective  
gear in  
Gabon, 2002

# *Yellow fever*



# *Yellow fever*

- 90% of cases occur in Africa, 10% in South America.
- IP=3-6 days,
- Hepatorenal involvement. Jaundice is common, Majority mild dis
- Mortality rate: 5-10% (20-50% in epidemics). .
- Vaccine give 95% of people Protection for up to 35 years or more.
- Transmission only by mosquito .
- *Man to man transmission??*
- *No specific treatment available.*

# Dengue H fever



What is wrong here??

# *Dengue H fever*

- Described as “**break bone fever**”
- 4 sero types, sero-type specific immunity
- *Humans are the main reservoir*
- ✓ The Most prevalent mosquito-borne viral disease in the world.
- ✓ Endemic in >100 countries throughout of Asia (Arabic Island), Africa, America.
- ✓ 1/3 of world populations are exposed (100 million cases yearly with 50000 deaths)

## *Mode of transmission??*

- ✓ *Mosquitoes bite, no man to man*
- ✓ *Spectrum: Asymptomatic, (Dengue Fever), DHF.*

# *Dengue fever*

- ✓ In 2021 one version vaccine is available, is CYD-TDV (Dengvaxia), Live attenuated
- ✓ Given for children aged 9- yrs with previous dengue infection (endemic areas). **WHY?**
  - ***A one version vaccine, No full protection***
  - ***2<sup>nd</sup> infection is most dangerous.***
  - ***No specific treatment. .***
  - ***Fatality rate (5-15%)***

An aerial photograph of the African continent with a yellow line tracing the path of the Rift Valley system. The line starts in the East African Rift, passes through the Great Rift Valley, and extends southwards through East Africa. The background shows the natural terrain of Africa with various shades of green, brown, and blue representing different elevations and water bodies.

## *Rift Valley Fever*

**RVF is an arthropod-borne, acute viral disease of ruminants and people.**

# *Rift Valley Fever*

## *Occurrence*

- *1st identified in Rift Valley of Kenya 1931.*
- *Egypt, Saudi Arabia and Yemen.*
- *Spectrum: Sub-clinical , or mild fever and liver abnormality, severe infection with hemorrhage. Retinopathy, meningoencephalitis, loss of vision*
- *Severe HF 1%, Mortality ~1% - 50%.*

## *Reservoir:?*

live-stocks and camels.

## *Vector: ?*

## *Risky groups???*

# Rift valley fever (RVF)

## ***Mode of transmission:***

- *Contact with the tissues of infected animals.*
  - *Bites of mosquitoes.*
  - *No direct man to man transmission.*
- ***What about Noso-comial ??***

# Crimean-Congo Hemorrhagic fever (CCHF)

*high fever, severe liver damage, bleeding*

*CFR: 2% - 50%.*

## ***Occurrence:***

- *1st detected in Crimean region (1945) Then in Congo (1960s)*
- *In Iraq is an endemic (1979).*
- *last outbreak in 2023, 229 confirmed cases (1<sup>st</sup> 6 m), 36 deaths. CFR: 15.7%*
- *Iraq, Iran, Turkey, Pakistan, Yemen, India*

## ***Vectors??***

## ***Reservoir ?? Risk Groups ???***

*30% of deaths housewives, 22% putchers, 18% animal owners.*

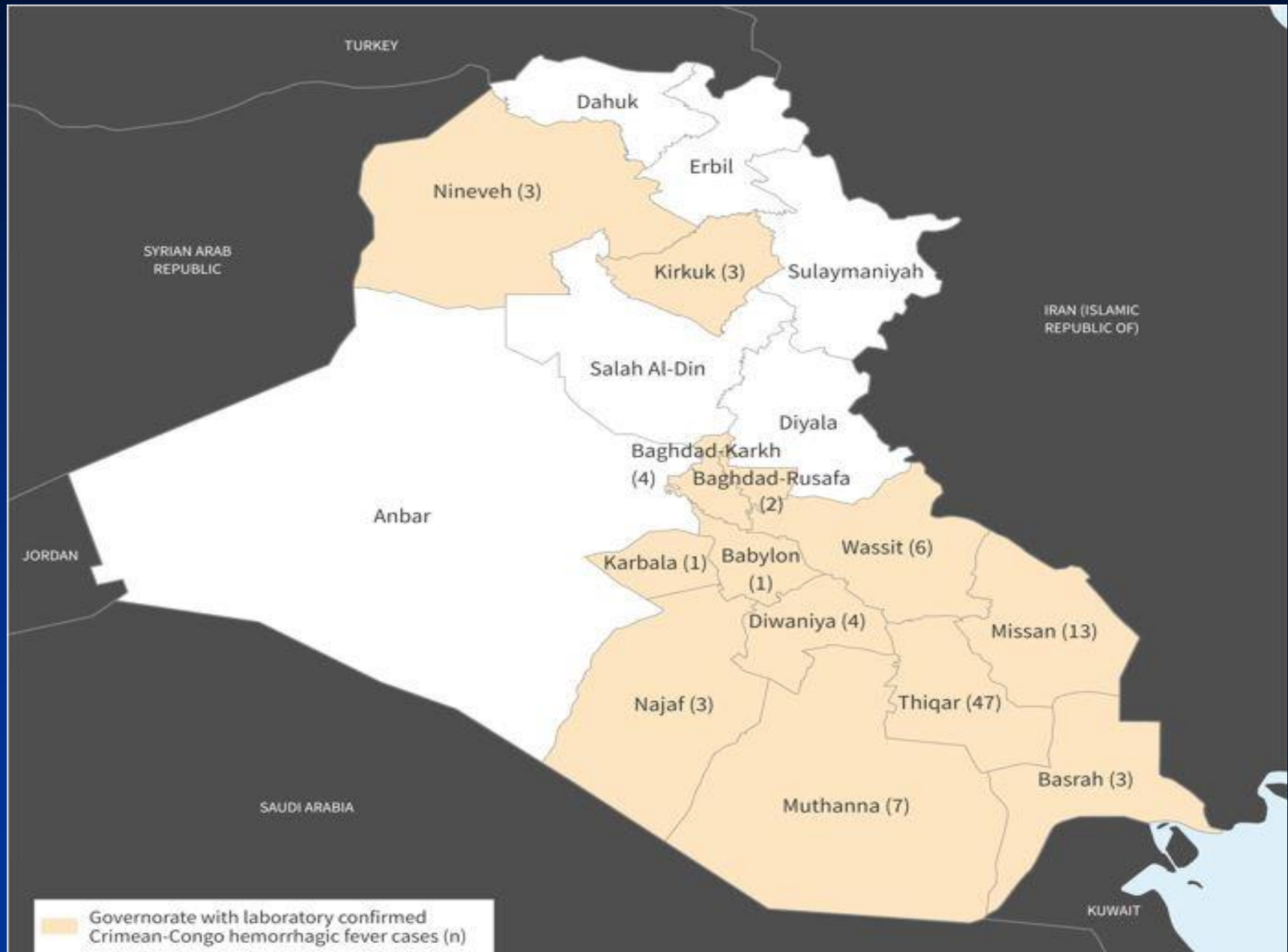


*Hyalomma* sp.

ticks



# Distribution of laboratory confirmed cases of C-C H F, Iraq, 2022



# Crimean-Congo Hemorrhagic fever (CCHF)

## ***Transmission***

- *Contact with infected ticks*
- *Contact with animal blood & tissues.*
- *Human to human .. Contact with infected Bd or body excretions and contaminated fomites & supplies*
- *Noso-comial infection.*

## ***Prevention***

- *Wearing PPE for animal workers, animal pools.*
- *Use infection control precautions by health workers.*
- *Multi-sectors coordination with Surveillance of zoonotic diseases.*

# Crimean-Congo Hemorrhagic fever (CCHF)

## ***Why CCHF cases increasingly occurs in Iraq?? :***

- *The practice of slaughtering animals outside of slaughterhouses. The lack of preventive veterinary activities*
- *lack of animal tick control activities,*
- *lack of human ticks-bite prevention interventions*
- *shortage of specific labs.*
- *Weak case management practices leading to misdiagnosis, late intervention & treatment.*

***NO specific Rx... only supportive with ribavirin .***

***NO vaccine yet.***

# Ebola virus disease

- **Ebola appeared for the first time in Zaire and Sudan in 1976.**
- Since then, it has appeared periodically.
- **CFR: > 70%.. IP: 2-21 days,**
- **The illness:** sudden onset of fever, lethargy, then impaired kidney and liver functions then internal and external bleeding.

- **Transmission through:**

- Direct contact with the tissues of *infected animals* (chimpanzees, gorillas, monkeys, fruit bats).

- *Human to human transmission* is through blood or body fluids, infected objects.

- **Nosocomial??**

- **Not air-borne disease.**

- **No specific treatment, NO VACCINE yet.**

- **Intensive supportive care, Can reduced CFR...**

- Does freezing kill the hemorrhagic fever virus ???

THANK YOU

