EBOLA VIRUS DISEASE

LIGULA RRH

DATE 30th **September, 2022**
Time **08:00hrs – 08:40hrs**

Presenter

Dr. Phinihas Jackson

INTRODUCTION

- Ebola Virus Disease (EVD) is a life-threatening and one of the world's most virulent diseases

- It is of public health importance because of its high rate of spread/rapid transmission rate within a community and hospital setting, high case-fatality rate

- Difficult to recognize and detect because symptoms are similar with other tropical infections

- There is lack of effective and proven treatment options, except for supportive care

HISTORICAL BACKGROUND

❑ Formerly known as Ebola haemorrhagic fever

❑ There are five known species of Ebola viruses, four of which cause human illness.

❑ The Zaire Ebola virus was the first Ebola virus ever isolated in 1976 in the Democratic Republic of the Congo (DRC) and the Sudan

❑ The name of the disease comes from the first recorded outbreak in 1976 in an area that lies on the Ebola River
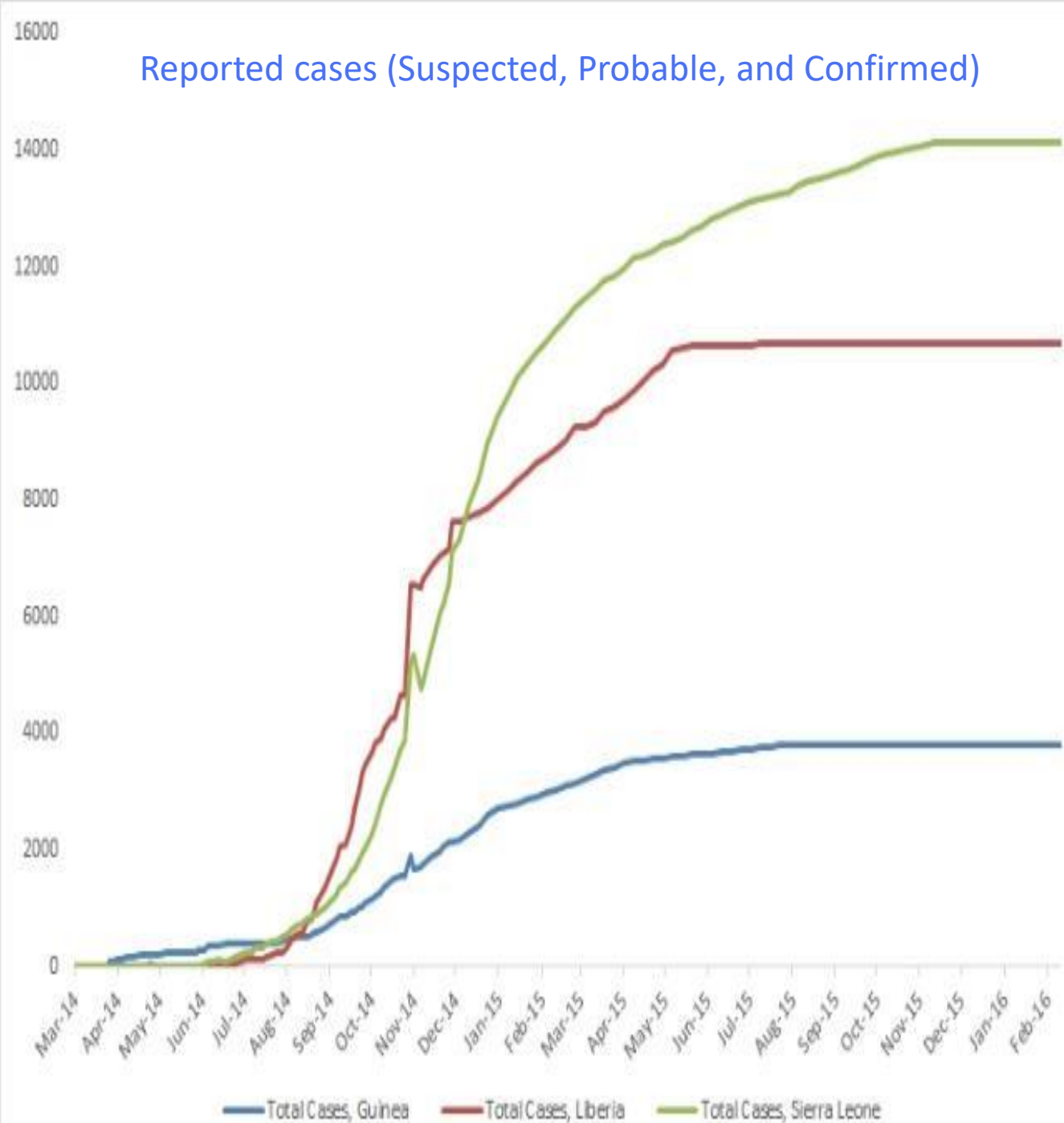
EPIDEMIOLOGY

➢ 1976 – Sudan(284 cases and killed 151) and Zaire DRC(318 cases and 280 deaths)

➢ Ngoy Mushola recorded the **first clinical description** of EVD in Yakumbuku, where he wrote the following in his daily log: **"The illness is characterised with a high temperature of about 39 °C, haematemesis, diarrhoea with blood, retrosternal abdominal pain, prostration with heavy articulations and rapid evolution death after a mean of three days''**

➢ The second major outbreak occurred in Zaire DRC in 1995, affecting 315 and killing 254

➢ In 2000, Uganda had an outbreak infecting 425 and killing 224; in this case, the Sudan virus was found to be the Ebola species responsible for the outbreak

➢ In 2003, an outbreak in the DRC infected 143 and killed 128, a 90% death rate

- In 2004, a Russian scientist died from Ebola after striking herself with an infected needle

- Between April and August 2007, outbreak in DRC(264 cases and died 187), in Bundibugyo District in Western Uganda the World Health Organization (WHO) confirmed the presence of a new species of genus *Ebolavirus*, which was tentatively named Bundibugyo

- The WHO confirmed two small outbreaks in Uganda in 2012, both caused by the Sudan variant also Ebola-Bundibugyo variant in the eastern region of DRC the same year

- In 2014, an outbreak occurred in the DRC, Guinea, Liberia and Sierra Leone

- In August 2014, the WHO reported that 10% of the dead were healthcare workers

Reported cases (Suspected, Probable, and Confirmed)

Total Cases, Guinea — Total Cases, Liberia — Total Cases, Sierra Leone

Total Cases
1 - 5
6 - 20
21 - 100
101 - 500
501 - 4,000
No cases reported
Cases in last 21 days

Source: WHO: Ebola Response Roadmap
03 February 2016

- As of 8 May 2016, 28,646 suspected cases and 11,323 deaths were reported

- 2017 Democratic Republic of the Congo

- On 1 August 2018, the world's 10th Ebola outbreak was declared in North Kivu province of the Democratic Republic of the Congo

- By March 2019, this became the second largest Ebola outbreak ever recorded, with more than 1,000 cases and insecurity continuing to be the major resistance to providing an adequate response. As of 4 June 2019, the WHO reported 2025 confirmed and probable cases with 1357 deaths

- On 25 June 2020, the second biggest EVD outbreak ever was declared ove

- 2021 – outbreak in DRC, Guinea and ivory coast

2022

o On 23 April 2022, a case of Ebola was confirmed in the DRC in the Equateur province. The case was a 31-year-old man whose symptoms began on 5 April, but did not seek treatment for over a week. On 21 April, he was admitted to an Ebola treatment centre and died later that day

o By 24 May 2022, there were 5 recorded deaths in the DRC.

o On 15 August, the fifth case was buried, and the outbreak was declared over, 42 days after, on 4 July 2022

o In September 2022, Uganda reported 7 cases infected with the Ebola Sudan strain

Enzootic Cycle

New evidence strongly implicates bats as the reservoir hosts for ebolaviruses, though the means of local enzootic maintainance and transmission of the virus within bat populations remain unknown.
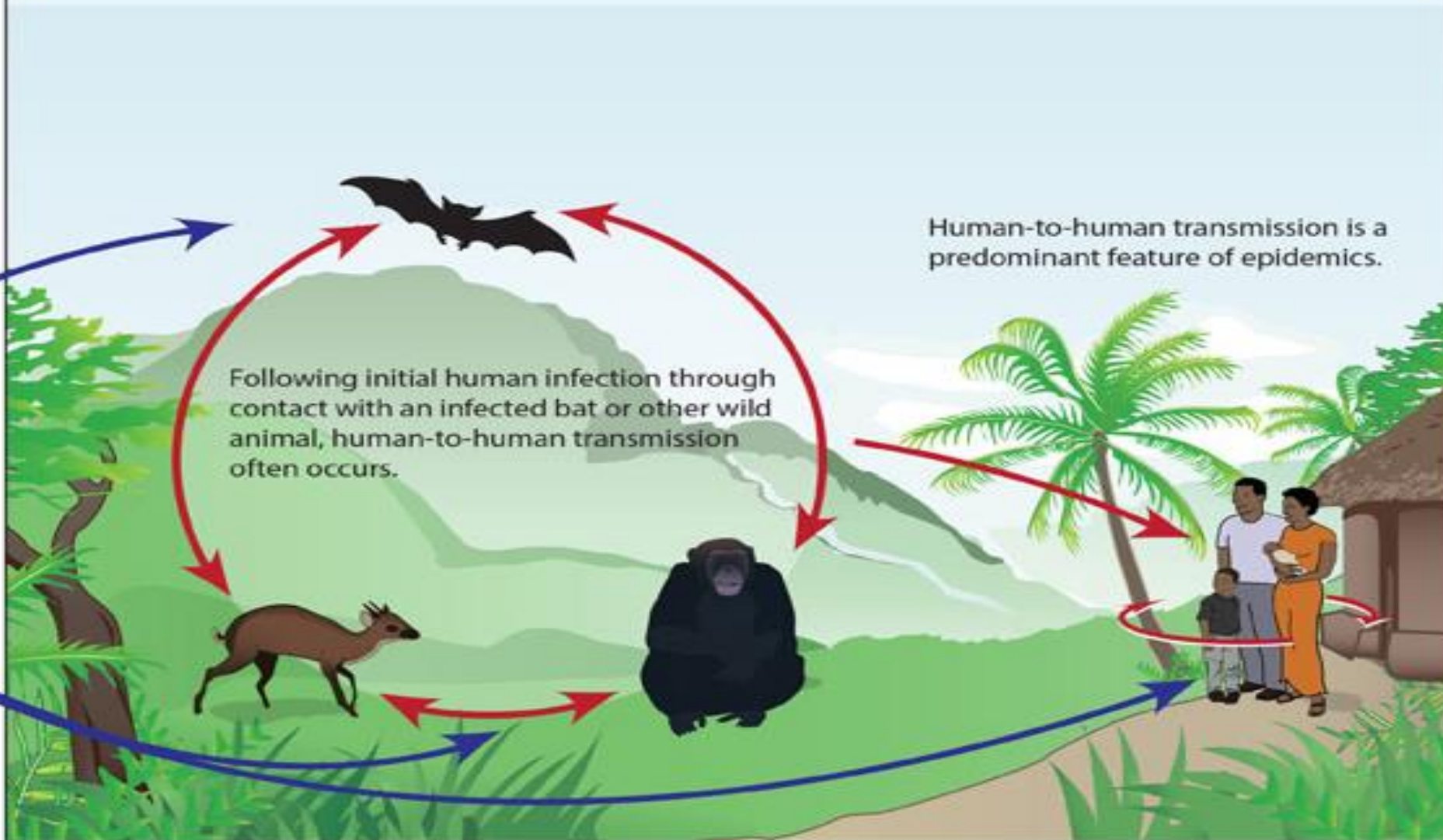
Ebolaviruses:
 Ebola virus (formerly Zaire virus)
 Sudan virus
 Taï Forest virus
 Bundibugyo virus
 Reston virus (non-human)

Epizootic Cycle

Epizootics caused by ebolaviruses appear sporadically, producing high mortality among non-human primates and duikers and may precede human outbreaks. Epidemics caused by ebolaviruses produce acute disease among humans, with the exception of Reston virus which does not produce detectable disease in humans. Little is known about how the virus first passes to humans, triggering waves of human-to-human transmission, and an epidemic.

Human-to-human transmission is a predominant feature of epidemics.

Following initial human infection through contact with an infected bat or other wild animal, human-to-human transmission often occurs.

CDC

PATHOPHYSIOLOGY

- Direct infection of tissues

- Immune dysregulation

- Hypovolemia and vascular collapse

  - Electrolyte abnormalities

  - Multi-organ failure, septic shock

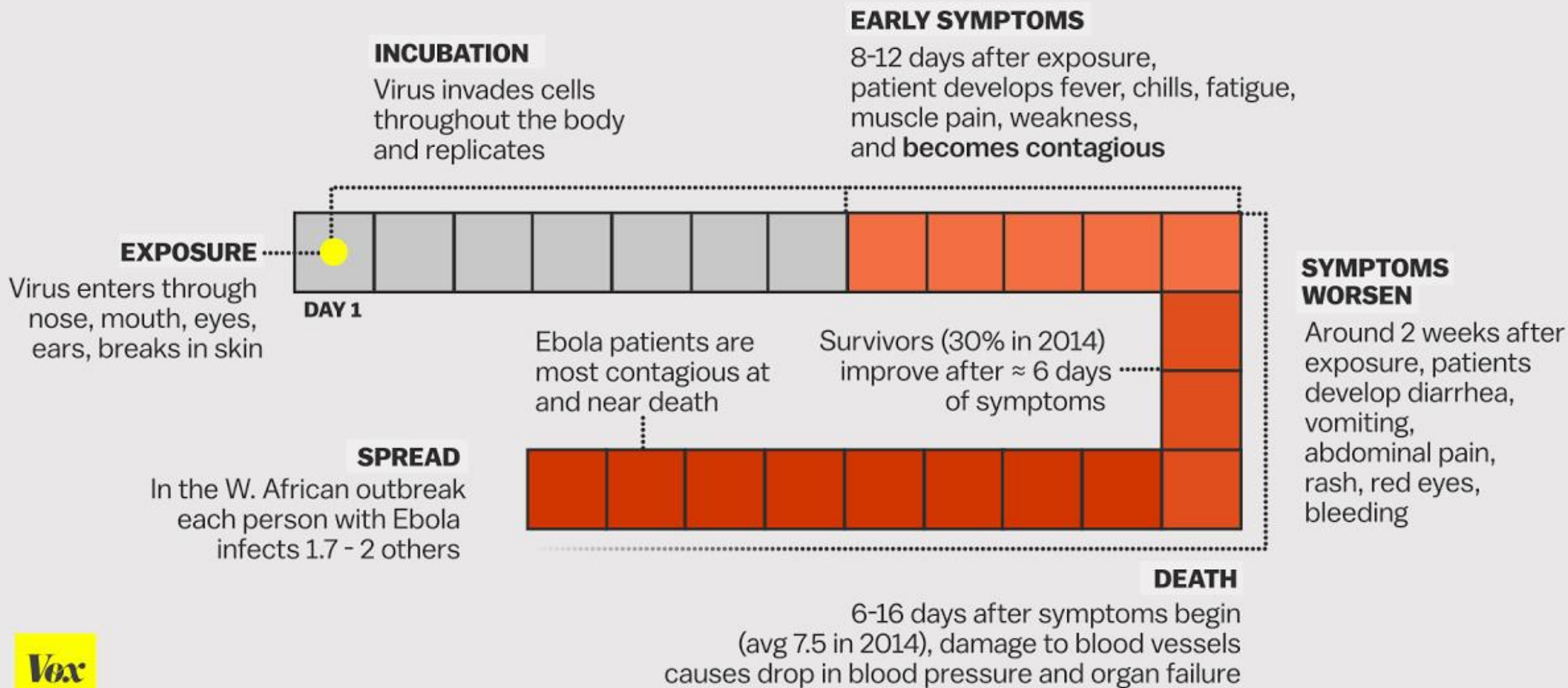- Disseminated intravascular coagulation (DIC) and coagulopathy

STAGES OF EBOLA VIRUS DISEASE

Contagious through bodily fluids =

Not contagious =

SOURCE: CDC

INCUBATION

Virus invades cells throughout the body and replicates

EARLY SYMPTOMS

8-12 days after exposure, patient develops fever, chills, fatigue, muscle pain, weakness, and **becomes contagious**

EXPOSURE

Virus enters through nose, mouth, eyes, ears, breaks in skin

DAY 1

SYMPTOMS WORSEN

Around 2 weeks after exposure, patients develop diarrhea, vomiting, abdominal pain, rash, red eyes, bleeding

Ebola patients are most contagious at and near death

Survivors (30% in 2014) improve after ≈ 6 days of symptoms

SPREAD

In the W. African outbreak each person with Ebola infects 1.7 - 2 others

DEATH

6-16 days after symptoms begin (avg 7.5 in 2014), damage to blood vessels causes drop in blood pressure and organ failure
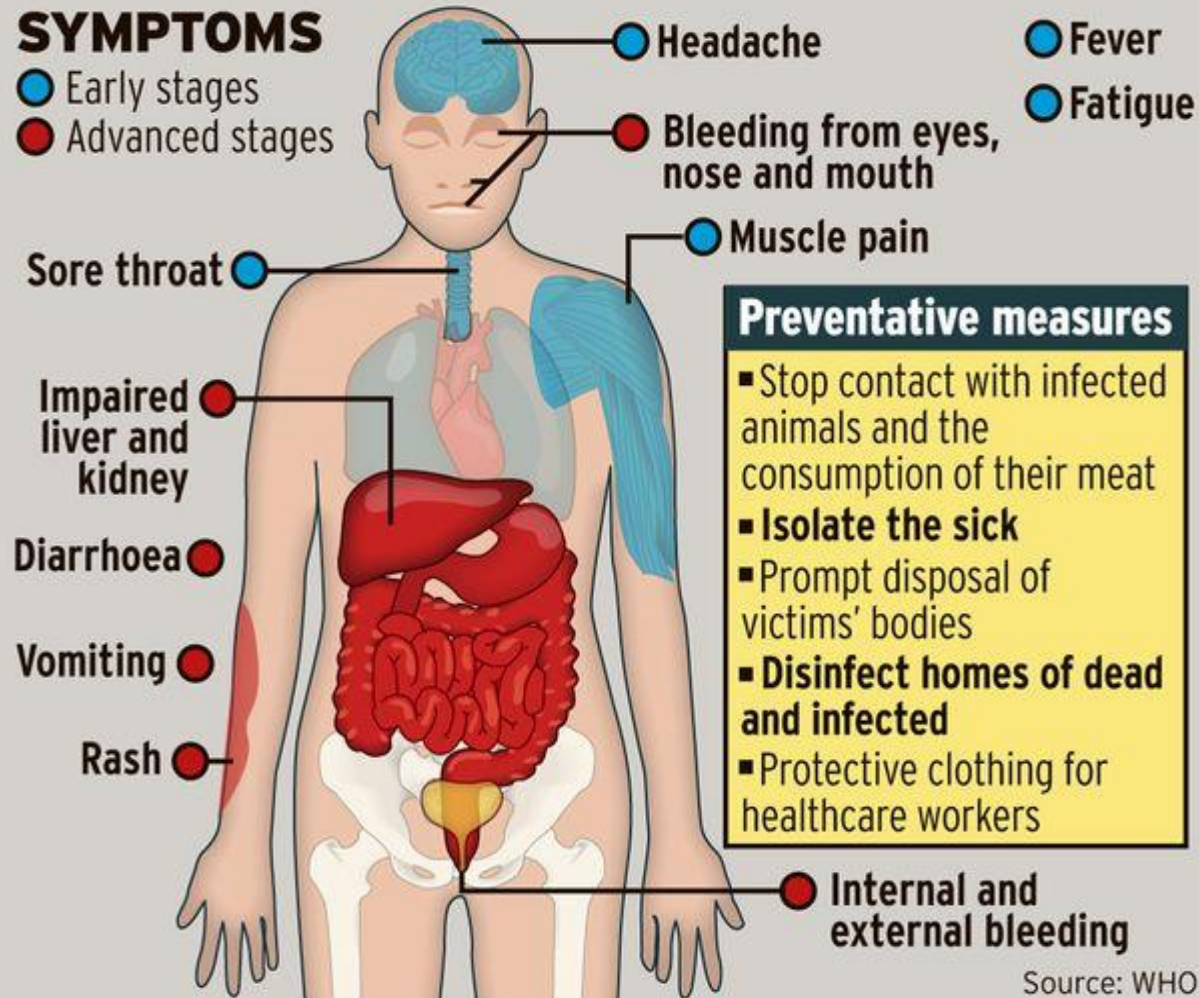
Vox

SIGNS AND SYMPTOMS

EBOLA: KILLER VIRUS

An outbreak of the deadly Ebola virus is spread by close contact and kills between 25 and 90 percent of victims. There is no cure or vaccine

SYMPTOMS
- Early stages
- Advanced stages

- Headache
- Fever
- Fatigue
- Bleeding from eyes, nose and mouth
- Muscle pain
- Sore throat
- Impaired liver and kidney
- Diarrhoea
- Vomiting
- Rash
- Internal and external bleeding

Preventative measures
- Stop contact with infected animals and the consumption of their meat
- **Isolate the sick**
- Prompt disposal of victims' bodies
- **Disinfect homes of dead and infected**
- Protective clothing for healthcare workers

Source: WHO

EBOLA IS REAL. TOGETHER WE CAN STOP THE SPREAD!
YOU CAN SURVIVE EBOLA!

Tell your community leader

CALL 4455 QUICK-QUICK! IT IS FREE!

Do not run away or hide sick people

KNOW THE SIGNS AND SYMPTOMS

If you get a fever that starts quick-quick and any of these other signs, call 4455

Other signs:

Vomiting

Running stomach

Red eyes or bleeding from the nose or mouth

Weakness, pain in the body, headache, or sore throat

Rash or bumps on the skin

EBOLA CASE DETECTION

Shall base on the following components:

✓ History of exposure

✓ Clinical assessment

✓ Screening

✓ Surveillance – filling of Case Investigation Form

✓ Laboratory

- To detect EVD case you should determine patient's history of exposure within 2 to 21 days prior to onset of symptoms as one of the most important aid in making the diagnosis. This is the potential incubation period for EVD

CASE DEFINITION AND WHO CASE CLASSIFICATION CRITERIA

1. **Person Under Investigation** –A person who both consistent symptoms and risk factors as follows :

   ✓ Clinical criteria

   -Fever >38°, headache, vomiting, diarrhea, abdominal pain and unexplained hemorrhage

   ✓ Epidemiology risk factors

   -contact with body fluid, travel, handling animals, residency in rea with ebola

2. **Suspect** - A person(Alive or Dead) who has / had sudden onset high fever and contact a suspected / probable / confirmed case of ebola dead or sick with high onset of fever and at least 3 symptoms of active infection

3. **Probable case** – A PUI whose his/her epidemiological risk factors include low or high risk exposure

3. **Confirmed case** – A case with laboratory confirmed diagnostic evidence of EBV infection

EBOLA RISK ASSESSMENT

Low risk exposure (But not Zero)

✓ Brief direct contact while not wearing appropriate PPEs

✓ Brief proximity with ebola patient with symptoms while not wearing appropriate PPEs

✓ Dealing with infected lab sample while wearing appropriate PPEs

✓ Travel with ebola patient who has symptoms

Some risk exposure

✓ Being in close contact with a person with Ebola who has symptoms, while **not wearing** appropriate PPE (for example, in households, healthcare facilities, or community settings)

❑ Close contact is defined as being for a prolonged period of time while not wearing appropriate PPE within approximately 3 feet (1 meter) of a person with Ebola while the person was symptomatic

✓<u>High risk exposure</u>

  ✓Percutaneous (e.g., needle stick) or mucous membrane exposure to blood or body fluids from a person with Ebola who has symptoms

  ✓Direct contact with a person with Ebola who has symptoms, or the person's body fluids, while **not wearing** appropriate personal protective equipment (PPE)

  ✓Lab processing of blood or body fluids from a person with Ebola who has symptoms while **not wearing** appropriate PPE or without using standard biosafety precautions

  ✓Providing direct care in a household setting to a person with Ebola who has symptoms

STANDARD PRECAUTIONS

❏ Consider every person (patient/clients or staff) as potentially infectious and susceptible to infection

❏ Use appropriate hand hygiene techniques • Wear appropriate personal protective equipment

❏ Appropriately handle sharps, linen and instrument processing

❏ Appropriately manage patient placement and environmental cleaning

❏ Safely dispose of infectious waste materials

❏ Promptly and carefully clean up spills of blood and other body fluids after the spill event

❏ Process instruments by cleaning, and sterilization or high-level disinfection following recommended procedures

❏ Introduce cough etiquette to patients, caregivers and visitors with signs and symptoms of respiratory illness

❏ Provide pre and post exposure prophylaxis

❏ Provide vaccination - rVSV – ZEBOV vaccine

5 MOMENTS OF HANDS HYGIENE
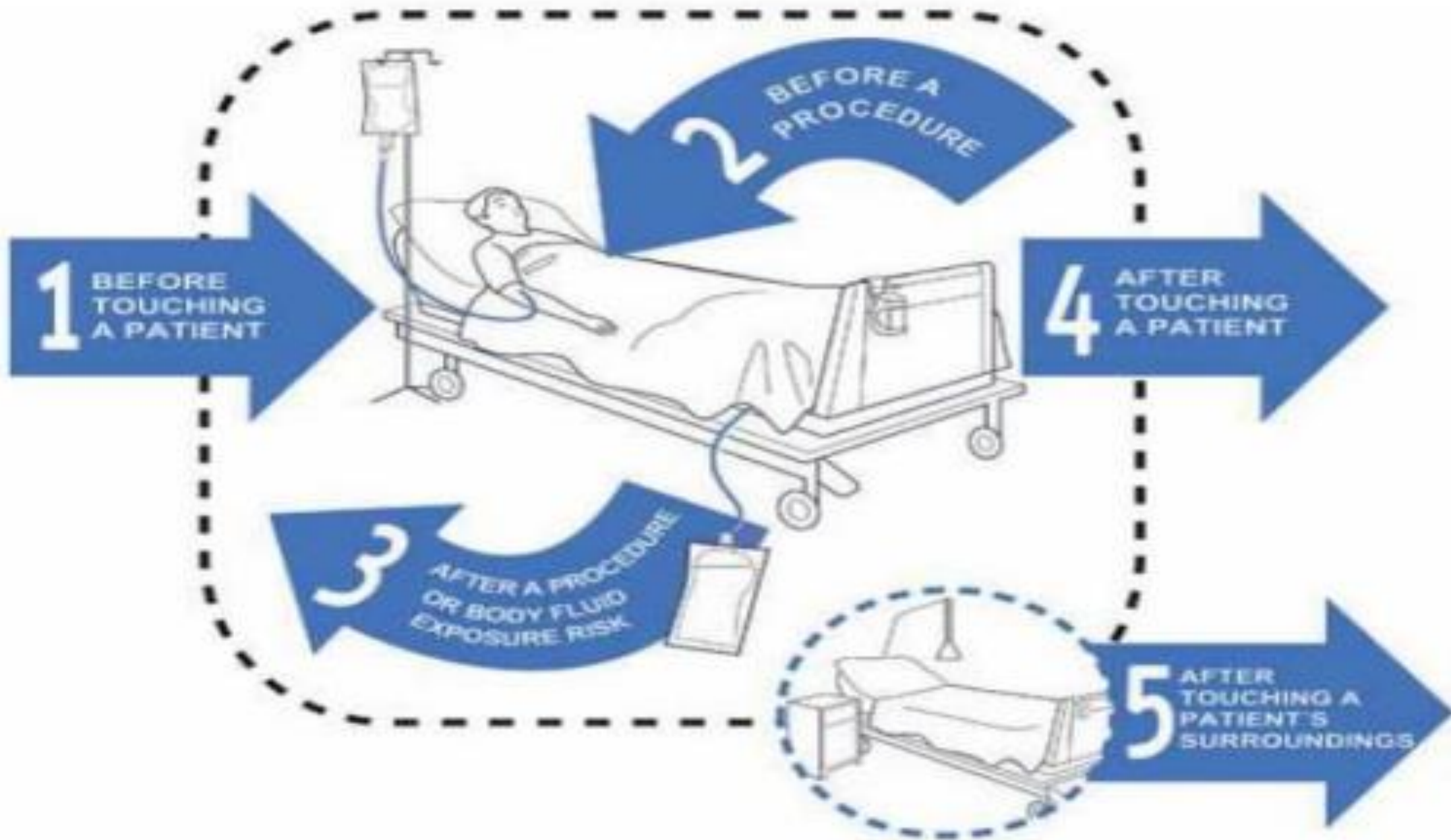
How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds

1a Apply a palmful of the product in a cupped hand, covering all surfaces;

1b

2 Rub hands palm to palm;

3 Right palm over left dorsum with interlaced fingers and vice versa;

4 Palm to palm with fingers interlaced;

5 Backs of fingers to opposing palms with fingers interlocked;

6 Rotational rubbing of left thumb clasped in right palm and vice versa;

7 Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8 Once dry, your hands are safe.

NB: Steps in hand washing and alcohol hand rub must be the same.

TRANSMISION BASED PRECAUTIONS

✓ Health-care workers have frequently been infected while treating patients with suspected or confirmed EVD. This has occurred through close contact with patients when infection control precautions are not strictly practiced. Burial ceremonies that involve direct contact with the body of the deceased can also contribute to EVD transmission. People remain infectious if their blood or body fluids contain the virus.

✓ Ebola virus has been found in breast milk with recent evidence suggesting that breast milk can remain positive for Ebola virus at least for up to 9 months after symptom onset

✓ Being the sexual partner of a known or suspected male case, the virus can be isolated from semen up to 82 days after symptoms onset and the viral RNA has persisted in semen up to 406 days (13.5 months after symptoms onset).

✓ Male Ebola survivors should be offered semen testing at 3 months after onset of disease and then for those who test positive, every month thereafter until their semen tests negative for virus twice by RT-PCR, with an interval of one week between tests.

- ✓ Being the sexual partner of a known or suspected female case, as Ebola virus RNA has been detected using RT- PCR in vaginal fluid 33 days after symptoms onset

- ✓ Ebola infection in pregnancy may result in persistence of viral RNA in the products of conception (amniotic fluid, placenta, fetus)

- ✓ Pregnant women with EVD Ebola infection may have no clinical symptoms of EVD (and do not meet EVD case definition) or have mild clinical symptoms

- ✓ Newborns of infected mothers may be infectious even if they are not exhibiting symptoms.

- ✓ NB – is not airborne unless for certain procedures such as bronchoscopy

ISOLATION PRECAUTIONS

- ✓ Isolation precautions are precautions taken at an area in all facilities used for housing patients suspected or confirmed of having highly contagious diseases such as Ebola (ETC, Holding area, isolation)

- ✓ It includes the patient's room or area, isolated latrine or toilet, food and food utensils, family entrance, and changing room

- ✓ The precaution includes to
    - ✓ Isolate the patient
    - ✓ Wear PPE in the isolation area and maintain a distance of at least 1 meter between patients beds
    - ✓ Perform hand hygiene while in isolation area and disinfect spills, waste using 2% chlorine solution before disposal, after spill removal clean the surface using 0.5% chlorine solution
    - ✓ Clean and disinfect reusable equipment in the isolation area using 0.5% chlorine solution and then rinse with clean and safe water

- Limit transport and movement of patients from moving out of red zone in ETC or isolation

- Use of special ambulances

- Trained medical personnel should handle transportation of the suspect

- Isolation areas to have limited entry

- The composition of the burial team include

  1. Four to six bearers (the ones who carry the dead body)
  2. Two decontaminators (responsible for spraying the outer side of the body bag)
  3. One Environmental Health Officer (technical supervisors)
  4. One Social Worker (interact with family and community members)
  5. Two drivers (transporting the dead body and burial team)

DIAGNOSTIC

- PCR and ELISA

- FBP – Thrombocytopenia and Leukopenia

- **Transaminase elevation**: elevation serum aspartate amino-transferase (AST) > alanine transferase (ALT)

- **Electrolyte** abnormalities from fluid shifts

- **Coagulation:** PT and PTT prolonged

- **Renal**: proteinuria, increased creatinine

✓ **Real Time PCR (RT-PCR)**

- Used to diagnose acute infection

- More sensitive than antigen detection ELISA

- Identification of specific viral genetic fragments

- Performed in select CLIA-certified laboratories

✓ **RT-PCR sample collection**

- Volume: minimum volume of 4mL whole blood

- Plastic collection tubes (not glass or heparinized tubes)

- Whole blood preserved with EDTA is preferred

  o Whole blood preserved with sodium polyanethol sulfonate (SPS), citrate, or with clot activator is acceptable

INTERPRETING NEGATIVE EBOLA RT-PCR RESULT

❑ **If symptoms started ≥3 days before the negative result**

  ❑ Ebola is unlikely → consider other diagnoses

  ❑ Infection control precautions for Ebola can be discontinued unless clinical suspicion for Ebola persists

❑ **If symptoms started <3 days before the negative RT-PCR result**

  ❑ Interpret result with caution

  ❑ Repeat the test at ≥72 hours after onset of symptoms

  ❑ Keep in isolation as a suspected case until a repeat RT-PCR ≥72 hours after onset of symptoms is negative
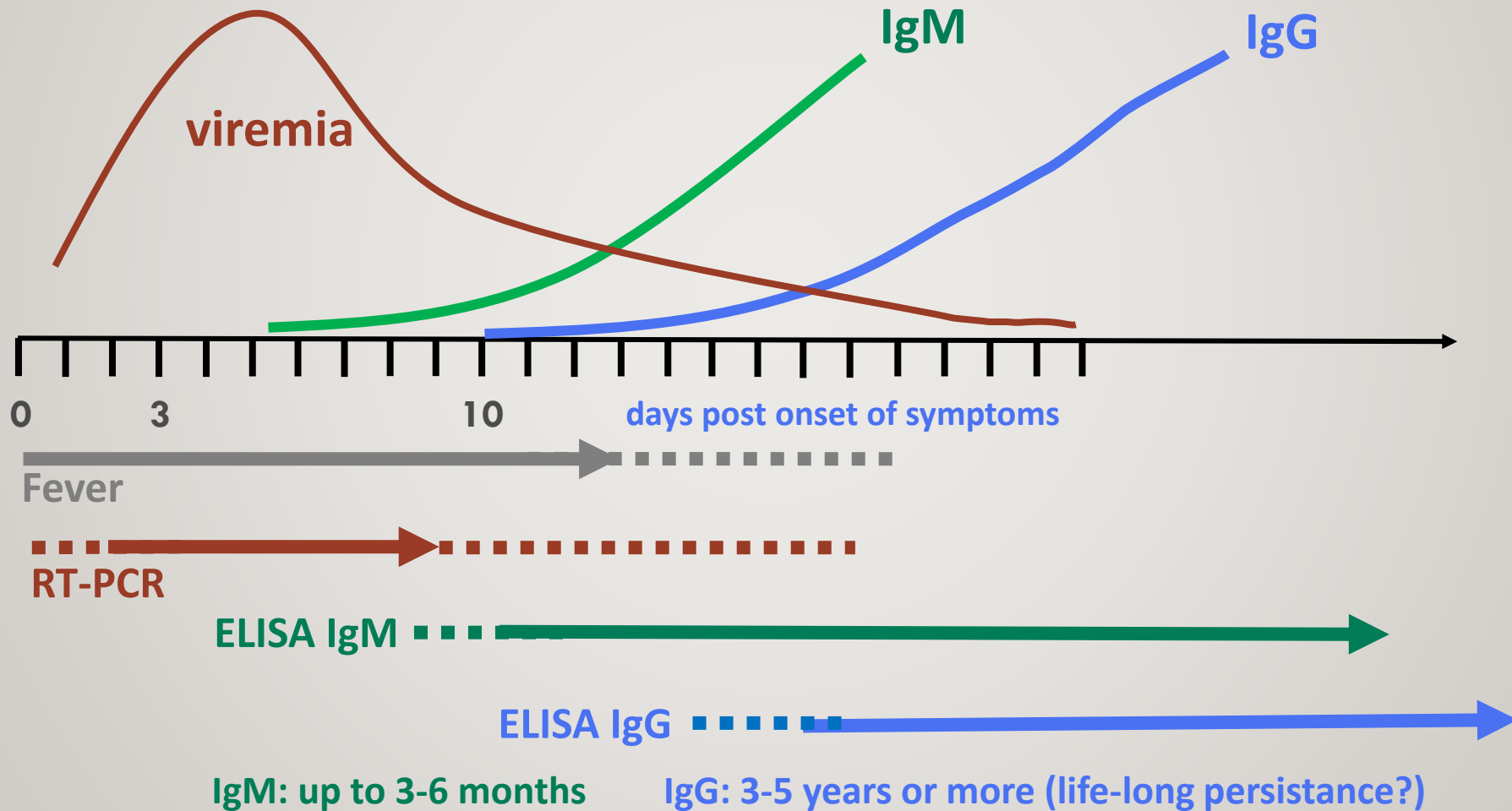
CLINICAL MANAGEMENT OF EBOLA "Supportive, but aggressive"

❖ Hypovolemia and sepsis physiology

- Aggressive intravenous fluid resuscitation
- Hemodynamic support and critical care management if necessary

▪ Electrolyte and acid-base abnormalities

- Aggressive electrolyte repletion
- Correction of acid-base derangements

▪ Symptomatic management of fever and gastrointestinal symptoms

- Avoid NSAIDS

▪ Multisystem organ failure can develop and may require

- Oxygenation and mechanical ventilation
- Correction of severe coagulopathy
- Renal replacement therapy

PATIENT RECOVERY

❑Patients who survive often have signs of clinical improvement by the second week of illness

- Associated with the development of virus-specific antibodies
- Antibody with neutralizing activity against Ebola persists greater than 12 years after infection

❑Prolonged convalescence

- Includes arthralgia, myalgia, abdominal pain, extreme fatigue, and anorexia; many symptoms resolve by 21 months
- Significant arthralgia and myalgia may persist for >21 months
- Skin sloughing and hair loss has also been reported

How to prevent it from spreading

1- Avoid physical contact with people showing signs and symptoms such as continous high fever, red eyes, vomiting and stomach ache.

2- Wash your hands regularly with soap and clean water

3 - Do not shake hands with persons showing signs of ebola

4- Keep away from bats, monkeys, baboons and dead animals.

5- Avoid eating bush meat cook all food very well

INTERIM GUIDANCE FOR MONITORING AND MOVEMENT OF PERSONS WITH EBOLA EXPOSURE

RISK LEVEL	PUBLIC HEALTH ACTION		
	Monitoring	Restricted Public Activities	Restricted Travel
HIGH risk	Direct Active Monitoring	Yes	Yes
SOME risk	Direct Active Monitoring	Case-by-case assessment	Case-by-case assessment
LOW risk	Active Monitoring for some; Direct Active Monitoring for others	No	No
NO risk	No	No	No

"**Prevention, Early recognition are must and very important for infection control cause to mess around with Ebola is easy way to die**"

THANK YOU FOR LISTENING