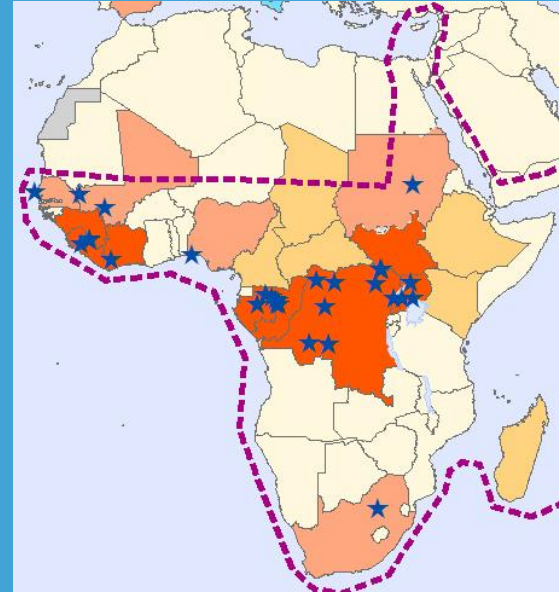


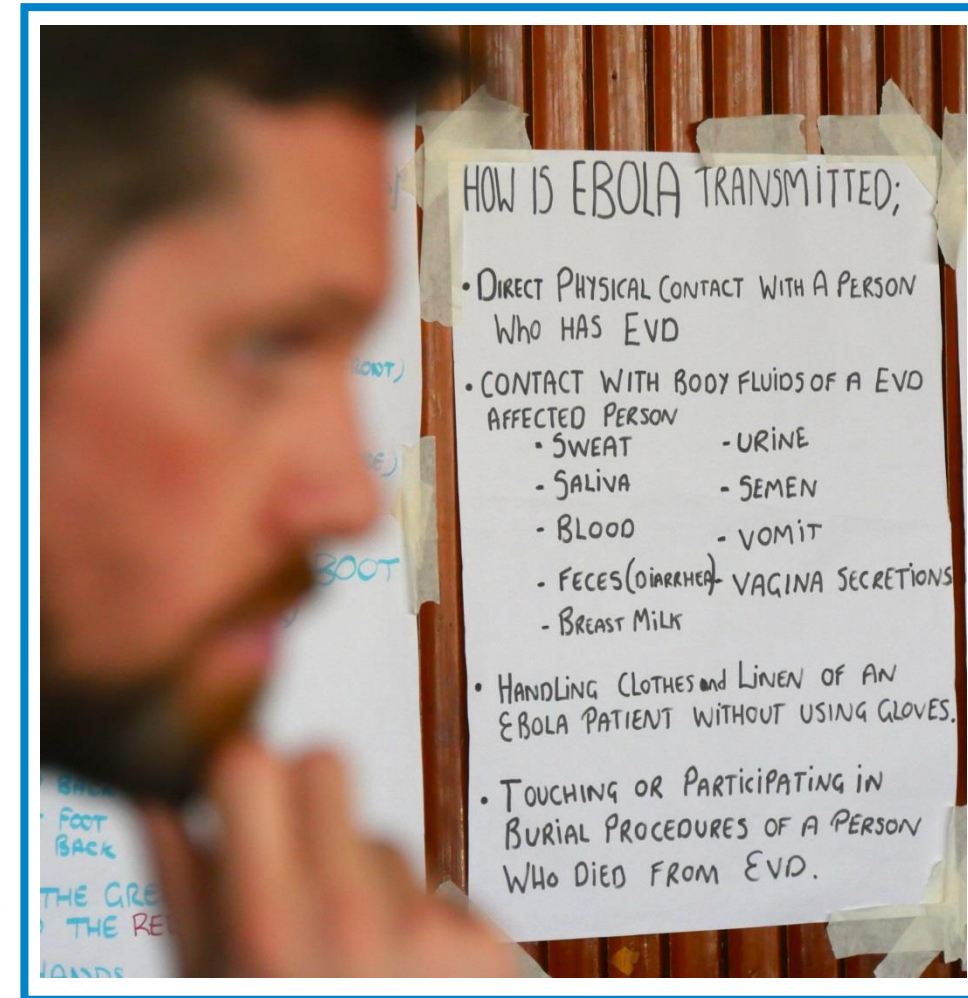
# Introduction to Ebola disease

## Managing infectious hazards



World Health  
Organization

- Describe signs, symptoms, and transmission of Ebola disease
- List preventive and control measures
- Describe main public health concern during an Ebola disease outbreak

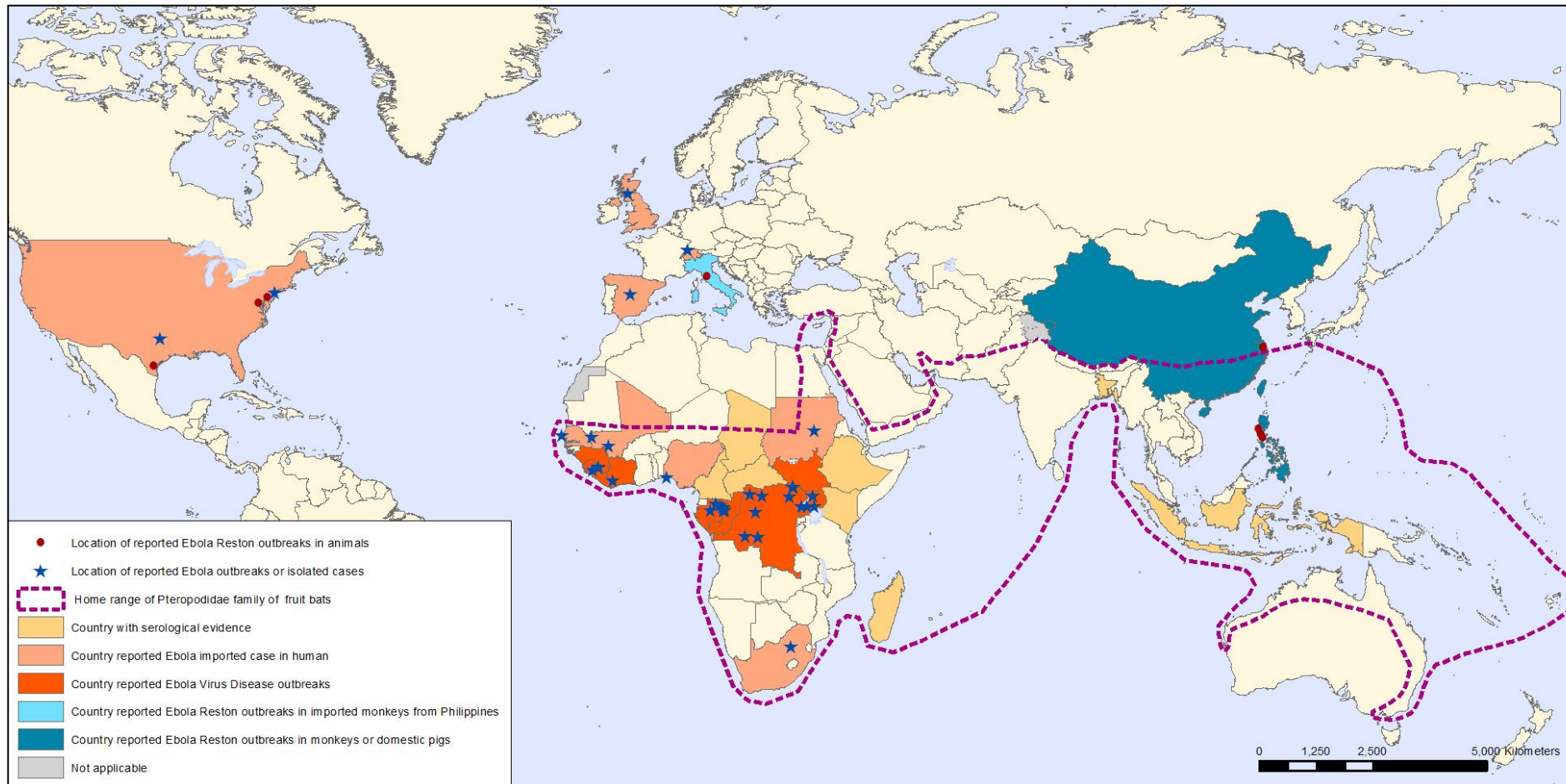


# Ebola disease

- Ebola disease is a severe, often fatal illness in humans.
- The virus is transmitted to people from wild animals and then spreads in the human population through human-to-human transmission.
- The average Ebola case fatality rate is around 50%. Early supportive care with rehydration, symptomatic treatment improves survival.
- Five species of Ebola virus have been identified. Among them, Bundibugyo ebolavirus, Zaïre ebolavirus, and Sudan ebolavirus have been associated with large outbreaks in Africa.



# Geographic distribution of Ebola



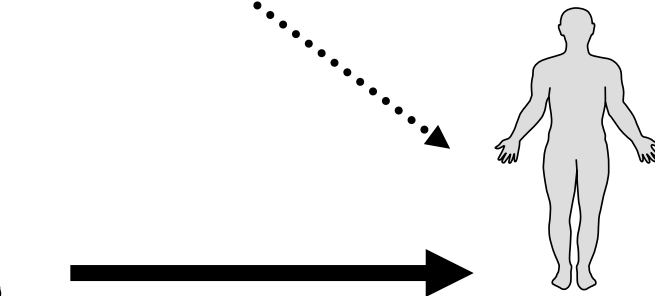
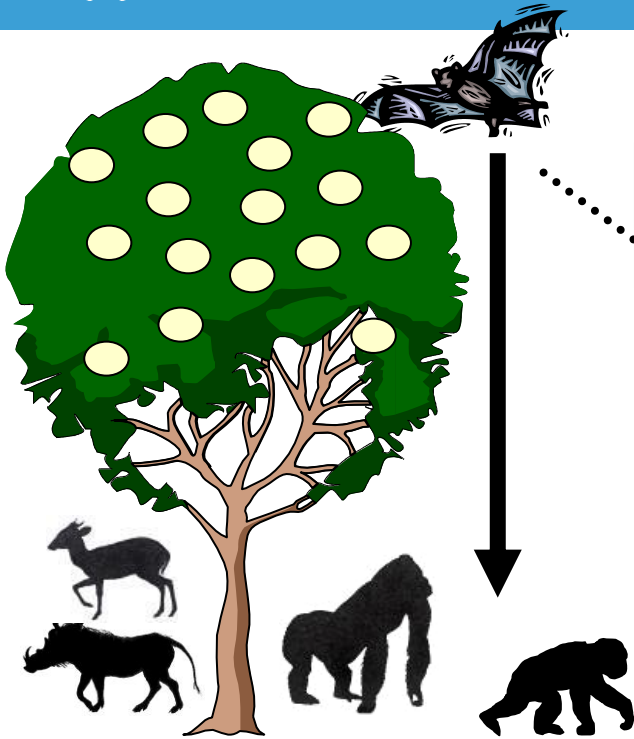
- Ebola disease was identified in 2 simultaneous outbreaks in 1976, one in South Sudan and one in the Democratic Republic of the Congo.
- Since 1976, 25 Ebola outbreaks occurred mostly in central Africa.
- The 2014–2016 Ebola outbreak in West Africa was the largest and most complex.

Map available at: [http://www.who.int/csr/disease/ebola/global\\_ebolaoutbreakrisk\\_20150316.png?ua=1](http://www.who.int/csr/disease/ebola/global_ebolaoutbreakrisk_20150316.png?ua=1)

# Ebola virus transmission

## 1. Virus reservoir: fruit bats

The virus maintains itself in fruit bats



## 2. Epizootics in animals

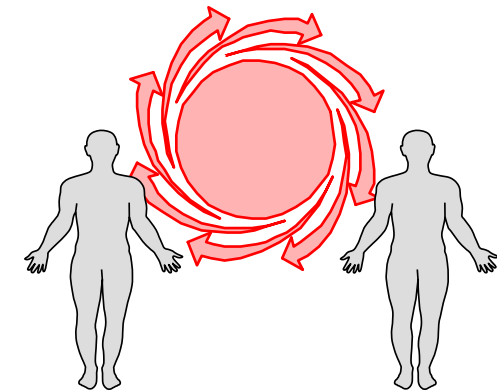
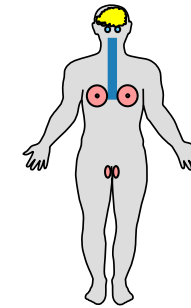
- Infected fruit bats enter in direct or indirect contact with other animals and pass on the infection.
- Large-scale epidemics in primates or mammals (e.g. forest antelopes) can happen.

## 3. Primary human transmission

- Humans are infected either through:
- handling infected dead or sick animals found in the forest (more frequent);
  - or through direct contact with infected bats (rare event).

## 5. Virus persistence

Persistence of Ebola virus in body fluids of EVD survivors represent a risk for sexual transmission.



10% Health Care Workers




## 4. Secondary human transmission

- Secondary human-to-human transmission occurs through direct contact with the blood, secretions, organs or other body fluids of infected persons.
- High transmission risk when providing direct patient care or handling dead bodies (funerals).


- The incubation period is 2 - 21 days.
- Human are not infectious until they develop symptoms.
- Initial symptoms are sudden onset of fever and fatigue, muscle pain, headache and sore throat.
- Usually followed by: vomiting, diarrhoea, rash, impaired kidney and liver function, spontaneous bleeding internally and externally (in some cases).


## FACTS TO KNOW ABOUT EBOLA




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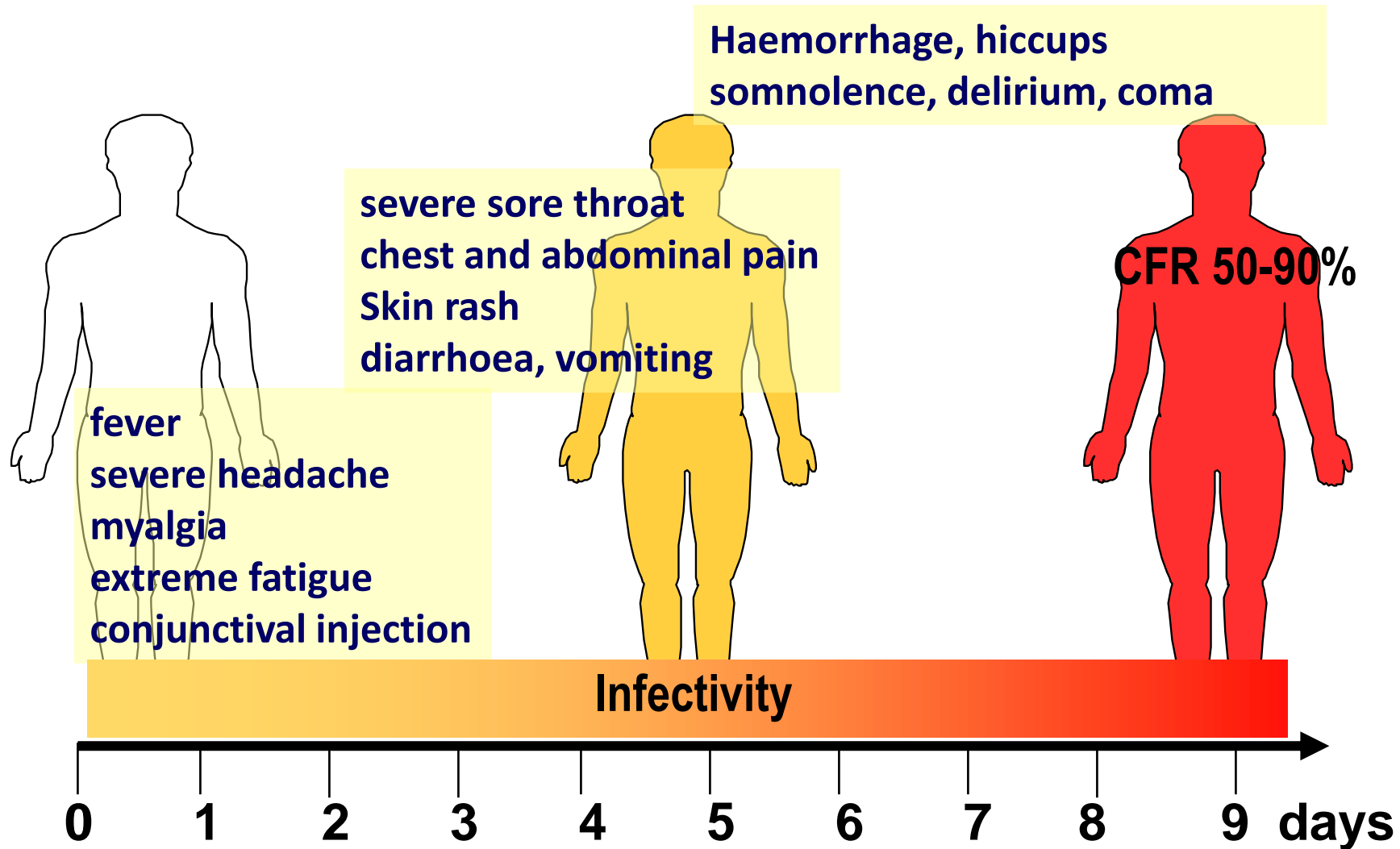
### SYMPTOMS

 Fever, weakness, muscle pain, headache and sore throat, followed by vomiting, diarrhoea, and bleeding

  
38°C  
100.4°F



# EVD: clinical symptoms



# Ebola disease diagnosis

- Symptoms are non-specific; clinical diagnosis may be difficult.
- Differential diagnosis includes other viral haemorrhagic fevers, yellow fever, malaria, typhoid fever, shigellosis, and other viral and bacterial diseases.
- Patient history is essential and should include:
  - Contact with a dead or sick animal;
  - Contact with a suspected, probable or confirmed Ebola patient



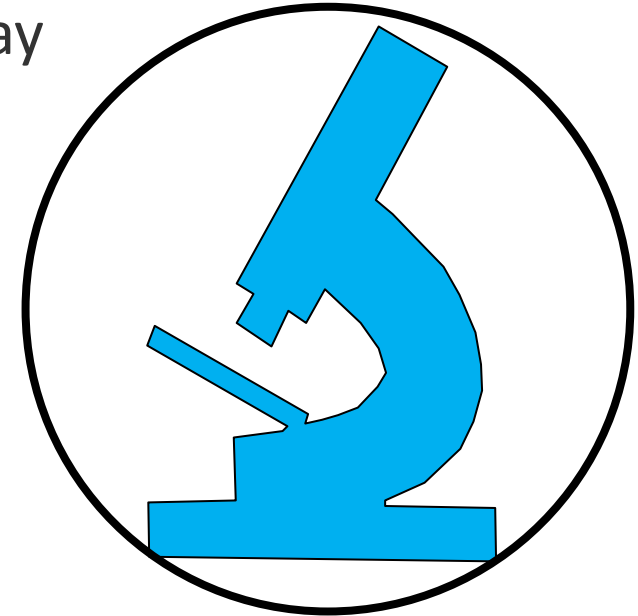


## Definitive diagnosis requires testing:

- reverse transcriptase polymerase chain reaction (RT-PCR) assay
- IgG and IgM antibodies with enzyme-linked immunosorbent assay (ELISA)
- antigen detection tests
- virus isolation by cell culture

The list of diagnostics approved for Emergency Use Assessment and Listing procedure (EUAL) by WHO is available here:

[http://www.who.int/medicines/ebola-treatment/emp\\_ebola\\_diagnostics/en/](http://www.who.int/medicines/ebola-treatment/emp_ebola_diagnostics/en/)



Handling and processing specimen requires **suitably equipped laboratories under maximum biological containment conditions** and staff collecting samples should be **trained**

# Ebola disease treatment



- Early, aggressive, intensive care support: Monitor fluid and electrolyte balance and renal function, blood pressure, oxygenation, careful rehydration.
- Supportive drug therapy including : painkillers, antiemetic for vomiting, anxiolytic for agitation, +/-antibiotics and/or antimalarial drugs
- Psycho-social support and services

**Cases investigation**

**Care for sick people**

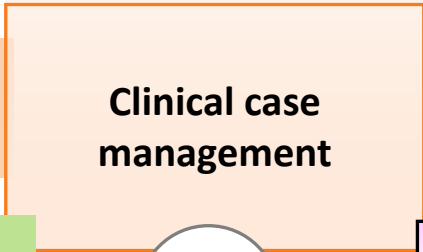
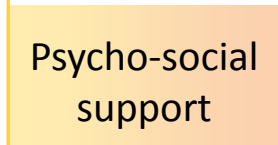
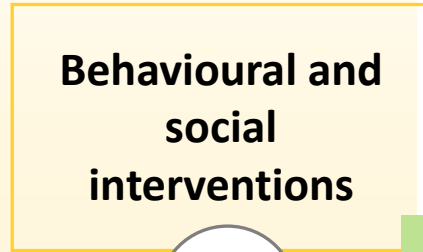


**National  
leadership**

**Preventive measures in communities  
and health care settings**

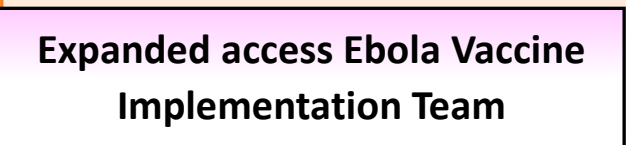
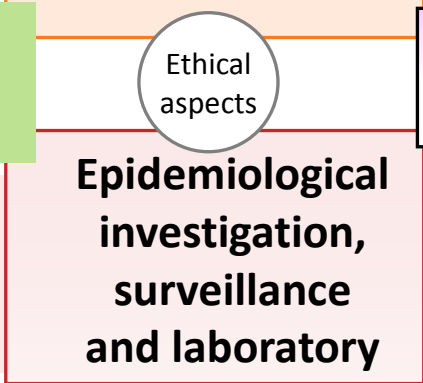
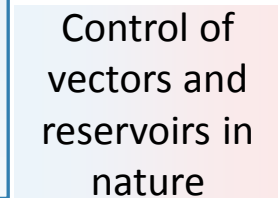
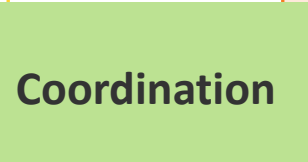
# General strategy to control EVD outbreaks

- Conduct social and cultural assessments
- Engage with key influencers: women and /or youth associations, traditional healers, local authorities, religious & opinion leaders
- Formal and informal communication
- Address community concerns

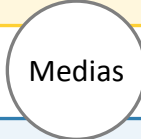


- Triage in/out
- Barrier nursing
- Infection control
- Organize funerals
- Clinical trials
- Ethics committee

- Security, police
- Lodging, food
- Social and epidemiological mobile teams
- Finances, salaries
- Transport vehicles



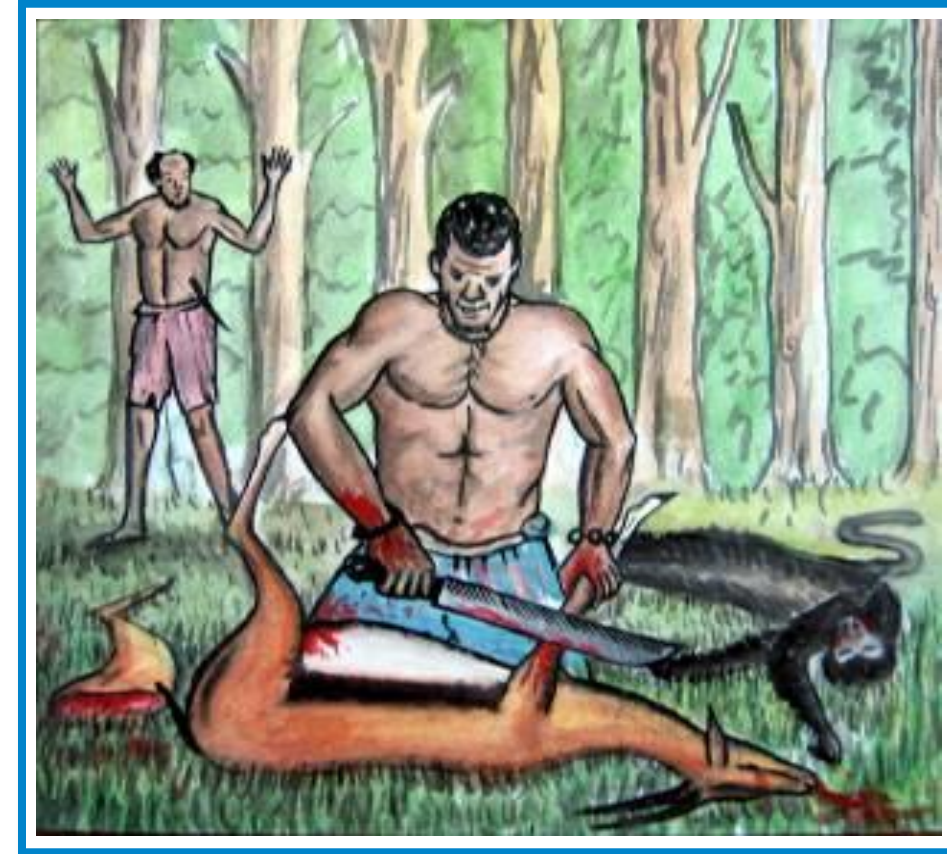
- Active case-finding
- Follow-up of contacts
- Specimens
- Laboratory testing
- Database analysis
- Search for the source



- Engage with communities to promote desired health practices and behaviours, particularly on caring for sick and/or deceased persons.
- Provide accurate and timely health advice and information on the disease.



- **Reducing the risk of wildlife-to-human transmission** from contact with infected fruit bats or monkeys/apes and the consumption of their raw meat.
  - Animals should be handled with gloves and other appropriate protective clothing.
  - Animal products (blood and meat) should be thoroughly cooked before consumption.

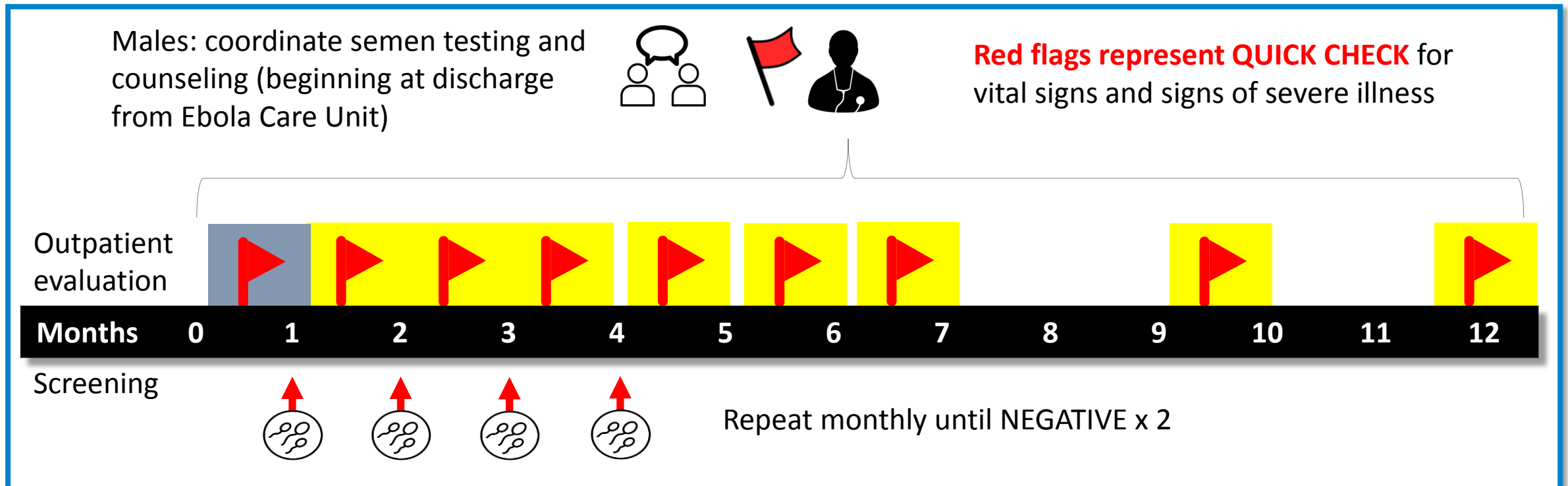


- **Reducing the risk of human-to-human transmission** from direct or close contact with people with Ebola symptoms, particularly with their bodily fluids.
  - Gloves and appropriate personal protective equipment should be worn when taking care of ill patients at home.
  - Regular hand washing is required after visiting patients in hospital, as well as after taking care of patients at home.
  - Organize safe and dignified burials for people who may have died of Ebola Virus Disease



# Reducing possible sexual transmission

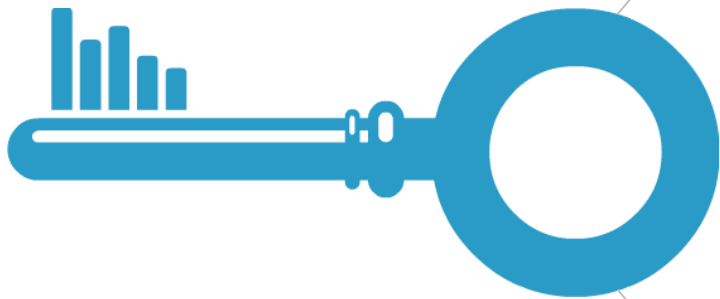
- **Reducing the risk of possible sexual transmission**, WHO recommends that male survivors of Ebola virus disease practice safer sex and hygiene for 12 months from onset of symptoms or until their semen tests negative twice for Ebola virus.



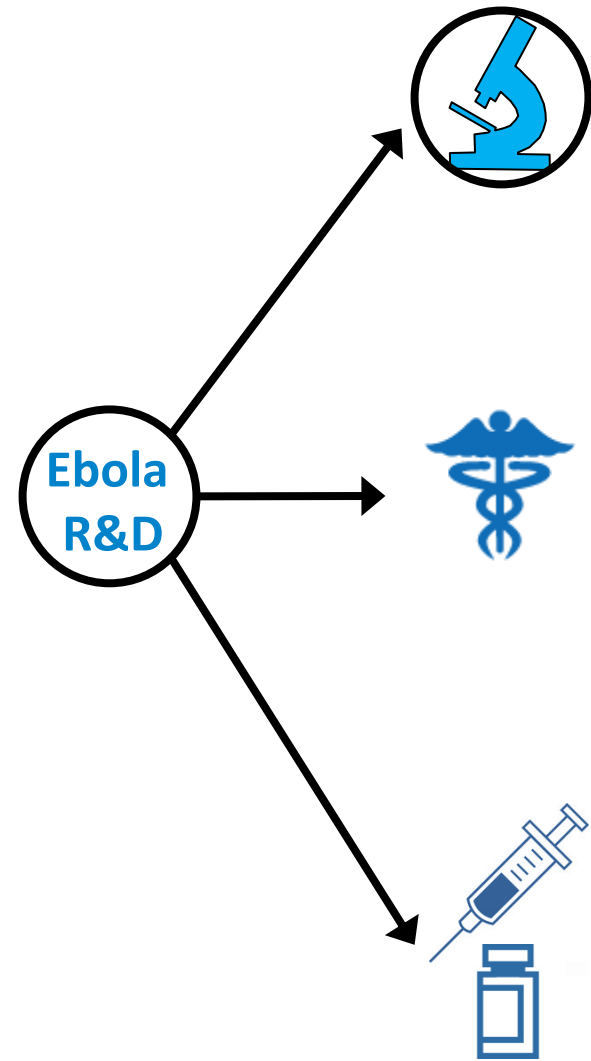


- Implement Standard Precautions with all patients – regardless of their diagnosis – in all work practices at all times including safe injection practices. <http://www.who.int/csr/resources/publications/standardprecautions/en/index.html>
- Health care workers treating patient with Ebola Virus Disease should apply extra infection control measures to prevent contact with the patient's blood and body fluids and contaminated surfaces or materials such as clothing and bedding.  
[http://www.who.int/csr/resources/publications/ebola/filovirus\\_infection\\_control/en/?ua=1](http://www.who.int/csr/resources/publications/ebola/filovirus_infection_control/en/?ua=1)
- Laboratory workers are also at risk. Samples taken from suspected Ebola Virus Disease cases for diagnosis should be handled by trained staff and processed in suitably equipped laboratories.

# Key Challenges for Ebola Virus Disease



- **Difficult to diagnose patients based on clinical presentation**
- **Stopping all chains of transmission**
  
- **Engaging timely with communities**



## Rapid Antigen Test (3) Nucleic Acid Test (6)

US-FDA and WHO approved for Emergency Use

## Therapeutics trials medicines and blood products

**ZMapp** Randomized Control Trial, estimated effect of appeared to be beneficial

**Favipiravir** decreases CFR in patients with a low to moderate viral load (200 patients)

**GS-5734** Gilead, phase I, used for 3 compassionate treatments

## Vaccines trials implemented in Guinea, Liberia and Sierra Leone

Expanded access proposed during Likati outbreak, DRC 2017

中文 English Français Русский Español عربي

<http://www.who.int/ebola/en/>

- Technical information
- Fact Sheet
- Disease outbreak news
- Infographics
- Maps
- Related links

## Ebola virus disease

### Sierra Leone one year on

9 June 2017 -- Today, Sierra Leone marks the one year anniversary of the end of the Ebola outbreak. The country is working to build back stronger, more resilient health systems, after the worst Ebola outbreak in history. This photo story shows how WHO-supported mothers' groups are playing an important role in bringing women and their families back to health services and clinics.

[Read the photo story](#)



UNO.Adland



#### Fact sheet

General information on Ebola virus disease, controlling the infection, WHO response



#### Frequently asked questions

Answers to questions on the disease, transmission of the virus, treatment



#### Ebola outbreak 2014-2015

Information and documents posted during the 2014-2015 epidemic

### Health systems

#### Health systems recovery

Recovering from an outbreak requires getting essential health services back up and running, and addressing the weaknesses of the health system. WHO's is working with affected countries in rebuilding their health systems.

### Survivors

#### Ebola survivors programme

Ebola survivors need comprehensive support for the medical and psychosocial challenges they face and also to minimize the risk of continued Ebola virus transmission.

### Situation reports: DRC

Review of the situation and an assessment of the response measured against the core indicators. The reports include tables, maps, and data on total number of Ebola cases in the Democratic Republic of Congo.

[All situation reports](#)

### Technical guidance

Key technical documents on Ebola  
 Clinical care for survivors of Ebola virus disease  
 Surveillance strategy during Phase 3 of the Ebola response  
 Recovery toolkit: Supporting countries to achieve health service resilience  
 Ebola response phase 3: Framework for achieving and sustaining a resilient zero  
 Infection prevention and control guidance for care of patients in health-care settings, with focus on Ebola  
 -- All publications, technical guidance documents  
 -- Journal articles on Ebola

### Preparedness. R&D

**Preparedness for emergencies**  
 WHO is working with countries in implementing plans to prevent and respond to a possible epidemic of Ebola virus disease.  
**R&D Blueprint**  
 Ebola clinical trials are bringing the world close to having its first safe and effective Ebola vaccine, while researchers are learning more every day about the long-term effects of Ebola on survivors.

### News, features

Past outbreaks of Ebola in DRC  
 19 May 2017  
 Press briefing on Ebola virus disease in the Democratic Republic of the Congo  
 18 May 2017, audio recording  
 WHO Regional Director for Africa, Dr Matshidiso Moeti travels to Kinshasa to discuss Ebola outbreak response  
 14 May 2017  
 Ebola vaccines for Guinea and the world: photos  
 5 May 2017



- Dr Pierre Formenty

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Infectious Hazard Management  
Health Emergency Programme  
WHO Geneva

[formentyp@who.int](mailto:formentyp@who.int)

