Ebola Virus Disease

- Introduction to Ebola Virus Disease
- Global Update on the EVD outbreak
- Essential Elements for Control
- UN response to the Outbreak
History of Ebola Virus Outbreaks

- Not a new disease – it is about 40 years old
- 1976, Ebola first detected through 2 simultaneous outbreaks in Sudan and Dem. Republic of Congo
- Since detection in 1976 until December 2013:
  23 outbreaks, 2388 human cases including 1590 deaths
- The current Ebola outbreak began in Guinea in December 2013. This outbreak now involves intense transmission in Guinea, Liberia and Sierra Leone
Ebola and Marburg viruses

Family *Filoviridae*, single-strand, negative-sense RNA virus

Genus *Ebolavirus*, 5 distinct species

- Species *Taï Forest ebolavirus*, virus: Taï Forest virus (TAFV)
- Species *Reston ebolavirus*, virus: Reston virus (RESTV)
- Species *Sudan ebolavirus*, virus: Sudan virus (SUDV)
- Species *Zaire ebolavirus*, virus: Ebola virus (EBOV)
- Species *Bundibugyo ebolavirus*, virus: Bundibugyo virus (BDBV)
Ebola Virus Disease

● Incubation (from infection to symptoms) period: 2-21 days
● No evidence of transmission (spread of infection) during incubation period
● Case Fatality (deaths among cases) Ratio 24-89%
● Handling specimens requires Bio Safety Level 4 labs
● Treatment is supportive but effective in reducing mortality
  ▪ Rehydration, intensive care
● Some potential specific treatment
  ▪ Monoclonal antibodies: very limited availability, limited information on safety & efficacy
  ▪ Other candidate drugs also in early stages of testing
● Vaccines in development
How Ebola Outbreaks Start

- First human cases start with infection from an animal
  - Chimpanzees, gorillas, monkeys, forest antelopes, fruit bats, porcupine...
  - How 2014 outbreak in West Africa started is unknown
- Infection from person-to-person creates an outbreak
  - Direct or indirect physical contact with body fluids of infected person (blood, saliva, vomitus, urine, stool, semen)
- Prominent locations where transmission occurs
  - Hospital: health care workers, other patients, unsafe injections
  - Communities: relatives / friends through contact while caring for the ill and through funeral practices
1. Virus reservoir:
   Fruit bats
   The virus maintains itself in fruit bats. The bats spread the virus during migration.

2. Epizootic in primates
   Infected fruit bats enter in direct or indirect contact with other animals and pass on the infection, sometimes causing large-scale epidemics in gorillas, chimpanzees and other monkeys or mammals (e.g. forest antelopes).

3. Primary human infection
   Humans are infected either through direct contact with infected bats (rare event), or through handling infected dead or sick animals found in the forest (more frequent).

4. Secondary 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).
Geographic distribution of Ebola virus disease outbreaks in humans and animals

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.
Diagnosis

- Diseases that should be ruled out include: malaria, typhoid fever, shigellosis (dysentery), cholera, leptospirosis, plague, rickettsiosis, relapsing fever, meningitis, hepatitis and other viral haemorrhagic fevers

- Essential role of patient history; exposure to area/place with ongoing outbreak and/or contact with confirmed cases

- Diagnostic tests:
  - Antibody-capture enzyme-linked immunosorbent assay (ELISA)
  - Antigen detection tests
  - **Reverse transcriptase polymerase chain reaction (RT-PCR) assay**
  - Electron microscopy
  - Virus isolation by cell culture
Disease in humans: Clinical Symptoms

- Incubation (infection to symptoms) period: 2–21 days
- Starts with feverish syndrome: often characterized by the sudden onset of fever, intense weakness, muscle pain, headache and sore throat
- Followed by vomiting, diarrhoea, rash, impaired kidney and liver function, and in some cases, both internal and external bleeding
- Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes
Disease in Humans: Treatment

- Intensive supportive care is required
- **Supportive care**: monitor fluid and electrolyte balance and renal function, careful rehydration
- **Provide supportive drug therapy**: painkillers, antiemetic for vomiting, anxiolytic for agitation, +/- antibiotics and/or antimalarial drugs
- Some **potential** specific treatment
  - Monoclonal antibodies
  - Other candidate drugs also in early stages of testing
Distribution of EVD cases in countries with intense transmission
13/14 October 2014

This map shows the distribution of EVD cases in countries with intense transmission as of 13/14 October 2014. The map includes a legend indicating different case counts and statuses:

- **All cases**:
  - 1 - 10
  - 11 - 100
  - 101 - 200
  - 201 - 300
  - 301+

- **No cases reported**
- **NO LONGER ACTIVE** - No cases in previous 21 days
- **ACTIVE** - New cases in previous 21 days
- **NEWLY INFECTED** - New cases in previous 7 days in previously unaffected areas

The map visually represents the geographic distribution of EVD cases across affected countries, highlighting areas with varying case counts.
Ebola West Africa - Distribution of cases by week of onset
as of 03 October 2014
EVD cases & deaths in this outbreak
(reported up to 13/14 Oct in W. African countries)

<table>
<thead>
<tr>
<th>Country</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberia</td>
<td>4262</td>
<td>2484</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>3410</td>
<td>1200</td>
</tr>
<tr>
<td>Guinea</td>
<td>1519</td>
<td>862</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td><strong>9191</strong></td>
<td><strong>4546</strong></td>
</tr>
<tr>
<td>Nigeria</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Senegal</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>USA</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td><strong>25</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9216</td>
<td>4555</td>
</tr>
</tbody>
</table>
**EVD cases & deaths in Health Care Workers**  
*(reported up to 13/14 Oct in W. African countries)*

<table>
<thead>
<tr>
<th>Country</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberia</td>
<td>209</td>
<td>76</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>124</td>
<td>98</td>
</tr>
<tr>
<td>Guinea</td>
<td>76</td>
<td>40</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td><strong>409</strong></td>
<td><strong>239</strong></td>
</tr>
<tr>
<td>Nigeria</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Senegal</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>USA</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td><strong>14</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>423</strong></td>
<td><strong>239</strong></td>
</tr>
</tbody>
</table>
Ebola Global Update..

- This is the largest Ebola outbreak ever.
- Intense transmission in Liberia, Sierra Leone & Guinea
- Nigeria, Senegal, the USA and Spain have also been affected through cases from the above 3 countries.
- WHO has declared the outbreak over in Senegal & Nigeria – no new cases 42 days after last known case
- Almost half the cases were in the past 3 weeks and cases are increasing exponentially.
- International experts assess that Ebola is spreading at an exponential rate, with the number of cases currently doubling approximately every three weeks.
- More than 22 million people are living in areas where active Ebola transmission has been reported.
Ebola in West Africa
“Extraordinary Event”

Declared a Public Health Emergency of International Concern (PHEIC) by DG WHO on 8 August 2014, under the International Health Regulations (2005):

• Serious consequences of international spread, severity/fatality of illness (no vaccine or cure); intense community and health facility spread; weak health systems in affected and at-risk countries

• Coordinated international response is essential to stop and reverse spread of Ebola
High-risk groups during Ebola Outbreaks

- Health care workers that care for Ebola cases who are not protected with personal protective equipment (PPE) > 380 HCWs affected, half of whom have died
- Family members, care-givers or others in close contact with sick Ebola patients
- Mourners who have direct contact with bodies or secretions of deceased Ebola cases
- For countries without Ebola cases, travellers need to be kept informed of the risks
Challenges – Infection control

Even though Ebola is highly infectious, prevention is possible through application of strict infection control measures

• Appropriate laboratory practices
• Standard biosafety precautions
• Use of personal protective equipment (PPE) by healthcare workers exposed to cases
• Disinfection of contaminated equipment, objects and areas
• Safe disposal of infected material
• Safe burial practices
Challenges – Risk Communication & Public Engagement

- **Education and communication**: Raising awareness is crucial so everyone understands what Ebola is, how it is transmitted and how to protect yourself.

- **Public fears**: Ebola is a disease that creates a lot of anxiety and fear. Clear, transparent and balanced messaging & information can help reduce such panic.

- **Public involvement**: Getting community leaders and the public to take an active role in implementing preventive measures, creating awareness and participation in the management of the outbreak, can limit spread of the disease in the community.
Essential Elements for Control of On-going Outbreak
General strategy to CONTROL Ebola outbreak

- Behavioural and social interventions
- Anthropological evaluation
- Formal and informal modes of communication
- Social and Cultural practices
- Communication Press Journalists
- Security Police
- Lodging Food
- Social and Epidemiological mobile teams
- Finances Salaries
- Transport Vehicles
- Control of vectors and reservoirs in nature
- Triage In/out
- Barrier nursing
- Organize funerals
- Clinical trials Ethics committee
- Duty of care Research
- Active case-finding
- Follow-up of contacts
- Specimens Laboratory testing
- Search the source
- Database analysis
UN Response to the Outbreak
WHO Ebola Response Roadmap

**GOAL:**
Stop Ebola transmission globally within 6-9 months, while addressing the broader socioeconomic impact in intense transmission areas & rapidly managing consequences of international spread
Response in countries with widespread and intense transmission
Joint UN Response

- UN Mission for Ebola Emergency Response (UNMEER) established in Accra, Ghana
- WHO reviews the situation in priority Countries based on geographical proximity to affected countries, trade and migration patterns and strength of health systems
- A new consolidated checklist issued by WHO - developed jointly with CDC and UN OCHA
- 10 key Items on the checklist: infection prevention control, contact tracing, case management, surveillance, laboratory capacity, safe burial, public awareness and community engagement and national legislation and regulation to support country readiness.
- Timing for key components and tasks for both countries and the international community ---should be completed within 30, 60 and 90 days respectively from the date of issue of checklist
Ebola in West Africa: Health Systems preparedness is critical

Affected countries have limited capacity for standard containment measures, including:

• Getting Ebola treatment centers fully operational with personnel and equipment
• Early detection and isolation of cases
• Contact tracing and monitoring
• Hospital procedures for infection control
• Logistics: personal protective equipment and disinfectants
• Trained human resources
EBOLA WHO website

- Technical information
  - Infection control
  - Social mobilization
  - Epidemiology
  - Preparedness and response
  - Patient care

- Guidelines

- Meeting reports

- Disease outbreak news

http://www.who.int/csr/disease/ebola/en/
Ebola India Response..

Daily MOH press releases
- Regular monitoring: Union level, JMG meetings on Ebola, highest level engagement for inter-sectoral collaboration
- States alerted, guidance prepared and disseminated; technical support
- Preparedness measures: Points of Entry (18 Airports activated and linked) with screening, isolation facilities; designated hospitals
- Training of Rapid Response Teams
- Health advisory
Summary - 1

- The 2014 Ebola outbreak is unprecedented in scope and threatens global health security.
- Ebola is a serious disease, but in this outbreak the survival rate has been higher than previous outbreaks – 51% of those sickened by Ebola have survived.
- With appropriate measures and concerted actions by all partners, this outbreak can be controlled.
Summary 2

• The risk of transmission during air travel is low.
• Ebola is not airborne (not spread by aerosol).
• Transmission of Ebola requires direct contact with blood, secretions, organs or other body fluids of infected people (living or dead persons) which are all unlikely exposures for the average traveler.
• A person who is infected will spread the virus to others only after the infected person starts having symptoms.
Summary 3

WHO believes that countries with health systems that are prepared to respond can quickly contain any imported cases. UN has activated system-wide response to EVD outbreak in West Africa. This outbreak requires global response and continued global attention and action. The IHR (2005) is designed to strengthen core capacities in countries for response to such public health emergencies.
THANK YOU