Ebola in West Africa
Previous Ebola Outbreaks
1976 - 2014
Ebola 101

• Reservoir
  – Fruit Bats are believed to be the reservoir

• Transmission
  – Contact with infected animals
  – Direct contact with bodily fluids of an infected person

• Incubation Period
  – Typically 8-10 days
  – Range 2 – 21 days

• Prevention
  – Hand-washing
  – Avoid Body Contact
  – Personal Protective Equipment for healthcare workers, burial teams, etc.
Signs and symptoms of Ebola

• Fever
• Severe headache
• Muscle pain
• Weakness
• Fatigue
• Diarrhea
• Vomiting
• Abdominal (stomach) pain
• Unexplained hemorrhage (bleeding or bruising)
EBOLA OUTBREAK IN WEST AFRICA
WHO Ebola Situation Report
Number of cases and deaths by country as of April 26, 2015

<table>
<thead>
<tr>
<th>Country</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea</td>
<td>3,584</td>
<td>2,377</td>
</tr>
<tr>
<td>Liberia</td>
<td>10,322</td>
<td>846</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>12,371</td>
<td>3,899</td>
</tr>
<tr>
<td>Total</td>
<td>26,312</td>
<td>10,899</td>
</tr>
</tbody>
</table>

Sources: WHO Ebola Outbreak in West Africa - Case Counts; WHO SITREP, 26 April 2015
Main Sources of Infection

• Taking care of sick people
  – Healthcare workers, family members

• Burial practices
  – Traditional burial practices include washing and touching the body of the deceased
SIERRA LEONE
Get equipped for free at Marie Stopes

Real men go to Marie Stopes

Get free condoms and advice at:

- Friendly
- Confidential
- Compassionate
- Affordable

I am Mr. Condom

TRUST ME
USE ME
I will Protect you from HIV and SIVs

Contact the nearest Health Facility for free HIV Services

I am Mr. Condom

Put on your boots before you score!

Condom

MARIE STOPES

Take your child five times for Marklate to the nearest health facility

BOTA MARKLATE Can Protect Your Child From Severe Diarrhoea

Types of Vaccines

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>LOT/BATCH</th>
<th>EXP DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPV</td>
<td>A00878500C</td>
<td>8 - 15</td>
</tr>
<tr>
<td>MV/FEVER</td>
<td>J50016-01</td>
<td>2 - 15</td>
</tr>
<tr>
<td>MEASLES</td>
<td>Z5088 13</td>
<td>10 - 15</td>
</tr>
</tbody>
</table>
Cumulative Cases by District

Cumulative Confirmed Ebola Cases, Laboratory Data, 23rd May 2014 - 21st April 2015

Kambia 220
Bombali 1049
Port Loko 1445
Western 3409
Moyamba 209
Tonkolili 454
Koinadugu 109
Kono 254
Kailahun 565
Bo 314
Bonthé 5
Pujehun 31

Cumulative Ebola Cases Laboratory Data
- 855 - 3409
- 464 - 855
- 247 - 464
- 149 - 247
- 0 - 149

Confirmed cases since 23rd May 2014 - 21st April 2015 = 8581;
14 cases could not be mapped because district information was missing.

Ministry of Health and Sanitation
The Republic of Sierra Leone
Disease Prevention and Control (D.P.C)
Ebola Response - Port Loko

• **Command Center (British Military)**
  – Sierra Leone military head up different sections, partner with NGOs
    • Alerts, Surveillance, Ambulance, Burial Team, Decon, Quarantine, Food distribution, Contact Tracers, etc.

• **Alert system**
  – 117 call system for community and health care providers to report possible cases and dead bodies
  – Surveillance team dispatched to investigate alerts
  – If meet case definition – Command Center dispatches ambulance for transport to a holding center
    • Case definition – Fever + contact with suspect EVD OR
    • Fever and 2 other symptoms OR
    • 3 Ebola symptoms
Port Loko Command Center
Ebola Holding Centers

• Suspect patients divided by dry and wet symptoms; bed spacing

• Blood drawn
  – Ebola
  – Malaria

• Results usually in 24 hours
  – If negative – symptom onset at least 72 hours?
    • No – hold and re-test 72 hrs post symptom onset
    • Yes – release
    • Report result to command center
  – If positive
    • Transport to treatment center
Ebola Holding and Treatment Centers
Positive Ebola Cases

- Lab results communicated to Command Center
- Contact tracers dispatched to gather line list
- 21 day quarantine for all contacts
  - Daily follow up
- Food distribution for quarantined households
- Social mobilization teams to educate community
- Decon team dispatched to decontaminate home
Orphanage
Ebola Prevention

Burial team

Checkpoint Hand-washing station
Treatment

• There is no cure for Ebola
• In Sierra Leone, ~40% mortality rate
• Treatment is mostly about preventing dehydration
Ebola Vaccine?

• No licensed vaccines currently
• Several vaccines being developed
• Clinical trials in humans with 2 vaccines underway
  – Liberia – January 2015
  – Sierra Leone – April 2015
Vaccine Phase 2/3 Trials Underway

• ChAd3-ZEBOV – Chimp adenovirus vaccine, GSK/NIAD. Safety/Efficacy trial in Liberia

• rVSV-ZEBOV – recombinant vesicular stomatitis vaccine, NewLink Genetics and Merck Vaccines USA, in collaboration with the Public Health Agency of Canada, trials in Liberia and Sierra Leone
STRIVE
Sierra Leone Trial to Introduce a Vaccine Against Ebola
Sierra Leone Study Partners

- Sierra Leone College of Medicine and Allied Health Sciences
- Sierra Leone Ministry of Health and Sanitation
- U.S. Centers for Disease Control and Prevention
- Biomedical Advanced Research and Development Authority
rVSV - ZEBOV Vaccine – how does it work?

• The Vesicular Stomatitis Virus is the vector
  – VSV infects animals
  – Does not cause illness in humans

• Vaccine contains a piece of Ebola virus
  – Does NOT contain live Ebola Virus
  – You cannot get Ebola from the vaccine

• Has only been tested in small numbers of people
  – Generally safe
  – Antibody response
  – Prevent Ebola???????
Ebola VSV Vaccine

• The Ebola VSV vaccine takes out the piece of the VSV virus that tells the body it is VSV.
• This piece is replaced with a small piece of the Ebola virus.
  • This tricks the body into thinking it is seeing Ebola, and the body makes antibodies to fight Ebola.
Objectives

• Introduce an **Ebola vaccine** among people at high-risk for getting Ebola

• Measure how **effective** the vaccine is in preventing Ebola among adult front line Ebola response workers in Sierra Leone

• Measure how **safe** the vaccine is by monitoring participants for possible adverse events after vaccination
Study Design

- **Unblinded, randomized trial with phased introduction of vaccine (no placebo)**
  - Enrolled responders will be randomly assigned to receive the vaccine shortly after enrollment or approximately 6 months later
  - Participants will be followed for development of Ebola and SAEs
    - Subset of participants will participate in a reactogenecity study
    - Immunogenicity trial also being planned

- **Vaccine effectiveness will be measured by comparing disease incidence in persons vaccinated earlier versus later**
Study Target Population

- **Study groups (~6,000 persons):**
  - All adults working in facilities that provide health care (Ebola or non-Ebola related)
  - Surveillance officers, ambulance teams, workers responsible for swabbing deceased persons, burial team members

- **Study districts:**
  - 4 districts
    - Western: All areas (Urban and Rural)
    - Selected chiefdoms in Port Loko, Bombali, Tonkolili
Sierra Leone Districts

Confirmed Ebola Cases, 8th April to 21st April 2015

Number of cases
- 51 - 100
- 16 - 50
- 6 - 15
- 1 - 5
- 0

Confirmed Ebola Cases during 8th April - 21st April 2015: 21; No cases were missing district information.

MINISTRY OF HEALTH AND SANITATION
THE REPUBLIC OF SIERRA LEONE
Disease Prevention and Control
Exclusion Criteria

- Pregnant and breastfeeding women
- History of HIV or other immune disorder
- History of serious allergic reaction to any vaccine
- Ebola virus disease survivors
- Prior vaccination with an Ebola or Marburg virus vaccine
Informational Sessions
Vaccination Site
Challenges

• Cold Chain
  – Vaccine must be stored at - 80 celsius
  – Dosing
  – Transport to vaccination sites

• Vaccine side effects
  – Mild flu like symptoms = Ebola case definition

• Poor health infrastructure

• No experience with any clinical trials in Sierra Leone

• Declining cases

• Language and literacy – consent issues

• Messaging re: continued use of PPE

• Other trials
  – Treatment trials
  – Lab test trials
  – Other vaccine trials (Johnson and Johnson vaccine)
Ebola Heroes

• [https://www.youtube.com/watch?v=n9rHaoQbFrs](https://www.youtube.com/watch?v=n9rHaoQbFrs)