EBOLA
THE IMPACT FROM INTERNATIONAL AND LOCAL PERSPECTIVES

Lessons Learned

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OUTLINE

- Background
- Ebola Virus Disease Outbreak
- Ebola outbreak in Nigeria
- Health Sector Response
- Regional Response
- Establishment of a Regional Public Health Institute
- Global impact and Health Security Issues
- Research Issues prompted by Ebola outbreak
- Lessons learned
- Conclusions
- Recommendations
WHAT IS EBOLA?

- Ebola virus disease (EVD) is an acute viral hemorrhagic fever
- It is caused by infection with a virus of the genus *Ebolavirus*
- One of the most virulent viral diseases known to humankind
- It is a severe, often fatal disease in humans and nonhuman primates (such as monkeys, gorillas, and chimpanzees)
- Most fatal viral hemorrhagic fever
- Confined mostly to rural-jungle areas of East and Central Africa
- Usually a “One site. One time” outbreak
THE RESERVOIR IN NATURE
Ebola Virus Ecology

Enzootic Cycle
New evidence strongly implicates bats as the reservoir hosts for ebolaviruses, though the means of local enzootic maintenance and transmission of the virus within bat populations remain unknown.

Ebolaviruses:
- Ebola virus (formerly Zaire virus)
- Sudan virus
- Tai 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.

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

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

Order: *Mononegavirales*
Family: *Filoviridae*
Genus: *Ebola like viruses*
Species: *Ebola*
How is Ebola Hemorrhagic Fever spread?

The manner in which the Ebola virus first appears in a human at the start of an outbreak has not been determined. However, Ebola HF could be spread through the following:

Direct contact with an infected animal or human;
1. Direct contact with the blood and or secretions of an infected person especially within families;
2. Contact with contaminated medical equipment such as needles;
3. Reuse of unsterilized needles in hospital;
4. Eating or handling the carcass of infected animals;
5. Inhalation of contaminated air in hospital environment;
6. Use of infected non human primate/bats as food source;
7. Non implementation of universal precautions.
Who is at risk?

- People exposed to and handling wild animals;
- People depending on wild animals such as bats as a food source;
- Mortuary attendants;
- Health workers caring for Ebola HF patients;
- Health workers in hospital settings with poor hygiene and sanitation practices.
THE EVD OUTBREAK
1976 - Ebola virus first broke out in Zaire and Sudan affecting more than 500 persons
   - Mortality rates were 88% in Zaire; 66% in Sudan
   - In one small village in Zaire, 274 out of 300 people infected in an outbreak died.
1995 - Ebola resurfaced in Kikwit, Zaire (Democratic Republic of Congo) affecting medical professionals (Kikwit was immediately under quarantine)
   - International medical expertise required for effective containment due to poor health infrastructure
Outbreaks of Ebola HF have been mainly restricted to Africa (Democratic Republic of the Congo, Gabon, Sudan, Ivory Coast, Uganda, Sierra Leone, Gambia and the Republic of Congo and now countries of West Africa).
DISTRIBUTION OF PREVIOUS EVD OUTBREAKS IN AFRICA

- Majority of outbreaks are due to Ebola virus
  - (species *Zaire ebolavirus*)
<table>
<thead>
<tr>
<th>Country</th>
<th>Town</th>
<th>Cases</th>
<th>Deaths</th>
<th>Ebolavirus</th>
<th>Year</th>
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<tr>
<td>South Sudan</td>
<td>Nzara</td>
<td>284</td>
<td>151</td>
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<td>1</td>
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<td>Guinea, Sierra Leone,</td>
<td>Multiple</td>
<td>745*</td>
<td>?</td>
<td>Ebola virus</td>
<td>2014</td>
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*Reflects confirmed cases only
The Ebola outbreak in West Africa constituted an ‘extraordinary event’ and a public health risk to other States.

Guinea officially declared that it was hit by the Ebola Virus Disease (Ebola) on 23 March 2014.

Within four months Ebola had affected four countries.

Liberia declared it was affected on 31 March 2014.

Sierra Leone, with the first death reported on 27 May 2014.

Isolated and quickly contained cases occurred in Nigeria (25 July), Senegal (29 August) and Mali (23 October).

However, by 20 March 2015 Ebola had infected a reported 24,753 people in Guinea, Liberia and Sierra Leone, killing 10,236.
The West African Ebola epidemic stems from the infection of a 2-year-old-boy from Guinea. The child died on 6\textsuperscript{th} December, 2013, just a few days after falling ill. Some of his family members contracted Ebola, and then mourners at his funeral carried the virus to a nearby village.

The boy’s pregnant mother was infected, and in turn infected a midwife, who treated her while she miscarried. By the time the outbreak was confirmed as Ebola in March 2014 49 people had contracted the virus, and 29 people had died. Four health workers were among the dead.

By the end of March 2014, Ebola had spread to Liberia and Sierra Leone. In July, a visibly ill air traveler brought Ebola from Liberia to Nigeria. Ebola spread to Senegal in August, when an Ebola patient who escaped the surveillance system in Guinea traveled to Dakar, Senegal by road.
Being treated, or working, in a hospital in affected states is extremely hazardous. Hospitals have become amplification points, fueling EVD transmission. Health professionals are most susceptible, working in hazardous conditions. They care for infected patients without personal protective equipment and infection controls; they lack training in diagnosis of and treatment for EVD; there are few safe and sterile isolation units; and they are underpaid. As a result, the disease is decimating the West African workforce, which was fragile even before the crisis emerged—nearly 400 health workers have contracted Ebola and more than 200 have died.
Distribution of EVD cases in West Africa
Several factors help explain the high proportion of infected medical staff.

These factors include:

- shortages of personal protective equipment (PPEs) or its improper use,
- Too few medical staff for such a large outbreak,
- Rejection of posting and escape to safe grounds by medical staff to lengthy work—time in isolation wards (far beyond the number of hours recommended as safe)
EBOLA OUTBREAK IN NIGERIA
EBOLA OUTBREAK IN NIGERIA

- Imported case in July 2014
  - 20 cases with 8 deaths; rapid response
  - 899 contacts; >99% contact tracing daily rate
  - Controlled within 8 weeks (20\textsuperscript{th} July-8\textsuperscript{th} of September (20\textsuperscript{th} October – WHO, 42 days post onset of last case).
NATIONAL PUBLIC HEALTH INSTITUTES ROLE IN EBOLA RESPONSE

- Nigeria Centre for Disease Control (NCDC) Nigeria Field Epidemiological and Laboratory Training Programme (NFELTP)
- >100 graduates and residents involved - Timeliness
  - Outbreak investigation competencies
  - Interpersonal communication skills
  - All Epidemiology background
- Case identification and investigation
- Contact identification and monitoring using real time (RT), GIS enabled system, Open Data Kit (ODK)
- All contact identified and followed up
- Over 18 000 contact visits and interview in 3 states with > 97% coverage rates
- Operational research to identify specific response gaps – evidence based decisions
- Deployment to other countries
CASE MANAGEMENT/INFECTION PREVENTION AND CONTROL

- 40-bed capacity isolation facility at the Infectious Disease Hospital, Yaba for Ebola case management with separate sections for suspected and confirmed cases
- Another 10-bed facility completed by LSMOH also within IDH Yaba
- 3 patients currently on admission in isolation ward
- The isolation facility was initially managed by WHO experts and later supported by MSF
- A team of Nigerian health workers including 9 doctors, 13 nurses and 16 ancillary staff now trained on Ebola case management and infection control and currently providing 24-hour care
Confirmed patient ward

Similar ward with more spacing
Between beds for suspects

Photo courtesy - CDC
<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Average duration of Stay in</strong></td>
<td><strong>11.6 days (Range 10-15 Days)</strong></td>
</tr>
<tr>
<td><strong>ETC</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Average age of patient</strong></td>
<td><strong>35.9 yrs (Range 26-58yrs)</strong></td>
</tr>
<tr>
<td><strong>Time interval btw Onset of symptoms-admission into ETC</strong></td>
<td><strong>5.8 days (Average 3-7days)</strong></td>
</tr>
<tr>
<td><strong>Currently on admission</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>
NATIONAL RESPONSE
NATIONAL LEADERSHIP

▪ President declared Ebola National Emergency

▪ Established Presidential Steering Committee
  ▪ N1.9Bn (11.5M USD) earmarked by the government of Nigeria
  ▪ EOC established in Lagos, another one set up in Port Harcourt
“EBOLA EOC” COORDINATES ALL RESPONSE ACTIVITIES LED BY FMOH/NCDC

- NCDC PD: National Coordinator - Prof A. Nasidi
- Incident Manager: Dr. Faisal Shuaib
- Strategic Group: Core Strategic planning & decision-making team comprising IM, Team Leads of WHO, UNICEF, US CDC, MSF, SMOH. Met twice daily

Organized into 6 teams responsible for:

1) Epidemiology/Surveillance
2) Case management/Infection prevention & control
3) Laboratory
4) Points of Entry (PoE)
5) Social mobilization
6) Management and coordination

Daily coordination meetings to share information and provide feedback
EEOC in Session
Active participants at EEOC
Contact tracing

- 18 Contact tracing teams in Lagos; 15 in Port Harcourt
- Contacts visited daily by trained personnel
- e-Reporting on contacts seen using android phones
- Contacts that develop symptoms automatically trigger messages and alerts to the team for immediate action;
- Special team to track and resolve non-compliant contacts with the support of community leaders, local government and law enforcement agencies
EBOLA OUTBREAK IN NIGERIA 2014: TRANSMISSION CHAIN

All the 20 cases and 899 contacts accounted for
Flow Diagram of cases and contacts – EEOC Nigeria

**Epidemiology Team**

- Identification of contact
  - Visit contact (21d)
    - Fever+ Symp?
      - Yes: Inform case management team
      - No: Continue follow-up until 21d

**Case Management**

- Clinical assessment
  - Meets susp case def?
    - Yes: Isolate?
      - Yes: Continue follow-up for 21d
      - No: Discharge per protocol
    - No: Continue follow-up until 21d
  - Suspect taken to isolation facility
    - LAB results 24h
      - Yes: Transfer to confirmed ward
      - No: Disinfection of Home

Contact listing & follow-up forms

Case Investigation form

LAB form

25 August 2014
<table>
<thead>
<tr>
<th>Contacts</th>
<th>Lagos</th>
<th>Port Harcourt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative contacts listed</td>
<td>362</td>
<td>530</td>
</tr>
<tr>
<td>Contacts that became EVD cases (Suspect, Probable, and confirmed)</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Contacts currently under follow-up</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Contacts who completed 21-day follow-up</td>
<td>362</td>
<td>530</td>
</tr>
<tr>
<td>Contacts lost to follow-up</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Total followed = 892
PARTNERSHIPS

- All of these efforts were possible through partnerships with WHO, UNICEF, US CDC, MSF, Private sector, Bill and Melinda Gates Foundation, Dangote Foundation, NGOs, Community and Religious Leaders and volunteers.

- In the end, Nigeria confirmed a total of 19 cases and probable case, of whom 8 died and 12 survived, giving the country an enviable case fatality rate of 40% – much lower than the 70% and higher seen elsewhere.
TRUE SEQUENCE OF EVENTS IN THE EBOLA OUTBREAK IN NIGERIA FROM 20 JULY 2014

First Case Detection/Reporting
Lab Confirmation
Response

Cases prevented - (The left shift!!)

4 Days work with no PPE

6 Days

DAY

CASES

0 10 20 30 40 50 60 70 80

7 10 13 16 19 22 25 28 31

DAY

0 10 20 30 40 50 60 70 80

7 10 13 16 19 22 25 28 31
SUCCESS FACTORS IN NIGERIA

Why it was successful

- Government leadership through EOC
- Multi-sectoral involvement – private/public partnership
- Preparedness plan and rapid response
- Availability of trained personnel (NFELTP)
- Use of highly skilled HEALTH CARE workforce for
  - Rapid response
  - Contact tracing
  - Operational research
  - Innovation – real time monitoring for contacts
  - (Open Data Kit and Hub technology)
GETTING TO “0”

According to WHO

- Nigeria demonstrated world class epidemiological detective work
- Nigeria Ebola free on 20th October 2014
GLOBAL HEALTH SECTOR RESPONSE
WHO advised that:

- The possible consequences of further international spread are particularly serious:
  - in view of the virulence of the virus,
  - the intensive community and health facility transmission patterns,
  - and the weak health systems in the currently affected and most at-risk countries.
- Based on this advice, the Director-General accepted the Committee’s assessment and on 8 August 2014 declared the Ebola outbreak in West Africa a Public Health Emergency of International Concern (PHEIC).
- Therefore a coordinated international response was deemed essential to stop and reverse the international spread of Ebola.
REGIONAL RESPONSE
The African Union urged its members to recruit more health care workers. The ECOWAS Commission has also directed:

- A three (3) month moratorium placed on all meetings
- Deployed ASEOWA Response Team
AFRICAN UNION SUPPORT TO EBOLA IN WEST AFRICA (ASEOWA) : ARRIVAL IN MONROVIA – 05-12-14

Nigeria was the first to deploy its Volunteers in the ASEOWA response.
BRIEFING LIBERIAN GOVERNMENT AT CROSS BORDER MEETING OF AFFECTED COUNTRIES
DELAYED TIME OF RESPONSE BY AU AND ECOWAS:
EVIDENCE OF POOR CAPACITIES IN PREPAREDNESS AND
RESPONSE IN AFRICA

[Diagram showing the number of confirmed Ebola cases over time with arrows indicating foreign support and reactivation of essential health services.]
THE ESTABLISHMENT A REGIONAL PUBLIC HEALTH INSTITUTE
The ECOWAS Regional Centre for Disease Control by decision of the Conference of Heads of State and Government was established

- To operate within the concept of West Africa Health Organization (WAHO)
- Encourage member countries to report outbreaks
  - Manage/mitigate trade and travel restrictions
  - Support the WHO to timely treat Ebola as a Public Health Emergency of International Concern (PHEIC)
- Establish a functional Laboratory network through National Coordinating Institutes (NCIs)
- Develop an event-based surveillance system (EBSS) at country and regional levels
  - could easily be transformed into real-time monitoring system during outbreaks
- Timely sharing of data during outbreaks will enhance timely evaluation and feedback towards effective control
- Innovation and equitable access to drugs, vaccines, diagnostics and other technologies
  - Regional centers of excellence with varied capacities
Based on this structure, an ERRRT, otherwise also known as the “ECOWAS White Helmets” is formed launched at the KAIPTC 19th to 22rd of September 2016.

Formation of ERRRT adopted “One Health Approach” combining experts from human, animal and environmental health sectors for well-rounded preparedness and response to epidemics.
GLOBAL IMPACT AND HEALTH SECURITY ISSUES
The West African Ebola epidemic is an international public health crisis, representing a threat to international peace and security. said on September 18th,

“The gravity and scale of the situation now requires a level of international action unprecedented for an emergency.” As the international community begins to accelerate its response commensurate with the magnitude of the immense human suffering, additional actions – in both the immediate and longer term – are necessary. In the immediate term, the UN should exercise decisive leadership, and move the international response from a “catch-up” exercise to a well-planned, properly resourced, and diligently executed strategy.

UN Secretary-General Ban Ki-moon, Sept 2014
The land mass of Africa is daunting! It swallows most of the well populated countries of the world.

Africa has approximately 30% of the earth’s remaining mineral resources – yet we are referred to as “Resource limited nations”.

The continent has the largest reserves of precious metals with over 40% of the gold reserves, over 60% of the cobalt, and 90% of the platinum reserves.
Population - 366,254,975 by November 15, 2016

Western Africa population is 4.81% of the total world population.

The population density in Western Africa is 60 per Km² (155 people per mi²).

The total land area is 6,067,010 Km² (2,342,485 sq. miles)

44.6% of the population is urban (164,351,190 people in 2016)

The median age in Western Africa is 18 years.
Our highly mobile, interconnected world ripe for rapid spread of global threats

Infectious diseases emerging and spreading geographically faster than any time in history
  - An outbreak anywhere only few hours away somewhere else

Nearly 40 new diseases discovered
  - Unknown a generation ago
  - Globally, WHO verified >1100 epidemics in the last 5 years

Need for effective surveillance and response has never been as urgent
THE GLOBAL THREAT OF INFECTIOUS DISEASES

EMERGING AND RE-EMERGING DISEASES

Adapted from Morens, Folkers, Fauci 2004 Nature 430; 242-9
About 100 acute public health events annually

2015: 105 public health events

- 82 (78%): Infectious diseases
- 18 (17%): Disaster
- 4 (4%): Chemical

Map of public health events reported, Jan - Dec 2015

- Infectious
- Disaster
- Chemical
- Nutritional deficiency

[Map showing various public health events across Africa]
Marburg and Ebola risk mapping

**Marburg**
- Countries with reported index cases
- Countries at risk without reported index cases

**Ebola**
- Local transmission (indigenous)
- Local transmission (triggered by imported cases)
- Imported cases (no local transmission)
- No reported cases but suitable ecology for transmission
Lassa and Crimean Congo risk mapping

**Lassa**

- Reported cases
- Presence of the *Mastomys natalensis*

**Crimean Congo**

- Indeterminable
- Moderate presence
- Complete presence
Yellow fever and Zika risk mapping
LASSA FEVER – AN EXAMPLE OF A PENDING DISASTER

- Lassa fever has a very high case fatality rate of between 54% and 98%, but with prompt reporting could be as low as between 1-25% (Bulletin of Epidemiology, 2009).

- The disease cuts across all age groups though more predominant among the adolescents and reproductive age group, hence constitutes a lot of public health and economic hazard.
The LF has been known to be geographically located across the West Africa sub-region of the World and endemic in Nigeria, Sierra Leone and Liberia.

First cases occurred in Mali – 2009, Ghana – 2011 and Cote D’Ivoir - 2013
WHAT DID THESE EPIDEMIC INFECTIOUS DISEASES HAVE IN COMMON?

- All were caused by zoonotic pathogens
- All spread across boards by modern transportation
- Most had Asian or African origin
- Laboratory and clinical diagnoses were problematic
- Poor communication among countries
- Major economic impact
- Government denial and delayed response
ECONOMIC IMPACT OF SELECTED INFECTIOUS DISEASES

Plague, India: $5-6 bn
WHY HAVE WE SEEN SUCH A DRAMATIC INCREASE IN EPIDEMIC INFECTIOUS DISEASES?

- Complacency, Lack of Political Will
- Policy Changes
- Changes in Public Health
- Changing Life Styles/Behavior
- Microbial Adaptation
- Technology
- Intent to Harm
- Climate Change
RESEARCH EFFORTS PROMPTED BY EBOLA OUTBREAK
The rapid development of rVSV-EBOV contributed to the development of WHO’s R&D Blueprint, a global strategy to fast-track the development of effective tests, vaccines and medicines during epidemics.

The WHO R&D Blueprint developed as a direct consequence of Ebola outbreak has defined a priority list of diseases likely to cause epidemics in the future. For each of these, WHO is preparing R&D roadmaps and developing the profile for the kinds of vaccines, medicines and diagnostics we would need to address them.

So far, four target product profiles have been developed for vaccines and diagnostics to address Zika, Nipah virus and Lassa fever. These ‘standards’ will guide the research of our partners and will ensure that everyone works according to the same parameters for quality, safety and efficacy.
On August 11th, WHO approved the compassionate use of experimental drugs and, on September 5th, a WHO expert committee considered a list of promising candidates, such as antibody treatments and blood transfusions from Ebola survivors. Several vaccine candidates are currently being studied. Johnson & Johnson, GlaxoSmithKline (GSK) and NewLink Genetics are among the many companies currently testing potential compounds, but none have yet proven safe and effective in humans (preliminary results from GSK’s human trials are expected in November). An experimental drug, ZMapp, has shown considerable promise in primate trials. However, it has neither been proven effective nor tested.
WHO BLUEPRINT: A GLOBAL STRATEGY

The rapid development of rVSV-EBOV contributed to the development of WHO’s R&D Blueprint, a global strategy to fast-track the development of effective tests, vaccines and medicines during epidemics.
Glovebox is decontaminated by spraying with 0.5% hypochlorite and overnight incubation. Double bagged waste from previous day is sprayed and autoclaved.

Materials needed for sample inactivation are placed inside the glovebox.
RESULTS

Phylogenetic Analysis

Molecular Phylogenetic analysis of the L-Gene Segment of EBOV/Hsap/NGA/2014/LIB-NIG 01072014 in comparison with selected filovirus sequences by Maximum Likelihood method. Sequences are labelled using the ICTV consensus nomenclature for variants of Filoviridae Family and their corresponding Genebank Accession numbers in parenthesis.
DEVELOPMENT OF POLYCLONAL ANTIBODIES FOR THE TREATMENT OF EBOLA VIRUS DISEASE
PROGRESS TO DATE

- Recombinant glycoprotein expressed in mammalian cells in sufficient quantities to immunise a pilot flock of sheep and develop assessment assays to monitor antibody production
- Recombinant glycoproteins have been “probed” with human convalescent serum and shown to be recognised
- Sheep have demonstrated a good antibody response to the immunogen
- Small quantity of purified ovine IgG antibodies have been prepared for \textit{in vitro} assessment
- Guinea pig and non-human primate experiments are promising
SOME OTHER NEW TECHNOLOGIES ON SAFETY

- Body Apparels
  - PPEs
  - Vestex®
- Creams, sprays, etc.
LESSONS LEARNED
LESSONS LEARNED
CRITICALLY NEEDED FOR EFFECTIVE CONTROL

▪ Swift response
▪ Available laboratory capacity and continued support with timely results
▪ Strong Government leadership and commitment - EOC
▪ Country ownership of response programme
▪ One Outbreak, One response
▪ Effective community awareness and engagement
▪ Preparedness plan developed using lessons learned from the response
▪ Strong coordination of partners and harmonization of resources
▪ Unprecedented support from the private sector and professional bodies
▪ Extensive use of mobile technology and social media
▪ Outbreak response multi-sectoral
▪ Appropriate allocation and use of resources – (transparency)
▪ Most of All – empowering the national public health institute as the lead coordinating centre (in Nigeria’s case – the NCDC working under the office and supervision of the Minister of Health), while WHO was the coordinator of partner support)
LESSONS LEARNED CONT’D.
CRITICALLY NEEDED FOR EFFECTIVE CONTROL

- Health Policies to guide your direction in Health preparedness and response
- People (the right people) to implement your policies
- Programme ownership (country ownership)
- Leadership – Political and Technical
- Establish a well defined mechanism (structure), e.g. EOC/ IMC for effective coordination and management of response
  - The establishment of the Nigeria Centre for Disease Control (NCDC) and its Nigeria Field Epidemiological and Laboratory Training Programme (NFELTP) has provided Nigeria with such a mechanism.
WHY REGIONAL COLLABORATION?

- The West African outbreak of Ebola virus disease had 3 major lessons:
  - Injury to one is injury to all
  - Protecting Health Care worker – is cardinal to disease prevention and control
  - Member countries are not at the same level of when it comes to preparedness and response
- Need for ensuring national core capacities has never been more urgent
- Need to improve to technical and financial resources of member countries to develop and maintain their capacities
SUCCESS FACTORS

- Strong Government leadership and commitment- EOC
- Availability of SOPs and materials from WHO that were quickly adapted for use in Nigeria
- Adequate human resources – numbers and technical competence; including national and international staff
  - Enough teams to follow up the contacts
- Availability of required logistics – cars, phones, forms, airtime, thermometers
- Use of mobile phone technology enabled real-time follow up of contacts and prompt detection of those with symptoms
SUCCESS FACTORS CON’T.

- Available laboratory capacity and continued support with timely results
- Data management initiated from the beginning of outbreak – initially using Excel and later both Excel and Epi Info
- Active rumor/alert investigation system
- Use of data to monitor response
- Motivated and facilitated team
- Good teamwork and leadership
FROM ENDEMIC TO GLOBAL

- Ebola Epidemic has transitioned from local endemic to global public health problem
- Even after containment it can return
- Ebola has impacted severely on nations’ economies and has become a serious global health security risk factor
- Ebola needs a committed health workforce and effective biodefence tools such as vaccines, biologicals and drugs to contain it
CONCLUSIONS

- It is possible to control and prevent Ebola using local capacities
- Capacity building and on-the-job training key to success
- National Public Health Institutions - key to effective response
- National Leadership and Ownership most important
- International partnerships - Nigeria’s Ebola response would not have been as successful without the coordinated efforts of national and partner organizations
RECOMMENDATIONS
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▪ Strengthen national health system
▪ Enhance Health Sector Work Force
▪ Enhance health sector funding
▪ Strengthen international collaboration and partnerships
▪ Strengthen health promotion and information and data sharing among nations
Thank you All!