Role of NPHIs in Re-Emerging Infectious Diseases

Lassa fever: The Nigerian Experience

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Mandatory disclosure slide

No conflict of interest
Nigeria’s health and economy

Population ~ 186 million

Annual population growth rate of 2.6%

Recent outbreaks - Lassa fever, Ebola, Monkeypox, Yellow fever, Meningitis

Low expenditure on health as a percentage of GDP

Multiple competing priorities for Government
Major outbreaks in Nigeria

- **Ebola outbreak**
  - 2014
  - Highlighted the global health security challenges across the region

- **Polio Re-emergence**
  - 2016
  - Re-emergence of wild polio virus (WPV1) in the north eastern state of Borno
  - Insurgency and interruption in AFP surveillance major causes.

- **Lassa Fever outbreak**
  - 2018
  - Largest outbreak of Lassa fever reported in Nigeria

- **Monkeypox outbreak**
  - 2017
  - Re-emergence after 40 years

- **CSM outbreak**
  - 2017
  - Largest outbreak of Serotype C reported in Nigeria
Lassa fever in Nigeria

Large outbreak in 2018
- 638 confirmed cases
- 171 deaths
- 23/36 states affected
- Case fatality: 26%
- Cases concentrated in three hotspot states

Ongoing outbreak in 2019
- 420 confirmed cases
- 93 deaths
- 21/36 states affected
- Case fatality: 22%
- Cases being detected in new states
What has changed for Lassa fever in Nigeria in 10 years?
## Improved digital surveillance

<table>
<thead>
<tr>
<th>WHO, ECOWAS, R-CDC</th>
<th>Aggregated monthly</th>
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<tbody>
<tr>
<td>Nigeria Centre for Disease Control</td>
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Improved digital surveillance

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- **State/Regional Health Department**
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- **District / Local Government Area Health Dept.**
  - Aggregated weekly (by Monday)

- **Local Health Care Facilities**
  - Aggregated weekly (by Monday)

**Manual data entry**

**WHO, ECOWAS, R-CDC**

**Weekly**

**Laboratory**

**Aggregated weekly (by Tuesday)**

**IDSR 001A**
Cases in ‘new states’

2018

2019

LEGEND

≥1 Suspected Cases
1- 50 Confirmed Cases
>50 Confirmed Cases
1 dot = 1 Confirmed Case
Improved diagnostics- Four new molecular laboratories

NCDC LABORATORY NETWORK

Geopolitical Zones

North Central (N-C) Zone
North Eastern (N-E) Zone
North Western (N-W) Zone
South Eastern (S-E) Zone
South Western (S-W) Zone

LEGEND

Laboratories

ANR
CSKV/Cholera
Influenza
Lassa/UV
Yellow Fever/Meningitis/ Rabies

OPHL, Yate
NIR, Gaduswe

NCDC NETWORK

NIGERIA CENTRE FOR DISEASE CONTROL
Improved logistics system
Increasing use of EOCs
National sample transport system

Turn around time between sample collection and testing of Lassa fever samples received at NRL Abuja during the 2018 outbreak.
Improved almost real-time sequencing in Nigeria

Complementing the 19 newly-obtained sequences, we performed maximum-likelihood phylogenetic analysis of the coding genes in both the L and S segments, across all LASV lineages (I–VI), including those of 2018 and earlier years published by Kafetzopoulos et al. in Science in early January 2019 (1). Each of the new sequences was placed with the genotype II lineage, in both the L and S segments analyses (Figures 1 and 2, respectively). Thus, these 19 viruses transmitted in 2019 originate from the pool of lineages, sub-lineages and strains known to circulate in Nigeria. These results are in line with observations made during the 2018 Lassa fever outbreak.

In both L and S segment analyses, a single cluster of three 2019 viruses was observed (LASV-NGA-2019-IRR-0017, LASV-NGA-2019-IRR-0023 & LASV-NGA-2019-IRR-0024). In order to estimate the time of most recent common ancestors (MRDAs) across the tree, we are currently performing BEAST analyses, which will provide a preliminary MRCA for this cluster dating back to the second half of 2007 (95% highest posterior density: 2005-2010; see Figure 3). Other divergence time estimates are similar to those of Kafetzopoulos et al. (1). This preliminary analysis hence shows infection events with different viruses that are not directly linked. This is consistent with spillover of viruses from the rodent reservoir to humans rather than extensive human-to-human transmission.
Research activities

• National Lassa fever research plan developed
• Research as core pillar of EOC
• National Lassa Fever Research Consortium
• Lassa fever- critical areas for WHO R&D, CEPI vaccines
Improved collaboration
2019 Lassa fever preparedness

• Training of 1,000 health workers in Nigeria on Lassa fever management, diagnosis and surveillance

• Prepositioning of treatment and diagnostic supplies to the 21 states that recorded cases in 2018

• Publication of Lassa fever messages in newspapers, weekly radio shows, and intensive community engagement

• High level advocacy visits to State Governments

• Review of case management guidelines, initiated a Lassa fever Research Consortium and hosted International Conference on Lassa Fever
How is this coordinated?
Nigeria Centre for Disease Control

Mandate

Prevent, detect, and control spread of communicable diseases

**Coordinate** surveillance systems to collect, analyse and interpret data on communicable diseases to guide action

**Support States** in responding to small outbreaks, and lead response to large disease outbreaks

Develop and maintain a network of public health laboratories

Conduct, collate, synthesise and disseminate public health research to inform policy

**Coordinate** the compliance with international health regulations
NCDC’s role in infectious diseases (Lassa fever)

• **Coordination** of public health surveillance, laboratory and response functions

• **Coordination** of partners’ support

• **Building trust** among Nigerians through regular communication
Why we need strong NPHIs

1. A public health event can go from local to global very rapidly

2. Global health security can only be assured by local health protection

3. A strong surveillance & response system, managed by a skilled public health workforce, organised in a national public health institute is needed in every country

4. Partnerships matter more than ever before, NPHIs coordinate these

5. Vulnerability for one is vulnerability for all
Our posters at ICOREID 2019
THANK YOU

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