Field Epidemiology and Laboratory Training Program

Building National Workforce Capacity for Surveillance and Response

Dr Patrick M Nguku
Dr Abdulsalami Nasidi

Nigeria Field Epidemiology and Laboratory Training Program (NFELTP)
NCDC, FMOH, Nigeria
Outline

• Description of Field Epidemiology & Laboratory Training Program (FELTP)
  – Nigeria FELTP
• NFELTP ebola response – role in contact tracing
• Surveillance and response needs
• Documenting and sharing lessons
• Conclusion
Field Epidemiology & Laboratory Training Program

- Closely supervised competency-based training
- Modeled after US Center’s for Disease Control & Prevention Epidemic Intelligence Service (EIS)
- Two year full-time postgraduate training
- About 25% class work, 75% field placement
- Trainees assigned to positions that provide epidemiologic and public health services
- May receive a certificate or a degree
- Aims at developing public health systems
FELTP Competencies and Outputs

**Outputs**
- Outbreak report
- Surveillance analysis or data analysis report
- Surveillance evaluation report
- Study protocol
- Abstract
- Conference presentation
- Seminar
- Bulletin article
- Scientific manuscript
- Others
  - Teaching and mentoring reports
  - Management meeting minutes
Nigeria Field Epidemiology and Laboratory Training Program (NFELTP)

- Nigeria – most populous African country
- NFELTP essential for public health workforce development
- NFELTP initiated 2008 within FMOH, Abuja – sustainability
- Affiliated with two leading Universities – sustainability
- Scaled up from 13 to 40 due to its impact and need
- Public health leadership and management focused
  - Multi-disciplinary – human, animal, laboratory, environment
- Strengthening public health systems and delivery
  - Public health response – ebola, polio, malaria, HIV
  - Surveillance – integrated disease surveillance & response
  - Public health service delivery – hard to reach
- Science/epidemiology driven – evidence based
Public Health Workforce Development

- Pyramidal training: advanced, intermediate, basic, modular/service delivery

- Advanced 2 year training – Leadership
  - 262 trainees in the last 7 years
    - Goal: 5 epidemiologists per million (government structure)
    - Achieved 1.7 per 1 million population (34% of the goal)

- Basic training on surveillance and response
  - >800 trained – outbreak response and surveillance
  - Vaccine preventable diseases, zoonoses, HIV/TB

- Modular / service delivery
  - >500 trained on modular training at LGA/health facility level on routine immunization
National Coverage of NFELTP Trainees 2008 – 2015 (262)

Malaria focused
NFELTP Activities

• Response to Public Health Emergencies
• Polio and immunization
  – Defining hard to reach populations & designing strategies to reach them
  – Supporting polio eradication initiative activities
  – Routine immunization and DHIS
  – Modular LGA level training
• HIV
  – Program assessments and evaluations, sub-national surveys
• Malaria
  – Coverage/determinant to guide implementation
• Zoonoses control (e.g. Ebola, Dengue fever)
• Documentation
  – >60 peer review publications
  – Dissemination/conferences
Griag C, Waziri NE, Olavinka AT, Vertefeuille JF; Centers for Disease Control and Prevention (CDC).

Abstract


Oladimeji AM1, Gidado S1, Nuku P1, Nwangwu IG2, Patil ND3, Oladosu F3, Roberts AA4, Waziri NE1, Shuaib F5, Oguntumehin O6, Musa E7, Nasidi A8, Adewuyi P1, Olavinka A1, Odubanjo O4, N-FELTP Residents, Poggessee G1.

Author information

Abstract

OBJECTIVE: Healthcare workers (HCWs) play pivotal roles in outbreak responses. Ebola virus disease (EVD) outbreak spread to Lagos, Nigeria, in July 2014, infecting 11 HCWs (case fatality rate of 45%). This study was conducted during the outbreak to assess HCWs' EVD-related knowledge and practices.

Public knowledge, perception and source of information on ebola virus disease - Lagos, Nigeria; September, 2014.
Gidado S1, Oladimeji AM1, Roberts AA2, Nuku P1, Nwangwu IG3, Waziri NE1, Shuaib E4, Oguntumehin O6, Musa E6, Nuku C7, Nasidi A8, Adewuyi P1, Daniel T1, Olavinka A1, Odubanjo O4, Poggessee G1.

Author information

Abstract

BACKGROUND: The first ever outbreak of Ebola virus disease (EVD) in Nigeria was declared in July, 2014. Level of public knowledge, perception and
Polio Field Census and Vaccination of Underserved Populations —
Northern Nigeria, 2012–2013

In 2012, the World Health Assembly declared completion of polio eradication a public health emergency (1,2). However, wild poliovirus (WPV) transmission remains endemic in three countries (Afghanistan, Nigeria, and Pakistan). Country Office in Nigeria, the United Nations Children's Fund, and the U.S. Agency for International Development. FEITP is a 2-year fellowship in applied epidemiology and public health that deploys approximately 40 citizens per year.

Abstract


An evaluation of community perspectives and contributing factors to missed children during an oral polio vaccination campaign—Katsina State, Nigeria.

Michael CA1, Ashenafi S2, Ogbanu IU3, Oluabunwo C1, Sute A1, Corkum M3, Mackay S3, Storms AD4, Achari P3, Biva O1, Nguku P1, Newberry D2, Bwaka A4, Mahoney E2; OPV Campaign Missed Children Study Team.

An assessment of the reasons for oral poliovirus vaccine refusals in northern Nigeria.

Michael CA1, Ogbanu IU2, Storms AD2, Oluabunwo C1, Corkum M3, Ashenafi S2, Achari P3, Biva O1, Nguku P1, Mahoney E2; NSTOP OPV Refusal Study Team.

Polio eradication in Nigeria and the role of the National Stop Transmission of Polio program, 2012-2013.

Waziri NE1, Oluabunwo C1, Nguku PM1, Ogbanu IU2, Gidado S1, Biva O1, Wiesen ES2, Vertefeuille J2, Townes D2, Oyemakinde A3, Nwanwanu O4, Gassasira A5, Mkanda P6, Muhammad AJ7, Elmousaad HA1, Nasidi A8, Mahoney FJ2.

Author information


Performance of an HRP-2 rapid diagnostic test in Nigerian children less than 5 years of age.

Ajumobi O1, Sabitu K2, Nguku P2, Kwaga J2, Ntadom G2, Gitta S2, Elizeus R2, Ovibo W2, Nsubuga P2, Maire M2, Poggensee G2.
Building a Public Health Workforce in Nigeria through Experiential Training

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Outbreak Investigation & Response Activities of the NFELTP:
2008 - 2015 (N=186)

- Diethylene Glycol (my...)
- Chlorine poisoning
- Methanol poisoning
- Lead Poisoning
- Measles
- Acute Flaccid Paralysis
- Diptheria
- Mumps
- Meningoccal Meningitis
- Hepatitis
- Cholera
- Rabies
- Lassa Fever
- Trypanosomiasis
- Leptospirosis
- Dengue Fever
- Ebola
- Schistosomiasis
- Leishmaniasis
- Buruli ulcer

Environmental Vaccine Preventable Water/Food Zoonoses/VHF Tropical Diseases
Ebola Outbreak in Nigeria

• Imported case in July 2014
  – 20 cases with 8 deaths; rapid response
  – 899 contacts; > 97% contact tracing daily rate
  – Controlled within 8 weeks

• Why was it 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 workforce for
    • Rapid response
    • Contact tracing
    • Operational research
    • Innovation – real time monitoring for contacts
FELTP Role in Ebola Response

- >100 graduates and residents involved - Timeliness
  - Outbreak investigation competencies
  - Interpersonal communication skills
  - 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
Contact Tracing
Ebola Outbreak in Nigeria 2014: Transmission Chain

All the 20 cases and 899 contacts accounted for
OVERVIEW

Innovative Technological Approach to Ebola Virus Disease Outbreak Response in Nigeria Using the Open Data Kit and Form Hub Technology

Daniel Tom-Aba¹, Adeniyi Olaleye², Adebola Tolulope Olayinka³, Patrick Nguku³, Ndadilnasiya Waziri³, Peter Adewuyi³, Olawunmi Adeoye³, Saliu Oladele⁵, Aderonke Adeseye⁶, Olukayode Oguntimehin⁷, Faisal Shuaib⁸

response team members with technologies and solutions which would enable smooth and rapid data flow. The Open Data Kit and Form Hub technology were used in combination with the Dashboard technology and ArcGIS mapping for follow up of contacts, identification of cases, case investigation and management and also for strategic planning during the response. A remarkable improvement was recorded in the reporting of daily follow-up of contacts after the deployment of the integrated real time technology. The turnaround time between identification of symptomatic contacts and evacuation to the isolation facility and also for receipt of laboratory results was reduced and informed decisions could be taken by all concerned. Accountability in contact tracing was ensured by the use of a GPS enabled device. The use of innovative technologies in the response of the EVD outbreak in Nigeria contributed significantly to the prompt control of the outbreak and containment of the disease by providing a valuable platform for early warning and guiding early actions.
# Real-time Contact Tracing Monitoring

## EOC Nigeria | Ebola Outbreak Response

### FOLLOW UPS

- **Last Followup:** Today, Yesterday, 2 days ago, Symptomatic

### FOLLOW UPS

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### LAB RESULTS

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Surveillance Activities

• Leveraging lessons learnt from the Ebola response to strengthen existing surveillance and response systems
  – Development of a possible resilient surveillance system (Surveillance outbreak response, management and analysis system-(SORMAS)) – currently under pilot testing in collaboration with Germany institutions
Surveillance and Outbreak Response Management and Analysis System (SORMAS)

- Expansion of the mobile app use in contact tracing on pilot basis in 2 states
- Support data gathering, sharing, analysis and visualization at all levels – real time
- Links - surveillance management /coordination
- Integrated and automated analysis and visualization real time at all levels
- Standard reporting – IDSR /IHR
- Bidirectional communication
Integration SORMAS into System Architecture of Established Infectious Disease Surveillance and Reporting (IDSR)
Effective Surveillance Requires …

- Surveillance is the backbone of disease control
- Prerequisite for success of implementation:
  - Well trained network of motivated staff
  - Clear standardized guidelines and tools
  - Networked and functional laboratory
  - Communication means
  - Rapid response and feedback
  - Sustainable funding
Ideal Sequence of Events in an Outbreak Where Surveillance and Response are Effective

First Case Detection/Reporting
Lab Confirmation
Response

Cases prevented - (The left shift!!)
What is Required for the Epidemic Curve to Shift to the Left

- Functional and effective surveillance and response system
- Skilled public health workforce
- Functional and networked laboratory
- Inter-sectoral collaboration  
  – Human, animal and environment
- Strengthened public health system
- Public health funding and leadership
- Effective coordination
Impact of FELTP in Africa
Zimbabwe Weekly Epidemiological Bulletin

Number 182 Epidemiological week
38 (week ending 23 September 2012)

Highlights: Week 38: 17-23 September 2012

- 4 new suspected typhoid cases from Chitungwiza City
- 5 diarrhoea deaths reported

Contents
A. General context
B. Epidemic prone diseases
C. Events of public health importance in the region
D. Completeness and timeliness of the national data
E. Acknowledgments
F. Annexes
   1. Classification of events that may constitute a Public Health Emergency of International Concern
   2. Standard case definitions

A. General Context

The typhoid outbreak in Chitungwiza continues since it was first reported on 16 June 2012. Harare still reports some cases from 10 October 2011 when an outbreak of typhoid was initially reported. The disease has also been reported in other provinces.

There were no reports of cholera, influenza A and measles outbreaks countrywide.

B. Epidemic prone diseases

Cholera

No suspected cases of cholera were reported this week. The cumulative figure for cholera, from 2 May to 19 June 2012, is 22 cases (11 confirmed cases, 11 suspected cases) and 1 death. This outbreak was declared over on 20 June 2012.

Typhoid outbreak

Four new suspected typhoid cases were reported in Chitungwiza this week. The cumulative number of cases as of 2 October stands at 367 with one death. Nationally the cumulative figure for typhoid is 4,916 suspected cases, 80 confirmed cases and 2 deaths (CPR 0.04%) since October 2011.

Anthrax

This week, no anthrax cases were reported. Since the beginning of 2012, a total of 36 human cases have been reported.

Dysentery

Clinical dysentery cases reported this week are 1,067 and no death. Of the reported cases 282 (26.4%) were from the under five years of age. The provinces which reported the highest number of dysentery cases were Manicaland (183) and Mashonaland Central (174). The cumulative figure for dysentery is 2,820 and 19 deaths (CPR 0.07%).

Measles

A total of 4 suspected cases of measles were reported this week through the Weekly Disease Surveillance System. The cumulative figure for suspected measles is 282 and no death.

Malaria

A total of 4,272 malaria cases and 1 death (CPR 0.02%) were reported this week. Of the cases reported 792 (18.5%) and no death were from the under five years of age. The death was reported from Sanyati district. The provinces which reported the highest number of malaria cases were Manicaland (1,552) and Mashonaland West (969). The cumulative figure for malaria is 2,746,93 and 182 deaths (CPR 0.07%).

Weekly Epidemiology Report

Nigeria Centre for Disease Control (NCDC)
Federal Ministry of Health - Nigeria

Issue: Volume 4 No. 13
4th April, 2014

Summary Table (IDSR Weekly Report as of 04/04/2014)

| Disease         | Variables | Week 12 | Week 13 | Cumulative Week
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<td>1,883</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Deaths</td>
<td>19</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>CFR</td>
<td>1.99%</td>
<td>0.96%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Lassa Fever</td>
<td>Cases</td>
<td>34</td>
<td>31</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Deaths</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td></td>
<td>CFR</td>
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<td>0.00%</td>
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<td>CSF</td>
<td>Cases</td>
<td>122</td>
<td>91</td>
<td>39</td>
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<tr>
<td></td>
<td>Deaths</td>
<td>19</td>
<td>2</td>
<td>3</td>
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<tr>
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<td>2.20%</td>
<td>7.69%</td>
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<tr>
<td>Measles</td>
<td>Cases</td>
<td>497</td>
<td>509</td>
<td>2038</td>
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<tr>
<td></td>
<td>Deaths</td>
<td>1</td>
<td>2</td>
<td>36</td>
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<td>CFR</td>
<td>0.20%</td>
<td>0.36%</td>
<td>1.77%</td>
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<tr>
<td>Guinea Worm</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Deaths</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>CFR</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
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</table>

2013 (Jan - Dec) - 2014 Wild Polio Virus and circulating Vaccine-derived Polio Virus type 2 (isolates by States and Zones as of Week 13, 2014)

<table>
<thead>
<tr>
<th>Zone</th>
<th>State</th>
<th>New Results Received this week</th>
<th>WPV/P</th>
<th>WPV/P</th>
<th>cOPV/P</th>
<th>Total</th>
<th>WPV/P</th>
<th>cOPV/P</th>
<th>Total</th>
<th>WPV/P</th>
<th>cOPV/P</th>
<th>Total</th>
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<tbody>
<tr>
<td>NC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Jo</td>
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<td>0</td>
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</tr>
<tr>
<td>Ka</td>
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<td>0</td>
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<td>0</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
| Latest onset of confirmed WPV was 01-Feb-2014 from Gaya LGI, Kano State.
Republic of Kenya
Ministry of Health

WEEKLY EPIDEMIOLOGICAL BULLETIN

Week Ending 26th November, 2014

Regional & national surveillance indicators for week 43

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of Sub-counties</th>
<th>Reporting on time</th>
<th>Complete reports</th>
<th>Intra-Sub-county facility RR (%)</th>
<th>Timeliness (%)</th>
<th>Completeness of reports (%)</th>
<th>Weighted aggregate score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>36</td>
<td>33</td>
<td>33</td>
<td>59</td>
<td>92</td>
<td>100</td>
<td>82</td>
</tr>
<tr>
<td>Coast</td>
<td>21</td>
<td>22</td>
<td>22</td>
<td>59</td>
<td>100</td>
<td>100</td>
<td>86</td>
</tr>
<tr>
<td>Eastern</td>
<td>59</td>
<td>47</td>
<td>47</td>
<td>50</td>
<td>80</td>
<td>100</td>
<td>73</td>
</tr>
<tr>
<td>Nairobi</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>34</td>
<td>89</td>
<td>100</td>
<td>72</td>
</tr>
<tr>
<td>N. Eastern</td>
<td>19</td>
<td>14</td>
<td>14</td>
<td>45</td>
<td>74</td>
<td>100</td>
<td>68</td>
</tr>
<tr>
<td>Nyanza</td>
<td>41</td>
<td>39</td>
<td>39</td>
<td>83</td>
<td>95</td>
<td>100</td>
<td>92</td>
</tr>
<tr>
<td>R. Valley</td>
<td>67</td>
<td>61</td>
<td>61</td>
<td>65</td>
<td>91</td>
<td>100</td>
<td>84</td>
</tr>
<tr>
<td>Western</td>
<td>32</td>
<td>30</td>
<td>30</td>
<td>81</td>
<td>97</td>
<td>100</td>
<td>92</td>
</tr>
<tr>
<td>National</td>
<td>284</td>
<td>254</td>
<td>254</td>
<td>60</td>
<td>90</td>
<td>100</td>
<td>81</td>
</tr>
</tbody>
</table>

+ Overall IDR reporting increased in week 43 as compared to week 42
+ Zero measles cases confirmed in the week
+ Outbreaks: Kala azar
+ Total confirmed measles cases in the country in 2014 is 107

www.dds.or.ke

Fig 1: Summary of regional average intra-sub-county RR trends, week 43, 2014

- Central
- Coast
- Eastern
- Nairobi
- N. Eastern
- Nyanza
- R. Valley
- Western

National Summary

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Epidemiological week 41</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2014</td>
</tr>
<tr>
<td>% of Districts reporting</td>
<td>99.12</td>
</tr>
<tr>
<td>% UI reporting</td>
<td>59</td>
</tr>
<tr>
<td>% Timely District reports</td>
<td>99.12</td>
</tr>
<tr>
<td>AFP</td>
<td>0(0)</td>
</tr>
<tr>
<td>Animal bites</td>
<td>290(0)</td>
</tr>
<tr>
<td>Cholera</td>
<td>1(0)</td>
</tr>
<tr>
<td>Dysentery</td>
<td>891(1)</td>
</tr>
<tr>
<td>Guinea Worm</td>
<td>0(0)</td>
</tr>
<tr>
<td>Measles</td>
<td>133481 (21)</td>
</tr>
<tr>
<td>Measles</td>
<td>500(0)</td>
</tr>
<tr>
<td>Meningitis</td>
<td>9(2)</td>
</tr>
<tr>
<td>NIP</td>
<td>3(1)</td>
</tr>
<tr>
<td>plague</td>
<td>1(0)</td>
</tr>
<tr>
<td>Typhoid</td>
<td>1437(0)</td>
</tr>
<tr>
<td>Stickness</td>
<td>0(0)</td>
</tr>
<tr>
<td>Human Influenza</td>
<td>0(0)</td>
</tr>
<tr>
<td>Nodding Syndrome</td>
<td>0(0)</td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>0(0)</td>
</tr>
<tr>
<td>Viral Haemorrhagic Fever</td>
<td>0(0)</td>
</tr>
<tr>
<td>Maternal Deaths</td>
<td>5</td>
</tr>
</tbody>
</table>

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Highlights of the Week

**Completeness & Timeliness of Reporting**

This week, 111 (99.12%) districts submitted their weekly reports as opposed to 107 (95.53%) for the corresponding week of 2013. The mean intra-distric completeness this week is 59 [median 63.0%], compared to the mean intra-distric completeness of 58 [median 63.0%] for the corresponding week of 2013.

Only 31 (27.68%) of the districts that reported this week attained an intra-distric completeness of at least 80%. Compared to 32 (28.57%) during the corresponding week of 2013. This week 111 districts submitted their weekly reports [see annex 1].

Timeliness for week 41 reporting is 111 (99.12%) for the current week, and 109 (97.32%) for the corresponding week of 2013.

The proportion of health facilities submitting weekly reports in each of the reporting districts is way below the national target of 80% in most of the districts. DHOs and district surveillance focal persons (DSFPs) are urged to ensure their districts submit weekly reports and to actively follow-up silent health facilities.

**Public Health Emergencies/Disease Outbreaks**

**Polio Outbreak, Kamuli and Kween Districts:** A suspected AFP case was detected in Kween District between July and September 2014. Stool samples from the suspected case and 5 contacts were collected on 15th and 16th September 2014.

While results were subsequently negative for the suspected case, one of the contacts tested positive. In Kamuli, the AFP case was detected by the STOP team on 25th September 2014 beyond 14 days of onset. The AFP case was negative for polio but one of the 4 contacts sampled, a sibling to the AFP case, was positive for polio. Detailed field investigations into these cases have been conducted in both districts and the next steps will be determined by the laboratory findings.

**Marburg Outbreak, Mubende:** On 3rd October 2014, UVRI/CDC Viral Haemorrhagic Fever Reference Laboratory in Entebbe released preliminary results of a sample that was obtained from a patient in a private Hospital in Kampala. Results of the repeat test were positive for Marburg on 4th October 2014. A Marburg outbreak was declared and response activities started in Kampala, Mubende, and Kasenyi. 157 contacts were traced and followed for 21 days. None of them developed Marburg disease. The country will be declared Marburg free on 11th November 2014, having finished 42 days without detecting any Marburg cases despite heightened surveillance.

**Cholera outbreak, Arua:** There has been a Cholera epidemic in Arua District since 14th July 2014. As of 2nd October, 55 suspected cases (4 confirmed) including two deaths had been reported. Two cases were still admitted at Olongo HC IV. The most affected sub counties were River Olli, Amin, Ayinni and Rhino camp. The district reported on case during the current week. The cholera outbreak in Moyo has been controlled. Overall, 29 cases were recorded between 17th July and 26th August. Affects: 9 sub Counties were Dufil (16 cases) and Metu (13 cases with 1 death). No additional cases have been recorded since though active surveillance is still continuing.
Ebola and other PH emergencies


M. Lamunu\textsuperscript{a},*, J.J. Lutwama\textsuperscript{b}, J. Kamugisha\textsuperscript{a}, A. Opio\textsuperscript{a}, J. Nambooze\textsuperscript{c}, N. Ndayimirije\textsuperscript{d}, S. Okware\textsuperscript{a}

\textsuperscript{a} Uganda Ministry of Health, Kampala, Uganda
\textsuperscript{b} Uganda Virus Research Institute, Entebbe, Uganda
\textsuperscript{c} WHO-Country office, Kampala, Uganda
\textsuperscript{d} WHO-AFRO, Uganda

Received 13 August 2002; received in revised form 3 April 2003; accepted 8 April 2003
Corresponding Editor: Jane Zuckerman, London, UK

Emergency preparedness and the capability to identify outbreaks: A case study of Sabon Gari Local Government Area, Kaduna state

A. A. Abubakar, S. H. Idris, K. Sabitu, A. U. Shehu, M. N. Sambo
Department of Community Medicine, Ahmadu Bello University, Zaria, Nigeria
Rift Valley Fever in East Africa 2007

• Affected several countries in East Africa

• FELTP worked on
  – Outbreak investigation and description
  – Risk factor identification
  – Cross-border collaborations
  – Prediction models

• Closer Intersectoral collaboration
  – Zoonotic disease units
  – Follow up work on anthrax, plague and other Zoonotic diseases


Kenya Ministry of Public Health and Sanitation, Nairobi, Kenya; Field Epidemiology and Laboratory Training Program, Nairobi, Kenya; Provincial Medical Office, Garissa, Kenya; Epidemic Intelligence Service, Office of Workforce and Career Development, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia; Division of Vector-Borne Infectious Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases, CDC, Fort Collins, Colorado; Centre for Virologic Research, Kenya Medical Research Institute, Nairobi, Kenya; United States Army Medical Research Unit-Kenya, Nairobi, Kenya; Global Disease Detection Division, CDC-Kenya, Nairobi, Kenya

Abstract. An outbreak of Rift Valley fever (RVF) occurred in Kenya during November 2006 through March 2007. We characterized the magnitude of the outbreak through disease surveillance and serosurveys, and investigated contributing factors to enhance strategies for forecasting to prevent or minimize the impact of future outbreaks. Of 700 suspected cases, 392 met probable or confirmed case definitions; demographic data were available for 340 (87%), including 90 (26.4%) deaths. Male cases were more likely to die than females, Case Fatality Rate Ratio 1.8 (95% Confidence Interval [CI] 1.3–3.4). Serosurveys suggested an attack rate up to 13% of residents in heavily affected areas. Genetic sequencing showed high homology among viruses from this and earlier RVF outbreaks. Case areas were more likely than non-case areas to have soil types that retain surface moisture. The outbreak had a devastatingly high case-fatality rate for hospitalized patients. However, there were up to 180,000 infected mild or asymptomatic people within highly affected areas. Soil type data may add specificity to climate-based forecasting models for RVF.

Risk Factors for Severe Rift Valley Fever Infection in Kenya, 2007


Ministry of Public Health and Sanitation, Kenya; Centers for Disease Control and Prevention, Atlanta, Georgia; Walter Reed Programme (WRP) U.S. Army Medical Research Unit, Kenya; National Institute of Communicable Diseases of the National Health Laboratory Service, Johannesburg, South Africa; Global Disease Detection Division, Centers for Disease Control and Prevention, Nairobi, Kenya

Abstract. A large Rift Valley fever (RVF) outbreak occurred in Kenya from December 2006 to March 2007. We conducted a study to define risk factors associated with infection and severe disease. A total of 861 individuals from 424 households were enrolled. Two hundred and two participants (23%) had serologic evidence of acute RVF infection. Of these, 52 (26%) had severe RVF disease characterized by hemorrhagic manifestations or death. Independent risk factors for acute RVF infection were consuming or handling products from sick animals (odds ratio [OR] = 2.53, 95% confidence interval [CI] = 1.78–3.61, population attributable risk percentage [PAR%] = 19%) and being a herding person (OR 1.77, 95% CI = 1.20–2.63, PAR% = 11%). Touching an aborted animal fetus was associated with severe RVF disease (OR = 3.83, 95% CI = 1.68–9.07, PAR% = 14%). Consuming or handling products from sick animals was associated with death (OR = 3.67, 95% CI = 1.07–12.64, PAR% = 47%). Exposures related to animal contact were associated with acute RVF infection, whereas exposures to mosquitoes were not independent risk factors.
Epidemiologic and Clinical Aspects of a Rift Valley Fever Outbreak in Humans in Tanzania, 2007

Mohamed Mohamed,† Fausta Mosha,† Janeth Mghamba, Sherif R. Zaki, Wun-Ju Shieh, Janusz Paweska, Sylvia Omulo, Solomon Gikundi, Peter Mmbuji, Peter Bloland, Nordin Zeidner, Raphael Kalinga, Robert F. Breiman, and M. Kariuki Njenga*

Tanzania Ministry of Health and Social Welfare, Dar es Salaam, Tanzania; Department of Preventive Services, Viral and Rickettsial Diseases and Vector-Borne Infectious Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia; National Institute for Communicable Diseases of the National Health Laboratory Service, Sandringham, South Africa; Global Disease Detection Program, Centers for Disease Control and Prevention-Kenya, Nairobi, Kenya

Abstract. In January 2007, an outbreak of Rift Valley fever (RVF) was detected among humans in northern Tanzania districts. By the end of the outbreak in June, 2007, 511 suspect RVF cases had been recorded from 10 of the 21 regions of Tanzania, with laboratory confirmation of 186 cases and another 123 probable cases. All confirmed RVF cases were located in the north-central and southern regions of the country, with an eventual fatality rate of 28.2% (N = 144). All suspected cases had fever; 89% had encephalopathy, 10% hemorrhage, and 3% retinopathy. A total of 169 (55%) of the 309 confirmed or probable cases were also positive for malaria as detected by peripheral blood smear. In a cohort of 20 RVF cases with known outcome that were also positive for human immunodeficiency virus, 15 (75%) died. Contact with sick animals and animal products, including blood, meat, and milk, were identified as major risk factors of acquiring RVF.
Prediction, Assessment of the Rift Valley Fever Activity in East and Southern Africa 2006–2008 and Possible Vector Control Strategies


NASA Goddard Space Flight Center, Biospheric Sciences Branch, Greenbelt, Maryland; USDA-ARS Center for Medical, Agricultural and Veterinary Entomology, Gainesville, Florida; EMPRES/Animal Production and Health Division (AGAH) FAO - Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy; Global Alert and Response Department (HSE/GAR) World Health Organization, Geneva, Switzerland; Global Disease Detection Division, International Emerging Infections Program, CDC-Kenya Nairobi, Kenya; Division of Preventive Medicine Walter Reed Army Institute of Research, Silver Spring, Maryland; United States Army Medical Research Unit-Kenya; Arbovirology/VHF Laboratory, Centre for Virus Research Kenya Medical Research Institute, Nairobi, Kenya; 757th Airlift Squadron, Youngstown Air Reserve Station, Vienna, Ohio; Manatee County Mosquito Control, Palmetto, Florida; Chatham County Mosquito Control, Savannah, Georgia; Federal Ministry of Health, Epidemiology Department Khartoum, Sudan; Ministry of Health and Social Welfare, Dar es Salaam, Tanzania; Division of Disease Surveillance and Response Ministry of Health, Nairobi, Kenya; Institut Pasteur de Madagascar, Antananarivo, Madagascar; National Institute for Communicable Diseases, Sandringham, South Africa

Abstract. Historical outbreaks of Rift Valley fever (RVF) since the early 1950s have been associated with cyclical patterns of the El Niño/Southern Oscillation (ENSO) phenomenon, which results in elevated and widespread rainfall over the RVF endemic areas of Africa. Using satellite measurements of global and regional elevated sea surface temperatures, elevated rainfall, and satellite derived-normalized difference vegetation index data, we predicted with lead times of 2–4 months areas where outbreaks of RVF in humans and animals were expected and occurred in the Horn of Africa, Sudan, and Southern Africa at different time periods from September 2006 to March 2008. Predictions were confirmed by entomological field investigations of virus activity and by reported cases of RVF in human and livestock populations. This represents the first series of prospective predictions of RVF outbreaks and provides a baseline for improved early warning, control, response planning, and mitigation into the future.
Conclusion

• Workforce Development for Sustainable and Resilient System
  – Competency based, tiered, multi-disciplinary
  – Adequate number covering entire country – monitor
    • Aligned to functional administrative units and multi disease focused
  – Training to be tied to services based on existing priorities
    • Allow innovation- sometimes you will fail, lessons learnt
  – Vertical disease funding, horizontal systems strengthening
  – Contextual and adaptable to structure and current needs
  – Use of technology can help shift the Epi curve to the left /reduce response time to reduce morbidity and mortality
    • Augment existing systems - basics in prevention, detection & response
  – Public health funding, leadership coordination needed
  – Funding to surveillance and response beyond outbreaks
    • Preparedness, ability/authority to mobilize during need
Acknowledgements

• Federal Ministry of Health
• Federal Ministry of Agriculture and Rural Development
• US Centers for Disease Control & Prevention
• World Health Organization
• Universities
  – Ahmadu Bello University
  – University of Ibadan
• African Field Epidemiology Network
• Lagos and Rivers Ministries of Health
• Other State Ministries of Health and Agriculture
• All other stakeholders
Hope for the best, be prepared for the worst

Thank You