Chapter 21
Lagos the Mega-City: A Report on How the Metropolis Handled an Outbreak of the Ebola Epidemic

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21.1 Context

Lagos State is a mega-city with an estimated population of 16–21 million people.[1] In the last ten years, the megacity has made tremendous progress in terms of: sustained rapid economic growth, improved infrastructure and services, and a significant reduction in crime rates. This has provided an enabling environment for millions of Lagos state inhabitants to find their way out of poverty. Lagos State Government has also made great strides in its quest to: increase value for money in public spending; improve the business climate in Lagos; maintain fiscal sustainability; and properly monitor and manage financial and health risks.

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[1] The State attained megacity status in early 2000 with a population of above 10,000,000 people.

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Lagos is the most densely populated state in Nigeria, with over 5% of the national population estimated to reside in its environs (Ayeni 2017; Aliyu and Amadu 2017). Ironically, it is the smallest state in terms of land mass. The state has an area of 356,861 hectares of which 75,755 hectares are wetlands. Metropolitan Lagos, an area covering 37% of the land area of Lagos State, is home to over 85% of the state's population making it densely populated. The United Nations estimates that at its present growth rate, the state of Lagos may, in the near future be one of the top most populous mega-cities in the world joining, Tokyo in Japan and Bombay in India (UN 2016). Poverty levels in Lagos remain at about 48–50%. While access to health and education is quite high, poverty remains a huge challenge especially with rapid population migration into Lagos from other Nigerian states especially in the North and East.

21.2 Implications of Transportation, Security, Commerce, Housing, Environment, Healthcare/Safety

To make Lagos an economic hub and attraction that is liveable for all, a strong health dimension comes to significance as the liveability of a city, town or any community for that matter will require an efficient and effective health care delivery service and system. For Lagos to be liveable for all its inhabitants, Government authorities, as well as the local population would have to create and maintain an enabling environment that allows Lagosians to meet their maximum human capability. Above all, it would need to establish a health service delivery system that is

accessible, qualitative, affordable and diverse. This process can best be fascilitated by using innovative public health approaches and the use of technology. It would also have to revisit its existing public health services and infrastructure to meet the growing health needs of populations in the megacity. The Lagos state government, in collaboration with the federal government is already making major investments in health and it is hoped that these investments, both human and infrastructural would would prepare Lagos state public health authorities to quickly manage a disease outbreak. However, at this stage, the state is directing much of its efforts towards preventive measures, especially after its experience with Ebola in 2014. To achieve these goals, Lagos state has adopted a number of policies aimed at improving overall population health.

Current policy direction includes environmental infrastructure such as the much needed drainage and sewage systems. Others are policies on waste management, green areas, the reduction of pollution, slum reclamation, multimodal-transportationl system, Lagos bus rapid transit system, traffic law, Security-trust fund, disaster management, low-cost housing, health care, Safety-infrastructure, public health financing, health promotion and disease prevention.

21.2.1 Incident Management Approach: Existing Institutional Structures, Mechanisms and Capacity Plan

The following are established mechanisms to ensure there is an effective health incident management plan which will mitigate risks to safety:

- Rapid Response Teams
- Lagos State Emergency Management Agency (backed by law)
- Functional and effective Emergency Preparedness and Response Committees in all the tiers of health care delivery.
- Infectious Disease Hospital i.e. Mainland Hospital, Yaba (MHY)
- Lagos State Ambulance Service (LASAMBUS) – was very useful in transporting suspects who took ill from their homes to EVD isolation/referral center
- Public Health Law
- Coroner's Law/crematorium
- Sanitation Law
- State Environmental Health Monitoring Unit
- Integrated Disease Surveillance and Response (IDSR) system at both the State and Local Government levels for routine surveillance and notification, with this platform taken advantage of in tracing of contacts
- Lagos State Waste Management Authority
- Experience garnered in tackling previous emergencies and epidemics e.g. cholera, SARS, bomb blast, DANA air crash, etc.

21.3   Ebola Virus Disease Outbreak: Pre-outbreak General Measures

The following measures have been taken for pre-outbreak readiness: the development of Fact Sheets which contain advocacy on the preventive/protective measures from more general and immediate information such as: frequent hand washing, avoidance of contact with infected people, professional handling of corpses.

Advocacy has continued after the 2014 outbreak and significant investments have gone into rapidly institutionalizing emerging infection-control procedures such as: establishing standard operating policies / procedures on the use of Personal Protective Equipment (PPE); the activation of collaboration protocols with the Federal Ministry of Health's Port Health Services in the screening of persons coming into the Lagos via air, sea and land borders. The Lagos state health authorities have designated the Infectious Disease Hospital, Yaba (MHY) as the referral center for any suspected/confirmed cases of any emerging infectious disease, including Ebola and Lassa fever. Also, the Lagos state government has mandate all public health facilities to create an isolation ward for suspected cases of Ebola and Lassa fever, and to provide healthcare workers with a buffer stock of PPEs and body bags.
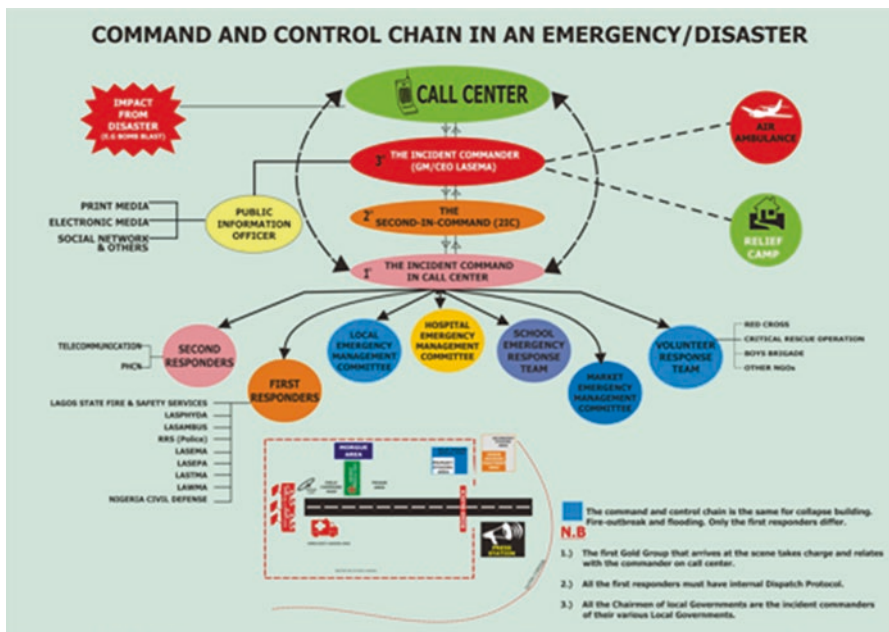
21.4   Lessons from Nigeria: Foundations of a Successful Emergency Response

Nigeria's experience in putting a stop to the spread of the deadly EVD virus has clearly been a learning experience. As a result here are some points which sum up what was learned; teamwork, fear is a good motivator, the need for expert technical leadership and technical assistance, incentives for health workers, the need for operational efficiencies and the importance of data and information sharing (Fig. 21.1).

21.4.1   Response Teams

The following response teams are crucial for a successful public health emergency: Epidemiology/Surveillance (to include all points of entry to the country), case management/infection prevention & control. Other important infrastructural elements are; laboratories, appropriate management and coordination leadership teams.
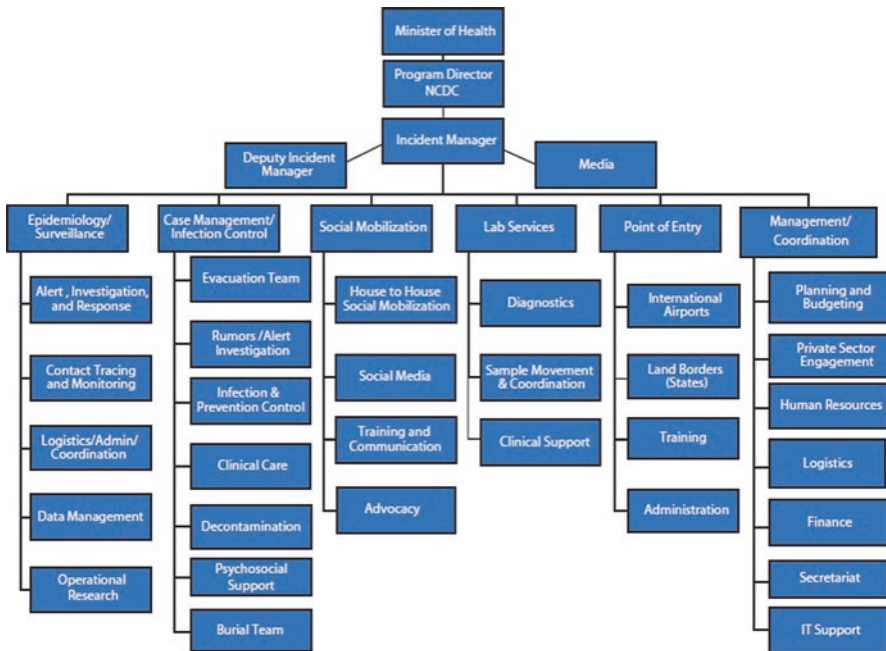

Fig. 21.1 Diagram showing different stakeholders and processes required for effective response to outbreaks. (Source: WHO Facts Sheet: Ebola Virus Disease. http://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease. Assessed on 19th July, 2018)

21.4.1.1 Post-outbreak Immediate Measures-Response-1

- Epidemiology & Surveillance
- Adoption of the *Incident Management* approach
- Initiation of WHO protocol governing management of the disease
- Constitution of a broad-based multi-agency Rapid Response Treams (RRT)
- Establishment of the Incident Management/Ebola Emergency Operations Center, Core Strategic Planning and Decision-making team and Response Teams
- Development of strategic plan of action.
- Commencement of active and immediate contact tracing regarding primary contacts
- Press conference held to sensitize Lagosians and indeed Nigerians on the arrival of EVD in the state and country
- Same day cremation of the corpse of the index case, following due preparation, decontamination, evacuation
- Decontamination of the affected hospital
- On-the-spot training of all relevant staff (morticians and environmental health workers) on evacuation

21.4.1.2 Post-outbreak Immediate Measures-Response 2

- Laboratory confirmation of cases
- Aggressive tracing of primary *(70)* and secondary/tertiary *(298)* contacts
- Decontamination of affected health facilities and homes of suspected/confirmed cases admitted
- Evacuation and burial of corpses and implementation of a protocol on mass gathering
- Shut down of NNPC Clinic, Lagos.
- Establishment of a Point of entry team at the Lagos airport
- The Screening of persons entering Lagos through the different national borders
- Development of screening instruments

21.4.1.3   Post-outbreak Immediate Measures-Response 3

- Case Management/IPC Team
- Upgrading of MHY as referral/isolation center. 40-bed Male and Female Wards for confirmed cases
- Eight (8_-bed Isolation Ward upgraded to hold suspected cases, backed up by
- Two (2) emergency tents to hold additional 24 suspected cases
- Dedicated 60KVA generator
- Dedicated borehole
- Burn and bury pit for waste management
- 2–5000 liter septic tanks (one each for urine and faeces) – ready for decontamination prior to evacuation
- Activation of the crematorium to cremate corpses of confirmed cases.

21.4.1.4   Post-outbreak Immediate Measures-Response 4

- Case Management/IPC Team (Cont'd)
- Dedicated ambulances for transport cases to referral center
- Dedicated environmental health purpose built vans to transport corpses
- Development of treatment SOPs

- Capacity building of relevant health workers
- Provision of psycho-social support to cases and their families
- Call for volunteers to fill critical human resource gap with same backed with life insurance cover, safe work environment, and daily incentives
- Establishment of additional isolation center outside of MHY to play host to quarantining some suspected cases.

21.4.1.5   Post-outbreak Immediate Measures-Response 5

- Social Mobilization Team
- Initial Mapping – community, stakeholders (including health workers), risk, political, incidence and contact.
- Advocacy to/sensitization of relevant stakeholders (Community Development As, CDCs, market men and women association, traditional and religious leaders, Lagos State Public Servants, Association of Private School Proprietors, NYSC, transport operators, morgue operators, etc.)
- Development of messages in different formats (public service announcements, jingles fan-tapes for motorized campaign and bulk SMS) and in different languages to cater for the different population
- IEC materials (fact sheets, FAQs, and hand-washing)
- Media appearances to allay fears and address concerns which include possible cure, denial i.e. need to report early for treatment, and stigmatization

Engaging Communities

21.4.1.6   Post-outbreak Immediate Measures-Response 5

- Social mobilization Team
- Frequent press briefings on cases of Ebola and respond strategies
- Use of social media platforms communicate information on Ebola. This included the use of services like
- Bulk messages on the prevention to subscribers of two major networks in Nigeria, that is- MTN and Airtel
- The introduction of n Ebola Help Line: **0800 EBOLA HELP (0800 32652 4357)**
- The development of a website that provided up-to data information on Ebola in Nigeria as well as other useful resources on Ebola prevention and management: **www.ebolaalert.org**
- The use of LiveChat messaging platforms:
- Facebook: **fb.com/ww.ebolaalert**
- Twitter: @ebolaalert

Community engagement took the form of grassroots mobilization (house-to-house, motorized campaigns, for example, road shows and engagement of town announcers, collaboration with Nollywood stars and high profile musicians, community dialogue in high risk communities).

21.4.2   Role of Traditional Medical Practitioners

Since 1980, the Lagos State had enacted a law establishing the Traditional Medicine Board[2]. The board was established to regulate the code of conduct and practice of traditional medicine practitioners in Lagos state to accredit, monitor and license all traditional medicine practitioners and traditional clinics/health facilities premises. To this end, and while a great population of Lagosians patronize traditional medicines and health service providers, it was easy to mobilize and partner with persons and establishments that provided alternative medicine and healing. Lagos has an inclusive framework.

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[2] The Board was established by the administration of Alhaji Lateef Jakande. Then the executive governor in 1980, by law 13th of governor in the Laws of Lagos 1980 caps 103 of 19194

21.4.3 Training

Infection prevention and control, inter-personal communication, case management includes the handling of Level III Pandemic Personal Protective Equipment (PPE); emergency crisis communications management; school health officers on preventive measures and referrals; emergency preparedness for port health services staff; the use of hand-held radios for volunteers at primary screening points (Port Health Services) and evacuation and decontamination procedures and training.

21.4.4 Capacity Building

Capacity building and strengthening cut across disciplines. In the Sciences this occurred for all staff, clinical and non-clinical including laboratory science, bio-banking and disease surveillance teams In the Public Health. Also, Research and Data Management, Disaster and Emergency response and communications teams received training. Supply logistics in the field of administration and management; in

governance, policy development, operational frameworks, regulatory capabilities and legal teams to include that of advocacy and ethics participated in capacity building exercises.

21.5 Challenges

At the inception of the outbreak, there was a strike by medical doctors in Nigeria. This led to a delay in securing adequate health care teams (especially doctors, nurses, public health experts) to effectively respond to the Ebola crisis. There was a lot of panic, fear and anxiety amongst health care workers, political leaders and the population, in general. During contact tracing, some people were difficult, evasive and downright hostile. They hid information and others preferred discrete follow-up. Stigmatization of both contacts and cases was a serious issue. Rumors, especially through the social media platforms travelled fast. There was community resistance due to ignorance in the spheres of religion and culture. For instance, in terms of religion, there was the tendency for some who suspected that they might have been contracted Ebola to make the churches or mosques the first port of call, while many traditionalists preferred to visit traditional medicine practitioners. Of course there were the rumors that the use of traditional medical potions had been used to treat persons infected with Ebola in certain communities. Undoubtedly, all these were anecdotes with hardly any evidential basis. If anything, they only made it difficult for public health authorities to contain the spread of the disease.

21.6 Key Success Factors

The factors which led to the success of the outbreak were of a diverse nature and could be grouped into: political will, good leadership, teamwork; robust inter-governmental, inter-agency and inter-sectorial collaboration; aggressive contact tracing, monitoring; effective surveillance and contact tracing activities with case management (basic instruction – temperature monitoring etc.); active rumour and alert investigation; aggressive public enlightenment campaign (role of media); availability of SOPs, protocols and other relevant materials from partners that were quickly adapted for use in Nigeria; use of mobile phone technology enabled real-time follow-up of contacts and prompt detection of those with symptoms; data management from the beginning and use of data to monitor response; training and re-training of health workers and support from the private sector mainly non-governmental organizations.

21.7   Post Containment

External vigilance remained the watchword during and after the outbreak. During post containment, public engagement activities were used to provide psychosocial support to survivors and affected communities. These public health activities also helped to address issues of stigmatas and created a sense of awareness amongst the population. Increasingly, the public became more alert and willing to report suspected EVD cases in their communities. They also demonstrated knowledge on, and had access to, the proper procedures for reporting suspected cases. Equally all Ports of entry into Lagos, for example airports and national/international borders were equipped with the necessary resources required for early detection and reporting of all suspected cases of Ebola.

Training and continues education of health care workers on management of EIDs were prioritised by the Lagos state government. This was in addition to: building research capacity for EIDs, scaling up of emergency preparedness and response activities at health care facilities; upgrading the infectious disease hospital in Lagos, through the acquisition of an apheresis equipment to examine the use of convalescent serum; as well as an upgrade of the isolation units. The majority of these activities were funded by the international donor agencies such as the Bill and Melinda Gates Foundation.

21.8   Key Conclusions for Health Sector Reform and Service Delivery Systems

Following the curbing of the spread of Ebola in Lagos, and Nigeria as a whole, the World Health Organisation made key recommendations that LMICs need to adopt in terms of preparedness for infectious disease outbreaks (WHO 2015). These recommendations centre on leadership, timely intervention; autonomy of policy makers, incentives for health care workers, evidenced based decision making and technical assistance to resource limited countries. The effective management of a case of Ebola in Lagos state is reflected in these recommendations, giving credence to arguments that if African countries were to implement the WHO recommendations, they will stand a good chance to bringing an outbreak under reasonable control. Details of these are provided below:

Effective Coordination and Leadership   The ability of the Lagos state government to effectively stop the spread of EVD in Lagos was, in a large part, due to strong political and technical leadership. Despite the fact that Lagos is densely populated and that a good proportion of the population stays in slum, coupled with systemic weaknesses in the health system, the Lagos State and indeed the Nigerian government was able to reorganise itself and to effectively respond to the first and subsequent cases of Ebola in Lagos. Firstly, Nigeria had a first-rate virology

laboratory that is affiliated to the Lagos State University Teaching Hospital. This unit is equipped with the appropriate infrastructure and resources to diagnose a case of Ebola virus disease. Therefore, there was some level of preparedness. Secondly, once it was confirmed that there was a case of Ebola in Nigeria, the government reacted promptly and quickly allocated funds for an emergency response. This was crucial in planning interventions to curb the spread of the disease.

Timely Actions The timely reaction by the Nigerian government to news of a case of Ebola in Nigeria had a spiral effect on planning and management. The Federal government immediately declared that there was a national public health emergency and this led to health facilities taking timely action to prevent the spread and to educate staff members. This shows that early ownership by the government that the health system is in crisis is important where there is the threat of an epidemic. As a result of this, the government, quickly asked that designated Ebola treatment and isolation facilities be set up built in Lagos and Port Harcourt, the tow cites that had reported cases of Ebola. More so, the government quickly set up sensitisation campaigns including: house-to-house health education programs, radio programs in English and local dialects. Much investment also went into contact tracing with the government adopting to use real-time contact tracing and daily contact mapping.

Meaningful Autonomy Giving mid-level managers control over their operations circumvents unwieldy bureaucracy that can throttle a rapid response. It allows them to find innovative solutions and can catalyse the efficient decentralization of functions. This is consistent with the findings of performance-based financing interventions which shows that health care results are achieved not by policy makers but by technical cadres at optional levels, particularly when they are granted autonomy.

Incentives for Health Care Workers In the wake of an outbreak, the workload on health care workers is further stressed. When the epidemic is one that kills fast, the chances or emotional burn out could lead to an inertia of heath care workers to respond to the increasing workload. Incentives can help motivate health care workers. Such incentives could be monetary or otherwise. However, it must be done such that it is in line with the broader socio-economic, political, cultural, lineage of the country.

Available Infrastructure It is important that governments, through their ministries of health, and associated government structures, identify existing assets and resources, infrastructural, human or fiscal that could be easily accessed and used during an outbreak and in curbing a possible outbreak. For example, once it was announced that there was a case of Ebola in Nigeria, the government instructed that available technologies that were in place for use in polio eradication program, be repurposed to support the Ebola response.

Data Driven Decision Making It is important that decisions during an outbreak are evidence-based driven. During an infectious disease outbreak, lots of data is generated but is not used to guide decision making. This should not be the case. During an outbreak, it is important that healthcare facilities make information on the epidemic available for use by policy makers. The advantage being that, if information is available and properly generated, it could foster the potential for real-time learning and effective decision making.

Relevant Technical Assistance In an outbreak situation, the importance of technical assistance, especially in resource limited settings, cannot be overemphasized. International health agencies and non-governmental organisations such as the WHO, and MSF stand a good chance to support national governments to quickly respond to threats of an outbreak. It is important that such a response be provided in a timely fashion taking into consideration local systems, organizational culture and political dynamics of the affected country. This can be best achieved if these organisations collaborate with local experts and national governments.

### Key Statistics on the Ebola Outbreak in Lagos, Nigeria

S/N	Cases		National	Lagos	Rivers
1	Cumulative No. of cases	Confirmed	19	15	4
		Probable	1	1	0
		Suspected	0	0	0
2	Cumulative No. of deaths (+ index case)	Confirmed	7	5	2
		Probable	1	1	0
		Suspected	0	0	0
3	Case Fatality Rate – Confirmed + Probable		40%	37.5%	50%
4	No. of patients in isolation facility	Confirmed	0	0	0
		Suspected	0	0	0
5	Date of last discharged case	Confirmed	-	Sept 2	Sept 7
6	Cumulative No. of discharges	Confirmed	12	11	1
7	Cumulative confirmed cases among health care workers		11	9	2
8	Cumulative deaths among health care workers		5	4	1
9	Cumulative No. of contacts listed		891	365	526
10	Contacts under follow-up as at Oct 8		0	0	0
11	Contacts that have completed 21 days follow-up		890	365	525
12	Contacts lost to follow-up		1	0	1

Source: Lagos State Ministry of Health. 2014 Joint Ebola Emergency Operations Files. Available on request from the Office of the Commissioner, Lagos State Ministry of Health, Lagos State Secretariat, Alausa, Lagos.

Ebola Epi Curve, Nigeria, 11/9/2014
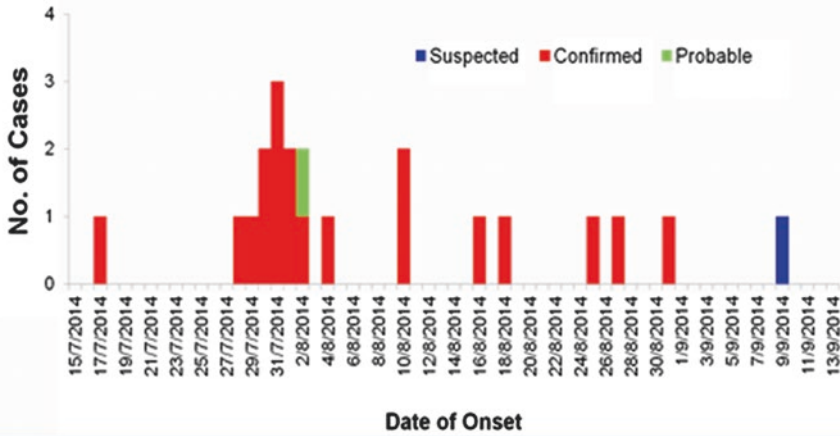
Age Group of Confirmed and Probable Cases (n=20)
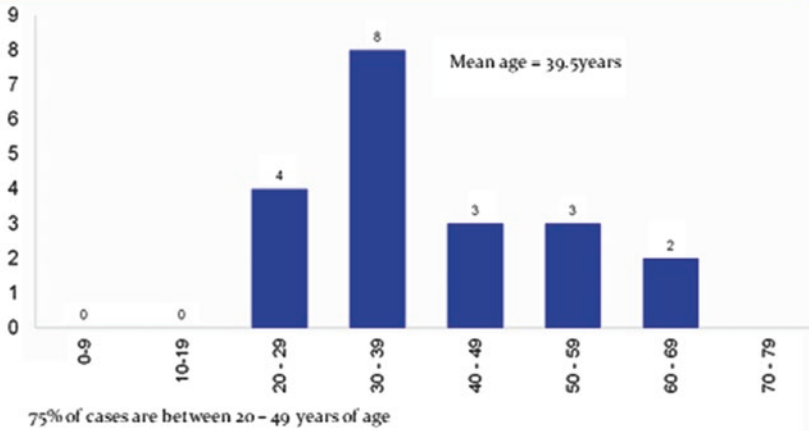
Sex Distribution of Confirmed and Probable Cases

Male
9 (45%)

Female
11 (55%)

Lagos State Ministry of Health. 2014 Joint Ebola Emergency Operations Files. Available on request from the Office of the Commissioner, Lagos State Ministry of Health, Lagos State Secretariat, Alausa, Lagos.
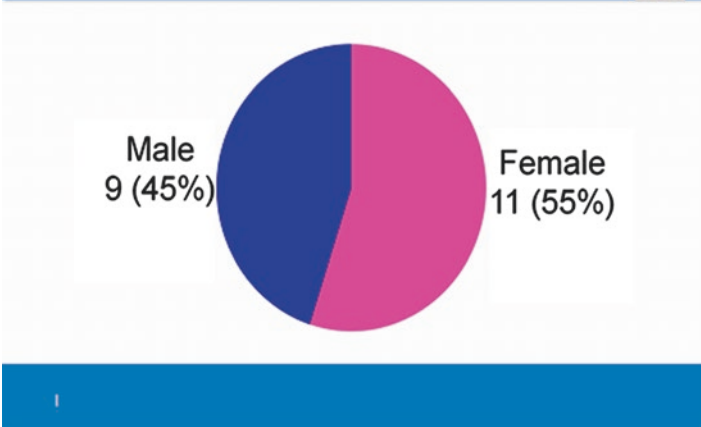
Frequency of signs and symptoms

Symptom*	Frequency	Percent	
Fever	12	85.7%	
Fatigue	8	57.1%	
Vomiting	8	57.1%	
Diarrhea	8	57.1%	
Anorexia	7	50.0%	
Headache	3	21.4%	
JointPain	3	21.4%	
Conjunctivitis	2	14.3%	
MusclePain	2	14.3%	
BleedingNose	1	7.1%	Case presentation in line
BleedingSkin	1	7.1%	with case definition
BleedingUrine	1	7.1%	currently in use
BleedingVagina	1	7.1%	
Confused	1	7.1%	*For confirmed and
PainEyes	1	7.1%	probable cases only
SoreThroat	1	7.1%	

Source: Lagos State Ministry of Health. Internal Epidemiology Files: 2014 EVD Outbreak. Available at the office of the Commissioner, Lagos State Ministry of Health, Lagos State Secretariat, Alausa, Lagos.

Type of contact with source case (n=20)

Contact Type	Frequency	Percent
Had direct physical contact with the body	14	70
Touched body fluids	4	20
Touched or shared linens, clothes	1	5
Unknown	1	5
TOTAL	20	100.0

Lagos State Ministry of Health. 2014 Joint Ebola Emergency Operations Files. Available on request from the Office of the Commissioner, Lagos State Ministry of Health, Lagos State Secretariat, Alausa, Lagos.

Some Key Timelines

- Average duration from onset to admission (for discharge patients) = 3 days

- Average duration from onset to admission (for deaths) = 5 days
  Differences were not statistically significant

- Average hospital stay = 10 days (range: 2 – 21 days)

- Average duration of illness (Date of onset to discharge) = 15 days (range: 7 – 25 days)

- Average duration of illness for dead (Date of onset to death) = 11 days (range: 6 – 19 days)
  Differences were not statistically significant

DATA prepared by Dr. Jide Idris Commissioner for Health, Lagos State Nigeria.

Pictures of persons included in this chapter were taken by the Federal and Lagos State Ministry of health, Nigeria during its public health awareness campaigns against Ebola. Approval to publish pictures is provided by the Commissioner of Health, Lagos State Government.

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