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Public health at all levels in the recent Nigerian Ebola viral infection epidemic: lessons for community, public and international health action and policy

Introduction

Ebola haemorrhagic fever first appeared in the Central African countries of Congo and Sudan in 1976 and remained virtually confined in the Central African countries of the Congo, Sudan, Uganda, and Gabon, mostly in rural and sparsely populated communities.¹ A recent spread of the disease to West Africa, which started in December 2013, became explosive by about March that year in the neighbouring countries of Guinea, Sierra Leone, and Liberia. The new dimension of the epidemic is its growing grip on major cities with its high mortality rates and effects on large populations. On 20 July 2014, a well-warned but apparently wilfully non-compliant diplomat from Liberia, who had been instructed not to leave the country until cured of his infection, left the country and arrived in Nigeria with the disease. The subject was very ill with an unknown sickness on his arrival from Liberia at the Lagos airport. He was treated at a private hospital until his illness was identified as Ebola, not what everyone assumed, Malaria. Thus the Ebola virus was able to spread to his contacts in the hospital and their families before appropriate

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control measures could be taken. This occurred in Lagos town, by far the largest mega-city in Nigeria, in the most south-western part of the country. Some of the diplomats who travelled to Nigeria with him went to Calabar, capital of Cross River State in the most south-eastern part of Nigeria, before the public health importance of the event was recognised. Another of these contacts went to Port Harcourt, capital city of Rivers State, south-central Nigeria, when he felt sick, to seek care from a private doctor while staying in a hotel in that town. One of the nurses in the private specialist hospital in Lagos where the index case was admitted and treated, contrary to public health advice, travelled to Enugu, the capital of Enugu State in east-central Nigeria. All these four towns – Lagos, Calabar, Port Harcourt, and Enugu – are major towns, and have great potential for the escalation of the epidemic.

Once public health officials recognised these problems, Nigeria put in place the maximum public health control measures. In November 2014, the World Health Organization declared Nigeria entirely free of the disease. Nigeria's success in control and total elimination of this infection is widely recognised as significant, not only for the developing countries, but for the global community at large. In this article we summarise important elements of the success of Nigeria's Ebola Viral Disease (EVD) epidemic control.

Elements of Success and Lessons

Understanding and coordinating all aspects of public health

When the arrival of Ebola was first noted in Lagos State, enlightened leadership and the foremost competent unit in the Nigerian federation swung into action and set up a state committee of its entire public health units to tackle the problem. The immediate past Lagos State chairman of the Association of Public Health Physicians of Nigeria (APHPN) and co-author of this article (ATO) as well as leader in the Society of Public Health Professionals of Nigeria (SPHPN) chaired the public and community health mobilisation and contact tracing unit of that committee. The president of the Association of Medical Officers of Health in Nigeria (AMOHN) and co-author of this article (YD), who is also the publicity secretary of SPHPN, was a member of the community mobilisation and contact tracing sub-committee of the Lagos State team. He is the medical officer of health in the Ajeromi-Ifelodun Local Government Area of Lagos State and largely responsible for local government functions, including these control efforts. Using local and state funding, Lagos State put into place activities including tracing and relevant surveillance of all primary, secondary, and tertiary contacts of every suspected or confirmed case of EVD – in their homes and places of work. The efforts continued, keeping contacts under household surveillance or infectious disease hospital isolation, until each was proven to be free of the virus.

Local government education and mobilisation took place throughout Lagos State until the state confirmed total elimination of the virus, followed eventually by similar confirmation by the World Health Organization (WHO). Other states with returnees from the affected West African countries also collected information about each such person, traced all of them to their homes, and continued surveillance until each proved uninfected.

The chief epidemiologist in Enugu State, once informed about the escapee nurse, traced her to her home in Enugu, traced all her primary and secondary contacts, and kept them under surveillance until the absence of infection had been ascertained; the nurse safely returned to her work in Lagos. The Rivers State authorities also traced the index case who had travelled by plane to Port Harcourt, as well as the doctor who treated him, along with their primary, secondary, and tertiary contacts, and kept them under surveillance and viral screening until all proved to be virus-free. It was possible for the Lagos State control programme to transport all suspected or proven infected cases in Port Harcourt under the most controlled conditions in order to contain the infection, to provide care before Rivers State was able to establish any isolation or treatment centres in the state of their own – all with Federal Government/Federal Ministry of Health support and participation.

In Port Harcourt, the doctor who treated the primary contact of the index case and who sought secluded personal care for his illness contracted the disease along with some of his hospital staff. Again, the chief epidemiologist of the state organised the necessary contact tracing as well as treatment of the infected cases to contain the disease. Thus, on the whole, only Lagos and Port Harcourt had cases of the disease and all the public health actions contained the virus.

At the same time, the Nigerian Medical Association appointed the principal author of this article (MCA) as the founding president of the recently established Society for Public Health Professionals in Nigeria to head the national professional body's committee on 'the EVD and all the other future medical and health emergencies in the country', as a consequence of this epidemic episode and all the challenges arising from it. Several state and national lectures, seminars, and information-sharing sessions have been held by these committees and agencies, including the state committees on Ebola for up-to-date measures in this regard. By visiting and interacting with many of the states it was learned that they were already doing well on this score.²⁻⁷ Figures 1–3 show some of the other people involved in these actions.

The directorate for international and port health services and the Nigerian Centre for Disease Control worked in tandem to secure the borders against land importation of the disease with monitors at all the land entry ports. There was excellent and rich interaction between all these sectors and actors at all the different levels and the Federal Government was able to obtain extra budgetary funding for EVD control. Tables 1 and 2 summarise some of the

Table 1: Summary of contacts data, 29 September 2014

<i>Contacts</i>	<i>Lagos</i>	<i>Port Harcourt</i>
Cumulative contacts list	362	530
Contacts who became EVD cases (Suspected, Probable, and Confirmed)	16	4
Contacts currently under follow-up	0	0
Contacts who completed 21-day follow-up	362	530
Contacts lost to follow-up	1	0

Table 2: Number of cases and deaths in Nigeria at the end of the epidemic

<i>State</i>	<i>No. cases^a</i>	<i>No. deaths</i>
Lagos	16	6
Rivers	4	2
Total	20	8

^aCases include 19 confirmed case and 1 probable case.

NB: Survivors 12.

actions of these committees, units, and agencies. The activities amounted to far greater effort and coordination than ever before. Two negative events also provided lessons. Poor management at the beginning (including rumour and stigma management) led to many otherwise avoidable deaths: a rumour spread that drinking or bathing with strong salt solutions protected one from the virus. In addition, the unnecessary deaths of several people occurred when they concealed their disease instead of coming early for treatment upon noticing signs or symptoms of the disease. Most early reporters of the disease survived, suggesting that not only did such early reporting limit transmission of the disease, but early hospitalisation and supportive treatment contributed to lower mortality. This rate of 40 per cent is far lower than any other episodes with similar strains of the virus elsewhere, disregarding other contributing factors (see Tables 1–3).

Global communities, including various arms of the United State Government and of the UN and the World Health Organization, all came and helped as much as they could. Control efforts proceeded in a cooperative and mutually respectful manner. This experience provided a good lesson for the international health community (see Figures 1–3).

Lessons from the exercise

1. Government health services – starting with the district/local government, community and primary health-care systems as in Lagos State – should be

Table 3: International and port health services – Locations of 180 points of entry (POEs) and staffing

<i>PHS presence in 180 POEs</i>	<i>Distribution of POEs or HR^a</i>
<i>Total POEs before EVD outbreak</i>	63
Through the international airports	6
Through the seaports	12
Through the major land borders	45
<i>Following EVD outbreak, additional POEs activated</i>	117
Domestic airports+seasonal international airports	18
Jetties, waterfronts, and waterways	41
Ground crossings	58
Additional seasonal, emerging, or undocumented expansive POEs	178–200 ^b
<i>Human resources (total at the posts)</i>	601
Staffing gap	1122
Ideal	1727
New staff approved by President	660

^aHR = Human resources.^bOnly estimates. **Figure 1:** Community enlightenment campaigns on EVD.

competently and professionally led (by properly trained and supported medical health officers), so as to produce the necessary grass-roots action for disease control.

Figure 2: Meeting of foreign/international partners with staff of the Lagos State Emergency Operation Centre for EVD.

Figure 3: The community-responsive Lagos State Governor meeting with EVD survivors to help discourage stigma against survivors.

2. The regional or state governments should be led by politically enlightened people who are able to function with all the attributes of 'a viable federating unit'. Today possibly only Lagos State in Nigeria has these attributes; the

other areas remain impoverished and highly corruptible states of the nation.

3. National public health should be well led and competent – and sufficiently mature to cooperate with the other two lower levels of the health-care system.
4. The national health system should be able to assist the state governments in the face of similar threats in the future. All countries need to develop centres for disease control.
5. The international community can then assist these nations to work effectively, so long as they work closely with centrally involved local experts. Otherwise international participants may do more harm than good.
6. EVD has no ‘planetary health’ dimension as it does not yet involve any direct or clear climate change issues, or non-sustainable environmental issues. The successful approach in Nigeria suggests that, as stated in Alma-Ata, Riga and other subsequent documentation,⁸ all public health activities should centre on and begin with local government/PHC systems. Without these it will not be possible to achieve the broader objectives of regional public health, national public health, international health, global health, and eventually planetary health.

Conclusion

1. For public health success, as its practices evolve, we must remember that (statutory) community health is its basis – and an essential foundation.
2. Public health at the secondary health-care level (at the state or regional level) must work with PHC at the local government level, as well as ensure their competencies at all times. The states can only do this if they exist as capable federating units.
3. National public health, including the international and port health services, should also work in collaboration with all the lower levels of the public health system with much data and skills-sharing.
4. The international public health community will contribute more if they recognise the semi-autonomy of all these levels of the public health systems and respectfully collaborate with them, engaging as much local expertise as possible.
5. In issues involving climate change, the concept of planetary health should build on the more fundamental lower arms of public health. This means working in mutually respectful ways and synergistically with global health, international health (cooperation), national public health, regional or state

public health, capable federating units, and, ultimately, the community/primary health system. If success and sustainability are to be achieved, this will require supporting any level that appears weak, non-functional, or non-existent to achieve a level of competence and self-ownership of these activities.

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