

Forum: World Health Assembly

Issue: The question of containing the Ebola Outbreak in Guinea

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Introduction

On February 14, 2021, Guinean authorities declared the resurgence of Ebola in the district of Gouécké in the Nzérékoré region and officiated an Ebola outbreak in Guinea. As though the seemingly perennial onslaught of the COVID-19 Pandemic wasn't enough, the residents of this West African country, began recounting the horrors and anxiety of the previous epidemic that ended in 2016, leaving a trail of more than 11,000 deaths – the largest Ebola Epidemic to date. However, having already battled this virus once, officials promised to act swiftly in the face of the resurgent attack of this microscopic menace.

“The exact origin of the original infection is unknown, but health officials in Guinea have traced the outbreak back to the funeral of a nurse at the beginning of February” (www.dw.com). It is being suspected that this acted as the initial source of the spread of the virus (index case), as all 7 inceptive cases had attended the funeral. Symptoms of this deadly virus include bleeding (internal and external), diarrhea, and vomiting. EVD can be transmitted through infected blood or bodily fluid, which explains why traditional funerals in West Africa, that involve cleaning the corpse of the deceased (who may have contracted the virus), can be extremely infectious and can serve as breeding grounds for this virus.

The Ebola Virus is a zoonotic pathogen that can spill over from infected animals (mostly bats) to humans. This process is referred to as zoonosis and can take place through direct contact with bodily fluids of the animal, or through indirect contact

with contaminated areas. It has a high mortality rate and is highly infectious too, however, it can easily be tracked due to its instant symptoms. These severe symptoms may then lead to patient death due to multiple organ failure or dehydration.

The previous Ebola epidemic in 2014 had left the country devastated yet had taught the government and the associated health departments numerous public health lessons that could be appropriately used to control and contain this outbreak.

Definition of Key Terms

Ebola Virus Disease (EVD)

EVD, sometimes known as Ebola hemorrhagic fever, is an uncommon but devastating and frequently deadly infection in humans. The typical case fatality rate for EVD is about 50%. The virus that causes the disease was first discovered in 1976.

2014-2016 Ebola Outbreak in West Africa

“On March 23, 2014, the World Health Organization (WHO) reported cases of Ebola Virus Disease (EVD) in the forested rural region of southeastern Guinea. The identification of these early cases marked the beginning of the West Africa Ebola epidemic, the largest in history.” (CDC). The epidemic ended on March 29, 2016.

Epidemic

Sudden rise in the cases of a particular infection or illness that was not previously present in a particular geographical region or population.

Zoonotic Pathogen

Pathogens that are naturally transferred between animals and humans are referred to as zoonotic pathogens.

COVID-19

COVID-19, also known as Coronavirus Disease, is an infectious illness caused by a recently identified (novel) coronavirus called SARS-COV-2.

rVSV-ZEBOV Ebola Vaccine (Ervebo)

“Ervebo® is a replication-competent, live, attenuated recombinant vesicular stomatitis virus (rVSV) vaccine manufactured by Merck®” (CDC).

Ring Vaccinations

Method of vaccinating contacts around a case (that forms a kind of immunity ring around the case, reducing spread of the disease).

Contact Tracing

It entails identifying both those who have caught the disease (case) and others with whom they have come into contact. The latter type of people are referred to as contacts.

Inmazeb and Ebanga

“Two monoclonal antibodies that “were approved for the treatment of Zaire ebolavirus (Ebolavirus) infection in adults and children by the US Food and Drug Administration in late 2020” (WHO).

Immunocompromised

“Having a weakened immune system. People who are immunocompromised have a reduced ability to fight infections and other diseases” (US Department of Health and Human Sciences).

Zaire Ebola virus species

Zaire Ebola Virus is a species, one of six discovered, belonging to the Ebolavirus genus. It also has an extremely high fatality rate, one of the highest among all species.

Key Issues

Availability of Health Resources Worldwide

The seemingly perennial onslaught of the COVID-19 pandemic, raging worldwide has drastically weakened health resources worldwide. It has exposed the house of cards situations of the medical systems of numerous countries while continually exacerbating their conditions.

Supportive medication

Supportive medication, which is an essential tool in treating most viral diseases, is being prioritized for COVID-19 patients worldwide reducing the stocks being allocated for other viral conditions such as this Ebola outbreak, making this situation even more precarious.

PPE Kits

Furthermore, the over-usage of PPE kits, a vital piece of equipment for healthcare professionals when dealing with any transmissible disease, towards COVID-19 patients has also limited the availability of basic sanitation and protective measures when handling Ebola virus patients. This has decreased the ability of medical professionals to cater for the patients infected by EVD.

Vaccines

There is also a virtual outcry in almost all countries for enlarging the scale of production of COVID-19 vaccines. At this moment, clearly, “coronavirus vaccines are seen as a priority” (www.dw.com) worldwide. This means that it becomes much more difficult for manufacturers to rapidly produce Ervebo, the first approved Ebola Virus Vaccine that could play a massive role in the quick control of this outbreak. With all resources fixated towards the production of COVID-19 vaccines, along with a greater incentive for private pharmaceuticals to produce

Coronavirus vaccines over any other due to its enormous demand, the chances of mass producing Ervebo in time to contain this outbreak, seem slim. Moreover, in a country like Guinea, where more than 60% of the population lives in rural areas, the equitable and timely distribution of these vaccines by public health officials that have also been extensively occupied due to the pandemic would be a difficulty as well.

Medical Infrastructure in Guinea

Guinea is an LEDC that “struggles with one of the worst health-care infrastructures in the world” (Weyer). It’s mainly primary-sector focused economy has been further plagued by numerous past epidemics that have each left their mark on the country’s financial and logistical abilities as a whole. As an example, the world bank estimated that the 2014 – 2016 Ebola Outbreak in West Africa, cost \$600 Million to Guinea alone (World Bank). Such expenses have slowly weakened the resourcefulness of the Guinean government.

Testing Centers

The only technique to ensure appropriate identification and documentation of cases caused by a virus, is efficient testing (something we have all been witness to in the COVID-19 Pandemic). Capturing more infections would allow improved analysis and rapid, appropriate approach towards the outbreak. However, in order to obtain more tests, centralized test centers need to be established and testing/diagnostic methods need to be prepared, which is quite often very expensive. Hence, this is something that Guinea would find especially difficult to do due to its current economic turmoil as described above. Furthermore, with majority of international budgets being dedicated towards testing centers for COVID-19, obtaining the extended assistance of international health organizations would also be problematic. Although, some resources remaining post the recent 2014-2016 Ebola epidemic could be reutilized for emergency usage, however, proper control of the outbreak would require extra support in terms of increased testing centers and methods.

Contact Tracing

Due to the infectious/transmissible nature of the Ebola Virus, contact tracing is a salient public health measure that needs to be appropriately used for adequate surveillance and monitoring of the spread of the disease. Effective contact tracing has also been used in this pandemic to reduce the spread. However, contact tracing is generally conducted on a case-by-case basis which requires a plethora of resources and logistical management which the impoverished public health sector of Guinea would be unable to facilitate by its own.

Isolation and Treatment Facilities

Yet another important establishment during an outbreak of this kind is the creation of isolation and treatment facilities that serve as the final and most important stage in the approach to an Ebola case. While the presence of a few such centers from the previous outbreak could be used for the handling of initial cases, however, as the outbreak progresses the number of infections would continue to rise, and so would the need for such facilities. Since these facilities take up large amounts of space, they will need large volumes of construction materials to be built that would be hard for public health authorities to procure in their current financial condition. Lastly, the ability to treat patients using within these facilities, using new antiviral drugs such as Inmazeb and Ebanga is also limited due to the reduced production of such drugs due to several reasons such as trials for various different prospective antiviral drugs for COVID-19 that have preoccupied manufacturers similar to the conditions with vaccines coupled with low investment from the Guinean government towards such initiatives.

Community Engagement

Community engagement is a key issue when tackling any outbreak of such kind. As explained by MSF Emergency Response Coordinator, Anja Wolz; “It all comes back to community engagement. We have seen this many times in the past. If a community feels involved, heard and empowered, then an Ebola response will likely go well” (MSF). Maintaining the public’s trust and confidence in the public health authorities is one of the first hurdles that Guinean government will have to cross. Next, a calm situation needs to be maintained in the affected regions which would be a further challenge due to the recurring anxiety that the citizens would have from previous such scenarios. Furthermore, community involvement and overall active participation in efforts to contain the outbreak would need to be maintained throughout the duration of the outbreak. Such sincere efforts

require dedicated inputs of time and energy, both of which are lacking in a situation like this. Although previous attempts made by the government would have been noticed by the citizens, who would most likely respond more proactively to calls of the public health departments this time around, especially due to advancements since the last epidemic. However, the situation is very delicate and is hence dependent on many uncertain factors that owe to the key issue of the situation. If managed appropriately, then engagement by members of the community will lead to overall higher rates of vaccination, and an increased number of patients that would head to nearby healthcare centers when feeling ill, which would lead to higher treatment levels and greater care being provided. This heightened engagement towards public health initiatives would lead to better containment of the outbreak.

Awareness

Awareness is yet another vital aspect of community engagement. If people are unaware of how to protect themselves from the virus, or what to do if experiencing any symptoms of the virus, then the rates of infection would continue to soar. Protective measures against the outbreak (including vaccinations) should be largely marketed to ensure that people are completely aware of how to break the chain of infections. This would also increase overall citizen participation in public health measures. This widespread awareness campaign, however, is another difficulty that would be faced by Guinea – a country with a literacy rate of about 32%. This would not only make it difficult to make people understand what different elements of the awareness campaign mean but would also reduce the overall impact it would have had on community engagement. Lastly, a massive scale awareness program would also demand a large amount of government expenditure that would create an opportunity cost as if some of the federal budget is allocated to awareness programs then there would be lesser money available for other initiatives the government could implement.

Ebola-Safe burial practices

Implementing measures to try and modify the traditional method of burial in Guinea, which as aforementioned, is a breeding ground for the virus to spread, could lead to opposition from certain sections of the community as these would be infringing upon the traditional religious practices of the people. Although, such a solution would lead to

reduction in daily cases and overall spread of the virus, however, it could also lead to reduced community engagement due to distrust in the government because of religious reasons. This would be another bone of contention that would have to be well balanced and delicately dealt with by the Guinean authorities if successful management of the outbreak is desired.

Major Parties Involved and Their Views

WHO

The World Health Organization is key to control and containment of public health emergencies worldwide. It also played a massive part in the containment of the 2014-2016 Ebola epidemic as its role was mainly focused on sending “field epidemiologists to West Africa, who established initial response efforts such as contact tracing, laboratory support and infection control mechanisms, mirroring that which they had implemented in previous Ebola outbreaks” (Wenham). However, WHO was strongly criticized for its delayed actions and even admitted to its inefficient and slow initial response that allowed the epidemic to catch on like wildfire. Driven by the need to live up to its reputation, “since then, two vaccines have been pre-approved by the World Health Organization” (Weyer) in order to prepare itself for another outbreak such as this one. In this outbreak, the WHO looked at rapid, coordinated efforts to contain the virus. Its activities and approaches included supporting vaccination efforts to ensure that a greater proportion of the Guinean population is immunized while enforcing equitable distribution. Along with this, WHO experts were delegated to Guinea to manage key aspects on the ground level such as improved assistance with logistical support for contact tracing and surveillance mechanisms, establishment of make-shift facilities for infection treatment and control, widespread awareness campaigns and creation of temporary testing centers. While this sounds like a great approach to the outbreak, the diabolic backdrop of the COVID-19 pandemic also needs to be kept in mind, and how it has pressurized resources of the WHO massively. Most importantly, the WHO focused on tapping on its expertise of dealing with previous Ebola epidemics and how it could refine its approach to reduce the spread of this dreaded disease, especially into other countries.

Ministry of Health and Public Hygiene of Guinea

Acting as the first line of approach, the Ministry of Health of Guinea focused its resources strategically to ensure quick control of the outbreak. It is said the most important phase of any public health emergency is the initial phase. Being the first responders to this outbreak, the public health officials of Guinea have had to work around the clock to trace contacts, isolate cases and vaccinate the public with the help of the WHO. Recently, having come out of a gargantuan epidemic, the ministry of health has learned from its previous mistakes and has used existing laboratories, and treatment centers to reduce the resources needed to contain this outbreak. The National Health Security Agency, established just after the previous epidemic, has also been enforced by the Guinean authorities to ensure rapid response to this emergency. However, the trying efforts of the Ministry of Health could fall short due to reduced community engagement of citizens because of being witness to the collapse of the action plan that was constructed by the public health authorities during the previous epidemic. This previous incompetency of the national authorities would have surely etched a mark on the citizens who would be wary of taking part in any public health initiatives this time around. Lack of funds in the national health department of Guinea has also acted as a hindrance to appropriately equipping first responders, thereby weakening the impact of many actions taken by the government. Lastly, resource mobilization has been yet another headache due to the active COVID-19 containment measures already put in place by the Ministry of Health.

GAVI (The Vaccine Alliance)

With the Ebola vaccine already developed prior to the start of this outbreak, organizations such as Gavi, the vaccine alliance have lent their support to ensure rapid administration of vaccines to citizens. This collaborated effort along with that of the WHO, has ensured that the outbreak is being dealt with from different angles. This multifaceted response aims at enforcing an all-round attack on this outbreak.

World Bank and African Development Bank

All the solutions that are and would need to be employed require funding from multiple sources to cover and share the massive costs of such an outbreak. International financial institutions such as World bank are offering support to the Guinean authorities by providing funds to facilitate the numerous public health measures needed. Furthermore, this has been

helping the Ministry of health to recover some of the costs of previous epidemics along with the COVID-19 pandemic, reducing the international debt owed by the country of Guinea. Moreover, regional financial institutions such as the African Development Bank, have also provided local financial support that is being used to facilitate measures for patient care such as post – infection assistance which is an often vital yet unnoticed pillar of emergency response.

MSF and Africa CDC

Organizations such as MSF (Médecins Sans Frontieres) and Africa Centers for disease control and prevention (Africa CDC) have partnered with local Guinean public health authorities to offer ground level management and support which is extremely essential to garner community engagement and to ensure rightful execution of infection control measures. MSF has mobilized a team of Ebola experts that form the core of the response team against this raging outbreak. Furthermore, initial response, which as aforementioned is the most important step of infectious disease control, is being carried out by the Doctors Without Borders which includes epidemiological surveillance with the help of resources of the Africa CDC. The Guinean authority's public health efforts of contact tracing and medical facilities construction is also being assisted by the Africa CDC, that aims to “strengthen the capacity and capability of Africa's public health institutions” (Africa CDC).

Directorate-General for European Civil Protection & Humanitarian Aid Operations along with the EU

With the COVID waves already past the EU, European countries such as Germany, Belgium and France are also being able to assist the Guinean authorities through the European Union Civil Protection Mechanism. Providing important protective equipment such as PPE's, face masks, gloves and goggles, along with laboratory material and other testing equipment, now that the demands of these items have subsided in the above-mentioned countries, this approach is helping tackle the shortage of protective equipment in Guinea that had decreased the ability of healthcare professionals to care for Ebola patients. Furthermore, since Guinea was also a previous French colony, and due to its previous trades with the EU, the European Union is also being able to provide extra funding to strengthen the healthcare system in the country, which would ensure quick

response and better care for patients and healthcare workers in Guinean communities affected by Ebola.

World Food Programme and Government of Japan

“The COVID-19 pandemic, beyond its immediate effect on public health combined with the resurgence of Ebola, is affecting the food security, nutrition and livelihoods of the most vulnerable people” (WFP). The WFP issued this statement on the Guinea Ebola Outbreak of 2021. This shows how the WFP views the situation and aims to support Guinea with its nutritional needs in these troubling times. While Ebola may be the outbreak Guinea may be facing at face value, however, the deeper hidden weed of malnutrition, is depriving children of a strong immune system that makes them more susceptible to such diseases. This is a condition where people become immunocompromised. To reduce this phenomenon, WFP, supported by the Government of Japan, is supporting market gardening activities – growth of cash crops upon restoration of agricultural lands. This is not only providing a key source of income for citizens in this agriculture – based economy, but this increase in domestic income is also encouraging residents to opt for treatment when feeling ill, thereby improving community engagement as a whole; something extremely salient in such an outbreak. Although, this would seem like an unorthodox approach in terms of containing an infectious disease outbreak, it does act as a means of indirect support to authorities and more importantly patients during this tough time.

Development of Issue/Timeline

Date	Event	Outcome
14/02/2021	First confirmed case of Ebola in Guinea	Ministry of Health of Guinea announced the first official case of the EVD had been confirmed in the Nzérékoré prefecture.

<p>16/02/2021</p>	<p>20, 400 Red Cross volunteers begin work in Guinea. Red Cross and Red Crescent societies release information bulletin. It says that “there is significant cross-border movement, at official and unofficial border crossings, for trade, healthcare-seeking (traditional and clinical) and family links. Surveillance system at the borders is still weak” (Red Cross check appendix).</p>	<p>This bulletin relayed extremely important information regarding the initial management phase of the outbreak (which as multiple times stated before, is the most important phase when controlling an infectious disease outbreak). What the bulletin shows is not very promising information as although, it is assuring to see rapid on ground response to the outbreak with the help of volunteers, however, the cross border movement may lead to spread of infection to other countries which could massively escalate the condition. Furthermore, the bulletin also discusses the transport of patients in the absence of isolation, which is yet another pressing concern as it could lead to widespread infection too.</p>
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25/02/2021	15 cases (11 confirmed and 4 probable) as of this day. 6 deaths as of now. 351 contacts are being followed up.	Nearly two weeks since the first case, the outbreak has spread rapidly with both cases and deaths rising day by day. The number of contacts being followed also indicates that contact tracing is being done, which is a good sign of public health measures in place. However, the large number of contacts, each of which could be potential cases, starts to show that the situation is getting immensely serious and dedicated management of the outbreak is needed now more than ever.
28/02/2021	5 healthcare workers from different facilities had also tested positive for the virus	Virus had been spreading continually and had reached beyond regional hospitals leading to numerous more cases. This also showed how lack of PPE was putting healthcare workers at extremely high risk, as they are generally protected and contribute very few cases to the

		total case count. However, during this outbreak, due to the existing pressure of COVID-19 cases, the medical supplies have been stretched which has led to severe shortages proving to fatalities.
05/03/2021	No new cases for first time since outbreak	Strict crackdown on public health measures has led to severe control of the spread of EVD, which has led to a 'plateau' in daily cases. This is a good sign as it means that community engagement is high and public health measures are working effectively.
02/04/2021	"First case since March 4 bringing the total number of reported cases to 19" (Africa News). Total of 8 recorded deaths.	This shows the resurgence of the cases and a re-spike of the outbreak that needs to be controlled again or could spiral out of hand. Such a comeback of the virus shows that public health measures including strict surveillance need to be consistently maintained and any shortages in preparedness would lead to a second wave,

		just as that of COVID, that could be much more deadly.
12/05/2021	23 EVD Cases (16 confirmed and 7 probable). 12 recorded deaths in total	The total number of infected individuals continued to rise showing that the outbreak was in gradual flow, and its effect was evident. The number of deaths was also at greater than 50% mortality mark, hinting the presence of the Zaire variant of Ebola Virus. This gradual increase in confirmed cases and recorded deaths over time showed that measures were still in place due to which cases were not rising exponentially, however other solutions were required for a multifaceted response that would stop this viral menace once and for all.

Previous Attempts to Solve the Issue

Stockpile of Vaccinations

Post the harrowing experience of the 2014-2016 epidemic, pharmaceutical companies worldwide aimed to develop a vaccine for the Ebola Virus. After years of research and hard work, the Erbevo vaccine formulated by Merck, was finally approved in 2019. This vaccine was the hope that West African countries were looking for. A vaccine would ensure immunization against this deadly virus.

WHO, after being widely criticized for its poor efforts in the management of the 2014 West African Ebola epidemic, stepped up to ensure that measures were taken to prevent the next such outbreak, or at least be well prepared for it. Hence, over the course of the next 2 years, WHO aimed to vaccinate as many residents of the West African countries as possible. In Guinea alone, by 2021, 16,000 people had already been vaccinated. However, 16,000 out of a population of 12.8 million (0.00125% approximately) is like a drop in the ocean. Hence, when the outbreak struck Guinea in 2021, WHO was still unprepared and needed to elevate its response. However, with the majority of the WHO's resources dedicated towards COVID-19 vaccines, this became a much more difficult ordeal. Then, "in January 2021, the WHO said it was creating an emergency stockpile of 500,000 doses of the Merck Ebola vaccine, but only 7,000 were available at that point in time" (www.dw.com). The WHO's last moment attempt to ensure the outbreak was contained before it even began, had failed. Without enough vaccinations done in time, the residents of Guinea were almost as vulnerable as previous epidemics. Timely action by the WHO, would have ensured that the residents of Guinea were in a much better position when the outbreak began, than they were now in reality. The vaccines that were the source of hope for elevated preparedness before the outbreak, then were being used to control the spread of the outbreak during its occurrence. Although not as effective as they would have been if they had been administered to a large proportion of the population before the outbreak had begun, the vaccines were still of immense assistance in controlling the spread of the virus this time around.

Rapid and Coordinated response efforts

"In the aftermath of the 2014-2016 outbreak, the apparent lag in the initial responses was a major critique of the response efforts" (Weyer). This was one of the key lessons learnt the hard way, by the WHO and the Guinean health authorities post the 2014-2016 epidemic. The speed with which initial cases are identified and these 'sparks' to potential public health emergencies are

extinguished will determine the course of action taken by any outbreak. This is because if the initial response is rapid and well-mounted then the disease will not get much time and opportunity to spread which would reduce the overall effect it would have. This is something the authorities definitely worked on this time around as “health authorities were able to move swiftly to tackle the resurgence of the virus” (Felix). Furthermore, as seen in the timeline above, just 2 days after the first case was detected, 20,400 volunteers of the Red Cross were summoned for controlling this outbreak. Although this quick response may also be credited to the presence of healthcare professionals and equipment that was present from before due to the ongoing COVID-19 pandemic, however, still the pace at which the response was carried out is indeed remarkable. The coordinated response efforts were also evident this time as “shortly after the infections were detected, national health authorities, with support from WHO and partners, mounted a swift response” (WHO), which, along with the previous example of partnership with Red Cross, goes to show the cooperative approach taken by the Guinean government. Furthermore, the WHO was increasingly proactive this time, as it also ensured that the neighboring West African countries were brought to high levels of preparedness in case of the virus spreading to other countries as well. This ensured that there were tighter restrictions to travel between these countries and other measures that ensured that even if the virus would spread from Guinea to another country, the approach to be taken would be ready. This rapid and cooperative response from all associated authorities did lead up to fewer cases after a sudden initial spike in Guinea, as cases began reducing till March 4th after which there were no new cases for the next 27 days. This highlights the advantages of the quick and appropriate response taken by the Guinean government and the WHO. However, the resurgence in cases after those 27 days goes to prove that the actual problem in this outbreak were inconsistent efforts and declining public health interventions that weren’t sufficient to keep the country of Guinea Ebola-free. Hence, although the high-paced response taken in this outbreak

was successful in restricting the number of cases and the spread of the virus to neighboring countries, however, the shortfalls in vaccinations mentioned above and the lack of consistent public health interventions from the Guinean health authorities and WHO, prevented the outbreak from being resolved and contained in the first few weeks after its initiation.

Possible Solutions

Ring Vaccination

Learning from previous attempts at infection control is an important technique in epidemiology and infectious disease control. Following this technique, the 2018-2020 Ebola Outbreak in the Democratic Republic of Congo, could be used as an exemplar method of resolving an outbreak in yet another West African Country. An interesting and effective method used in DR Congo and many other West African countries during this outbreak was Ring vaccination, which as defined above involves vaccination of close contacts around each case. This effective method is generally effective for infectious diseases such as Smallpox and Ebola and leads to a comprehensive and tactful method of administering vaccinations in the population. By forming a ‘ring’ of immune individuals around the case, this method reduces the chances of the disease spreading from one person to another. It can also be thought of as a double benefit mechanism, as it not only reduces transmission and thereby spread of this infectious disease, but since a vaccine and not a medication is being used, this would also mean that all those vaccinated would be immunized for their lifetime (through artificial immunity – built through vaccine) and so would the case if he or she survives (through natural immunity).

Antivirals

Although traditionally, the only method for treating Ebola was through supportive medication (including fluids and electrolytes), however, after the 2014-2016 Ebola epidemic, 2 antiviral medications – Inmazeb and Ebanga have been approved for use. These medications consist of different numbers of monoclonal antibodies.

Monoclonal antibodies are artificially made (in a lab) antibodies that “act like natural antibodies to stop a germ such as a virus from replicating after it has infected a person. These particular mAbs bind to a portion of the Ebola virus’s surface called the glycoprotein, which prevents the virus from entering a person’s cells” (CDC). These two antiviral medications provide a better chance and means for treatment in this outbreak and must definitely be used appropriately, along with fluids and electrolytes, to treat as many cases as possible. The equitable and efficient use of these antiviral medications would be a problem that would have to be dealt with appropriately to ensure that none of these medications are wasted or used inappropriately. Yet another element of this solution that would need to be sufficiently addressed would be the appropriate administration of these antivirals. These are new forms of medication in the fight against Ebola and hence local healthcare professionals are less likely to be aware of appropriate dosages and storage conditions of the antivirals. Hence, these are factors that would need to be considered when enforcing this solution, as without it, the antivirals would be unable to be as efficient as they are meant to and could also lead to multitudes of financial losses, along with loss of lives, if not administered properly.

Increasing community engagement

With any outbreak of this kind, as mentioned before, community engagement is a vital tool. As it was concluded above, the main problem in the handling of this outbreak has been the inconsistent, although rapid, efforts of the public health department and WHO combined. This is what led to the resurgence of the Ebola Virus cases in Guinea post its subsidence by 5th March. This weak spot that has been identified may have also formed due to reduced community engagement. This is because if over time, the involvement of residents in public health measures keeps reducing, then although the interventions by authorities may be appropriate and consistent but they would be to no avail as they are not being followed out effectively. This could also be a cause that may have led to resurgence. A solution for this differential diagnosis would be increasing community engagement through

different techniques. An important skill that needs to be used to increase community engagement is adaptability. This is because governments must keenly listen to and understand the problems being faced by the citizens, because only then can they appropriately respond to them in the form of targeted messaging. Furthermore, clear and effective communication, an often-overlooked technique must also be used efficiently especially in the case of Guinea. This is because the public already has huge mistrust in the government due to its previously failed attempts. Trust is indeed something the government would need to rebuild before it can expect large-scale execution of its intended measures by the people. This rebuild of trust is only possible through meaningful actions such as development of laboratories and increased testing centers and isolation wards (with the help of international organizations). These prudent decisions when actually carried out would build a positive sentiment in the public that would reinstall the trust in the government and automatically boost community engagement thereby improving the effectivity of public health measures.

Consistent public health measures

Lastly, to address the other differential diagnosis to the resurgence in Ebola Virus cases in Guinea that have fueled the prevalence of the outbreak, ensuring consistent public health measures and constant interventions. From continual contact tracing to appropriate and long-lasting surveillance and monitoring of the spread of the outbreak, combined with increased testing centers and constant availability of diagnostic machines. These are the main pillars of consistent, long-lasting, effective public health measures that must be enforced for the long – term until the outbreak has not been declared over. While, yes, the continuous supply of funding for such long periods of time would be hard to maintain and create substantial opportunity costs, however, collaborative efforts from multiple financial institutions, each sharing the total costs over time would ensure this takes place smoothly. Furthermore, with the aid of the WHO, the Guinean authorities must aim to establish facilities and medical infrastructure that would give them the

capacity to respond to such sudden resurgences in cases. This should be accompanied with continuous awareness among the public regarding the do's and don'ts against the Ebola Virus with regular urges to get the public vaccinated. The appropriate method of burial must also be repeatedly emphasized upon to ensure that the people do not return to traditional practices unless and until the outbreak is declared over. Moreover, Guinean government should also ensure the constant supply of PPE's and face masks along with all other protective equipment required to prevent further infection and death of healthcare professionals too (which occurred in this outbreak as mentioned in timeline above). Last but in no way whatsoever, the least, testing facilities and equipment need to be increased and must be always present in abundant supply. In fact, if they are not available throughout, then community engagement would automatically reduce as well. The increased emphasis on this particular point is due to the fact that this outbreak was also detected in the same region that was believed to be the starting point for the 2014-2016 epidemic too, and new research is suggesting that the cause of this current outbreak may be a latent case from the previous epidemic as "genome sequencing found that the virus behind the latest outbreak was similar to that identified in the 2014 to 2016 epidemic, according to the WHO" (Duolamou). Hence widespread and constant testing along with after infection support, which is yet another aspect that must be focused on, should also be maintained throughout to ensure that this outbreak is contained as soon as possible, and future outbreaks are prevented.

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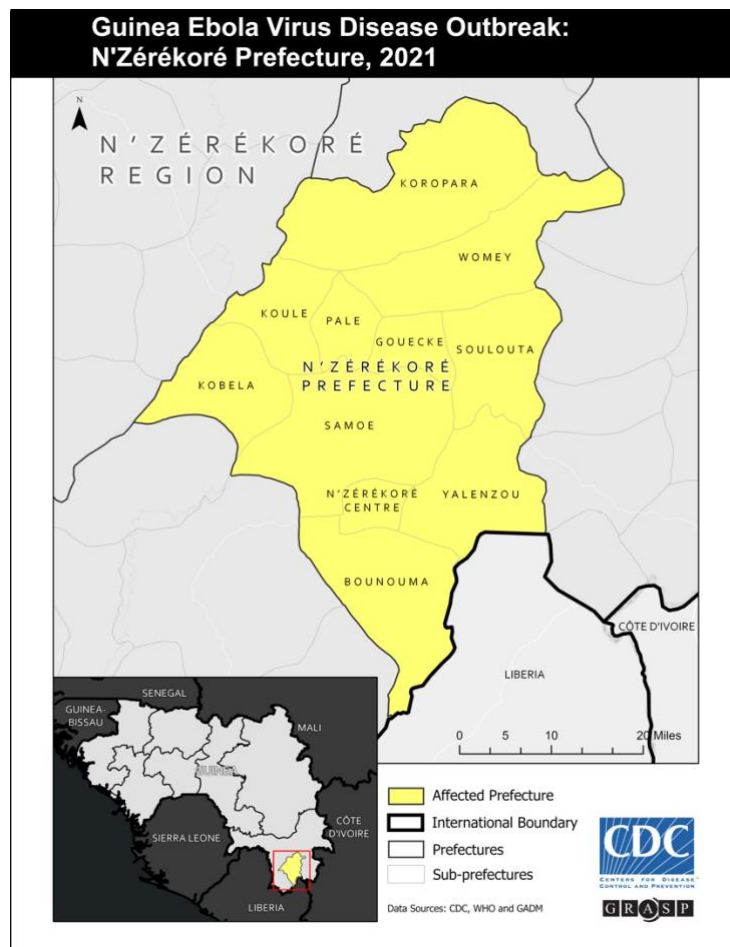
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Appendix

<https://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease> —

chronology of Ebola Virus Outbreaks

<https://www.the-scientist.com/news-opinion/ebola-outbreak-in-guinea-originated-from-past-epidemic-68545> - Research suggesting that the Ebola outbreak in 2021 was caused due to a latent case in 2014-2016.



- <https://www.cdc.gov/vhf/ebola/outbreaks/guinea/2021-february.html>
(Map showing spread of the outbreak)

https://reliefweb.int/sites/reliefweb.int/files/resources/IB_Guinea_Ebola_Virus_Disease.pdf – Red Cross appendix