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## Ebola's Scorecard: Failure of the WHO and the International Community

The international health community and its institutions made a slate of errors, each of which prolonged, helped to spread, and continued the Ebola epidemic from 2013 to its current status in 2016. Their failure took the form of responding too slowly, too inefficiently, and too ineffectively. When they did respond international organizations such as the World Health Organization (WHO), World Bank, and United Nations (UN) failed in their communications among one another, a major cause for delay of effective action needed to contain the viral disease. Non-governmental organizations (NGOs) clashed with the WHO and World Bank; the result was confusion about what was going on, what to do, or who was to do what. Multinational corporations initially contributed little of substance. Here, we describe the faults that caused such damage for the purpose of recommending steps to correct the errors and ensure that a catastrophe like this does not occur again.

The WHO has its share of blame and rightly so. Its chartered role is to protect the health of our world's human populations, and its task is to live up to that purpose. It's major malfunction in the Ebola epidemic was its failure to understand the public health disaster as it was unfolding and thus not acting early enough to limit the spread of Ebola virus infection. During the initial months of Ebola's debut, the WHO was slow in acknowledging that a unique infectious disease was advancing and killing people. Throughout this indolent period, Ebola continued to spread from Guinea across neighboring countries, primarily Sierra Leone and Liberia. With optimal public health control, the numbers of infections and deaths might have been 10-fold fewer or less, i.e., 28,000 to 2800 and 11,300 to 1300. Compared to the WHO's successes in handling prior epidemics of H1N1 and H5N1 influenza and Severe Acute Respiratory Syndrome (SARS), the Ebola epidemic was largely ignored and handled poorly. The major cause of this failure by the WHO was likely its administration at that time. Neither

their personnel nor that of the international disease control community was sufficiently decisive in understanding, acting, or supervising the outbreak. “We can mount a highly effective response to small and medium-size outbreaks, but when faced with an emergency of this scale, our current systems – national and international – simply have not coped,” stated WHO Director-General Margaret Chan, Deputy Director-General Anarfi Asamoah-Baah, and the organization’s regional directors in a joint statement on April 16, 2016.<sup>1</sup> But, of course, the earlier an infection is contained, the less likely it will spread from a small to a large problem. The WHO admitted it was ill prepared. “We have taken serious note of the criticisms that the initial WHO response was slow and insufficient, we were not aggressive in alerting the world . . . we did not work effectively in coordination with other partners, there were shortcomings in risk communications and there was confusion of roles and responsibilities”.<sup>2</sup> In contrast, the WHO led by a different administration in 2002–04 acted forcefully and correctly when faced with the outbreak and possible pandemic effect of SARS.<sup>3</sup>

The WHO was also defective in monitoring the Ebola outbreak. A critique by a group of 20 experts from the Harvard Global Health Institute and the London School of Hygiene and Tropical Medicine found that “The lack of capacity in Guinea to detect the virus for several months was a key failure, allowing Ebola eventually to spread to bordering Liberia and Sierra Leone, underscoring inadequate communication and arrangements between governments and the WHO to share, validate, and respond robustly to information on outbreak.”<sup>4</sup> Indeed, after Ebola was initially identified, it still spread through the capital cities of Guinea and Liberia, and within 2 months appeared in other major cities and their international airports. Without protocols in place for identification of Ebola, the virus rapidly spread. The *RT International* report of November 23, 2015 stated, “Without any approved drugs, vaccines or rapid diagnostic tests, health workers struggled to diagnose patients and provide effective care. Without sufficient protective gear, and initially without widespread understanding of the virus, hundreds of health workers themselves became ill and died.”<sup>4</sup>

In summary, early in the course of the Ebola infection, before its massive outbreak, Doctors Without Borders warned the WHO about

the potential threat. This evaluation, despite its highly qualified source, was originally disputed by the WHO. As a result, actions to fight the infection and arrange for humanitarian aid were delayed. Not until August 2014, a good 8 months after the initial Ebola cases emerged in Guinea, did the WHO begin to take action. The Harvard Global Health Institute's report called for greater accountability and transparency within all global health institutions and remarked that the WHO should respond to freedom of information requests.

In the West African countries, consistently poor health care and lack of adequate infrastructure were major factors in the increasing difficulty of addressing public health concerns and medical emergencies. By comparison, in Boston, at Peter Bent Brigham Hospital—part of Harvard's medical complex, more physicians worked on the second floor alone than in all of Liberia. Most of the healthcare staff in countries overrun with Ebola virus infections were not sufficiently trained to respond. They often lacked even the basic materials required for treatment and had insufficient knowledge or equipment to protect themselves from contamination. The exceptions in some areas included Kenema Government Hospital (KGH) in Sierra Leone and centers where Doctors Without Borders were located. For example, Dr. Mariano Lugli, a deputy director of operations for Doctors Without Borders, did respond to an early incidence of Ebola virus infection. Working in remote forests of Guinea during March, 2014, when the outbreak spread to Guinea's capital, Conakry, Lugli set up a healthcare receiving and treatment clinic. Although Lugli was met by a foreign medic and logistician sent by the UN health agency, he never saw or met a WHO official who was responsible for handling this escalation of the outbreak. Lugli elaborates, "In all the meetings I attended, even in Conakry, I never saw a representative of the WHO. The coordination role the WHO should be playing, we just didn't see it. I didn't see it the first three weeks and we didn't see it afterwards."<sup>5</sup>

Because so many patients and their healthcare providers had already died and those not yet infected feared the same fate, many hospitals were shut down and abandoned. Hundreds of patients remained waiting in front of nonfunctional hospitals in the hope of being admitted and treated. The WHO received extensive criticism for taking too long to provide and organize the flow of physicians, healthcare workers,

protective clothing, and even fluids. Without leadership by the WHO in pursuing outside governments and philanthropies to establish isolation centers, surveillance, and laboratory capacity in West Africa, the local governments turned school classrooms into holding centers for those suspected of carrying the viral disease. Even so, neither bedding nor basic medical equipment were available. For the most part this effort turned out to be useless.

In similar straits, Dr. Melvin Korkor, in charge of Phebe Hospital in Liberia, spoke of repeated delays in receiving much needed materials, none of which was available in the region. Many patients did not receive basic medications. Supplies of test tubes, gowns, and fluids were depleted. Medical staff lacked basic safety equipment and sterile latex gloves, without which their hands were unprotected while treating patients exposing these frontline health providers to the virus.<sup>6</sup> The end result was a high mortality rate among the care givers. Dr. Korkor considered himself “reborn” after surviving Ebola infection. The lack of doctors and trained medical workers in West Africa played a role in the spread of Ebola. Liberia has only one doctor for every 100,000 people, whereas Sierra Leone has two. In comparison, the United States has 245 doctors per 100,000 individuals. As hundreds of local doctors died in African communities, the Ebola outbreak escalated. Yet the WHO knew about the lack of health infrastructure in these countries, and one of their priorities should have been to plan support and enhancement of the healthcare network. Their responses should have been more vigorous.<sup>7</sup>

Failing to notify the global community about the rapid spread and danger of the Ebola outbreak was a major error. Ashish Jhna, director of the Harvard Global Health Institute, stated “People at WHO were aware that there was an outbreak that was getting out of control by Spring, and yet it took until August to declare a public health emergency.”<sup>8</sup> The Harvard Institute also accused the WHO of enabling “immense human suffering, fear, and chaos” as a result of their delayed response to the epidemic. A vivid example of poor management was the handling of early blood samples taken from infected patients to determine if they had Ebola. Some samples were shipped to laboratories where they were not examined immediately. Others sent to Paris, France, could not be tested at the recipient institution due to technical difficulties and had to be re-routed to Lyon, 250 miles away.

Thus, analysis of whether an individual was infected and should be quarantined was delayed, another administrative failure.

What was the reason for the problems encountered by WHO and for its delayed actions? According to the WHO, one major obstacle was their concerns about political opposition from West African leaders. Many were cautious about taking aid because they mistrusted the source, a reflection of past exploitation by the West. The WHO, instead of working vigorously to resolve this difficulty, providing education, and reinforcing communication, became politically correct. When they should have announced that a major infectious outbreak from a deadly virus would hurt these countries' economies, the WHO did nothing to improve those relationships. Sensitive cultural differences made the WHO leery of disrupting any country's governance without a consensus. Unfortunately, regional culture most often trumps science and reason. The WHO bowed primarily to political pressure rather than health concerns. Critics have said, and we concur, that the WHO should have understood that traditional and natural practices in the region stood in the way of effective mechanisms to contain the virus, and the WHO had a moral obligation to act as educators, to organize teachers, and to share scientific knowledge of what the outcome would be not only to political leaders of government but most importantly to local tribal leaders.

Inadequate funds and, when available at all, poorly used were part of the problem. The leader of Doctors Without Borders, Ebola response team, Christopher Stokes, said it was "ridiculous" that volunteers working for his charitable group were bearing the brunt of care in the most severely affected countries and that international efforts will not have any effect for more than a month.<sup>9</sup> As a defense for not arranging to provide sufficient funding to control Ebola's destruction, Director-General Margaret Chan of the WHO explained that the WHO is not an implementation agency for outbreak response:

*"First and foremost, people need to understand WHO. WHO is the UN specialized agency in health. And we are not the first responder. You know, the government has first priority to take care of their people and provide health care. WHO is a technical agency. So this is how we provide services. We are not like international National Government Organizations (NGOs), for example Doctors Without Borders, Red Cross, Red Crescent or local NGOs who are working on the ground to provide, you know, direct services".<sup>10</sup>*

However, the WHO has the pulpit on the world stage to organize international efforts. In this it was negligent. WHO should have been crisp in effective decisions to fight Ebola. It was not. It was wishy-washy, as its consensus-building approach and political correctness show. Instead, a bureaucracy that wishes to be admired and retained did not stir the pot by being decisive. We believe that the WHO should act aggressively once the science is known during potential major health disasters. They should be on the frontline to mobilize world support for control of such infectious diseases. Previously, they followed that kind of aggressive policy to combat the first 21st century pandemic, SARS, but that was at a different time and under different leadership.<sup>3</sup> A safe political bureaucracy should not be the game plan for setting up and funding the WHO.

Additional problems had hindered any effective response to Ebola. Bureaucracies of many countries blocked or delayed responses to the outbreaks by denying visas to scientists, doctors, and healthcare workers who tried to cross their borders to help the victims.

The World Bank, an international agency that provides loans to developing countries, also made errors during the Ebola outbreak. Predominant was its delayed response and poor cooperation with the WHO. The World Bank had opportunities early during the outbreak to meet the requests of scientists and government officials for finances to cover basic, necessary operations but chose to respond later. Oxfam, an international confederation of 18 NGOs working with partners in over 90 countries, criticized the World Bank for its failure to invest enough in the region's healthcare infrastructure. Jim Kim, president of the World Bank, admitted his institution's failures, "We should have done so many things. Healthcare systems should have been built. There should have been monitoring when the first cases were reported. There should have been an organized response."<sup>11</sup>

Many critics have pointed out that the delay in response to spreading Ebola virus infection was caused, in large part, by the lack of cooperation and disagreement between the WHO and World Bank on a plan of action. Kim admitted that failure and stated, "The most important thing is to stop arguing about what is or is not possible and to get on with doing what is needed."<sup>12</sup>

The African Development Bank played a large part in contributing funds to the beleaguered communities. This contribution was supported

by other NGOs, international organizations, and countries. In 2014, the African Development Bank provided a total of 223 million US dollars to Guinea, Liberia, and Sierra Leone. That bank additionally collaborated with the WHO to supply additional resources including medicines, equipment, and emergency training. In addition to the promised and paid contributions, the African Development Bank also established two new post-crisis operations to lessen and prevent the instability and chaos caused by the Ebola outbreak. These operations included the establishment of an African Centre for Disease Control, and a post-Ebola Livelihoods Restoration Project.<sup>13</sup>

An important goal of the UN is to provide humanitarian aid in times of famine and natural disasters. However, this time, the UN did not live up to its responsibilities. According to Doctors Without Borders, the UN had minimal impact on the epidemic regardless of their international pledges and deployments of staff. However, David Nabarro, a medical doctor who organized and led the UN mission to alleviate Ebola, disagreed “I am absolutely certain that when we look at the history, this effort that has been put in place will have been shown to have had an impact, though I will accept that we probably won’t see a reduction in the outbreak curve until the end of the year.”<sup>14</sup> All told, Doctors Without Borders was the front-line team in the fight against Ebola despite their frustration with the lack of support in terms of action and supplies they needed during the epidemic. That organization ran the majority of Ebola treatment facilities across the region, providing over 700 of the 1000 beds available. The UN was not the source of frontline defenders fighting the epidemic.

The international community of nations was also deficient in the humanitarian effort it should have supplied to West Africa. Many countries failed to commit needed medical or financial resources toward alleviating the outbreak. Large and wealthy countries such as China, Russia, and Saudi Arabia barely contributed anything. In contrast, a smaller country such as Cuba and a rich country such as Sweden participated in larger, prominent, and more effective ways. The majority of donations provided came from the United States, United Kingdom, and Germany. The United States funded over a third of the UN relief fund. Several banks and philanthropists were also active contributors.



The United States and United Kingdom provided the most support. Shamefully, responses from the rest of Europe and the European Union were limited and quite unsatisfactory. For example, France pledged \$89.7 million; \$44.85 million in direct bilateral aid and \$44.85 million to multilateral institutions, a meager contribution from its \$2.61 trillion economy. Northern European countries donated a significant amount more than Germany, which has one of the largest economies in Europe. Germany agreed to donate \$13.37 million, contributed to international aircraft and to building a field house with 300 beds in Guinea. The Netherlands contributed the most among its regional neighbors.<sup>15</sup> Canada generously pledged over \$100 million and sent supplies.

Although possessing a small economy, Cuba played a significant role in providing medical staff. Cuba sent substantial human resources in that more than 460 doctors and medical staff went to ease the crisis in West Africa. Other South American countries also donated: Brazil pledged \$450,000 to the WHO along with donating five supply kits, each of which can protect 500 workers from Ebola. Chile and Columbia have also donated funds.<sup>16</sup>

To better understand contributions and commitments of countries, it is critical to examine how much countries donated relative to their economy. That is donations by GDP.

Although the United States and United Kingdom have pledged the most funds among all countries, some smaller countries surprisingly pledged more money relative to their GDP. Along with the United Kingdom and United States, Canada as well as Australia and Japan stand out as having contributed the most relative to their economy. Other countries such as China, Russia, Italy, France, and Germany were poor donors, and why they were not more involved is unclear. The World Food Program (WFP), in particular, lashed out at Beijing's wealthy. "Where are the Chinese billionaires and their potential impact? Because this is the time that they could really have such a huge impact," said Brett Rierson, WFP representative in China.<sup>17</sup> Private donors as well as the government of China afforded only meager responses, considering that China is a major investor in Africa. Although it was in that nation's political interest to expand their influence and potential contacts among the African countries, the government and private sector in China contributed a total of only

\$8.3 million to the UN main Ebola relief fund (compared to more than \$200 million from the United States). Of that \$8.3 million, only \$4.89 million came from the Chinese government. However, China did expand its medical staff in Sierra Leone to 50 laboratory members and promised to contribute another \$34 million, but as of this writing has yet to fulfill that obligation. Beijing announced that it would donate up to \$4 million to the WHO.<sup>18</sup>

In addition to governments, some NGOs, multinational corporations, and other international organizations played a smaller than expected role during the Ebola crisis. However, other NGOs, specifically philanthropists and wealthy individual charities, made considerable funding available. Over 60 NGOs, foundations, and charities have provided much needed funding for equipment and supplies.<sup>19</sup> Among the major contributors were The Bill and Melinda Gates Foundation, Oxfam, Save the Children, Paul G Allen Family Foundation, Silicon Valley Community Foundation, and the Ikea Foundation.

Multinational corporations, also known as Corporate Enterprises, were slow to respond. During past natural disasters, multinational corporations responded far more quickly and generously. Many companies that rely on natural resources in West Africa offered little to no help. For example, the cocoa industry relies heavily on West Africa products. Seventy percent of the world's supply comes from this region. Large multinational corporations like Nestle, Mars Chocolate, and Hershey's have donated a meager \$700,000 to their Cocoa Foundation to support the effort against Ebola.<sup>20</sup>

In past natural disasters and global emergencies, the international community also responded far more magnanimously than recorded for the 2013–16 Ebola epidemic. Similarly, international organizations such as the WHO, World Bank, and UN appeared to do too little. At the end of the day, it seems that everyone insisted something should be done, but few took action. According to the internal WHO report, “Nearly everyone involved in the outbreak response failed to see some fairly plain writing on the wall. A perfect storm was brewing, ready to burst open in full force.”<sup>21</sup>

If all this went wrong, then how can the world community plan so this disaster does not happen again? Put another way, “Those who fail to learn from history, are doomed to repeat it.” Further, as

populations in West Africa increase and more humans breach the forest area, in all likelihood a new Ebola epidemic will occur. So a storm is brewing; if so, what recommendations are needed for preparations, devising a system for global warning, and implementing a response system? The stated purpose of the foregoing review is to contemplate the management of global health crises, and our suggestions follow.

First, better cooperation and communication among international agencies, governments, and NGOs are required. To accomplish this task, the development, commitment, and use of a single global institution with the responsibility for natural and environmental epidemics may be essential. Would it be more effective to create a new institution, rather than giving the authority to an existing global institution such as the CDC, WHO, or UN? Certainly these and other currently operational institutions can and have played important roles in the past. The best argument for a new institution is to generate one with a single focus. The current global institutions have multiple responsibilities and priorities. Creating a solely “nonpolitical” and lean institution whose primary goal is for the prevention and recovery of global and natural health disasters would eliminate the lengthy and bloated bureaucratic process so that action would be taken quickly and efficiently. One new institution currently being put in place to meet these responsibilities and could be up to the task is the Global Virus Network (GVN). GVN represent centers of excellence in medical virology. It's work is to understand, prevent, and eradicate viral disease threats to mankind. GVN or a similar type of focused institution might also have full authority over the distribution of raised assets and a reserve fund.

The last category brings us to the second recommendation, setting up an emergency fund. Acquiring a fund that already has pledged donations and resources would allow immediate action. A rapid action plan would impact future outbreaks of disease by quickly down-modulating their spread. This fund would be used for emergency preparation, recruitment, shipping, doctors and healthcare workers, as well as training populations in third-world areas where outbreaks are likely to occur. Also, necessary medicines and medical equipment should be stocked, stored safely, and available. Funds for research and facilities should be pre-arranged. One would have to gather international support and trust in creating a new global institution for this goal.<sup>22</sup> The

need is to convince the world's sources of wealth to fund an enterprise that manages epidemic-specific activities and to allocate part of their GDP to this effort. The world is getting smaller. Diseases like Ebola, Zika, yellow fever, and Lassa are more easily transported by air flight than ever before. Thus, the threats of these epidemics are today's reality not only in countries where outbreaks occur, but in all countries engaged in global trade.<sup>23</sup>

The third recommendation is the need to expand global investment toward international health and natural disasters. Sadly, only a few countries have met their commitments under the International Health Regulations created by the UN after the SARS outbreak. Realistically, the interests of many countries and institutions are best served by allocating assets toward elimination/control of epidemics despite the fact that they usually occur far from Western countries. The global community must recognize that these "exotic" African diseases readily arrive to distant shores of non-African countries carried by travelers incubating the infectious agent. This is not theoretical but actually occurred in the United States, United Kingdom, and elsewhere with the transport of Ebola, Lassa, and currently Zika viruses. Further, there is the possibility of spread of viruses like Ebola and Lassa by bioterrorism. In the past (1918–19) an influenza epidemic infected over 5% of the world's population and killed approximately 2% (over 50 million people).<sup>24</sup> The World Bank projected that the cost of inaction of a worldwide influenza epidemic would reduce global wealth by over \$3 trillion.<sup>25</sup>

A fourth issue is represented by the failure of Ebola containment. This was, in large part, due to the lack of a universal and robust disease surveillance system. Ideally, such surveillance systems would be part of a global public health network. The ability to perform in-depth, rapid sequencing to identify the virus in question in hours or at least a day is now available. This sequencing of individual blood samples during ongoing epidemics is now possible even in remote areas, where the majority of outbreaks occur.<sup>26</sup> Surveillance helps increase effective communication among global institutions, countries, and citizens and would greatly decrease the impact of any epidemic.

In the past, self-serving politics and flawed policies were the cause of delays that killed thousands; therefore, the fifth issue of reforms in global health care is to avoid bureaucratic issues that prevent the

speedy and worldwide release of data that forecast epidemics. The essential mandate is that, once data are obtained and verified, they are released immediately, not withheld for personal gain or credit or by countries wishing to mislead travelers and businesses.

The fifth recommendation in this world health plan is that essential investments should be made to train teams of doctors, medical staff, healthcare workers, and researchers. During the 2013–16 Ebola outbreak there was an enormous demand for doctors, nurses, and medical staff that was never met. Training in global health should be a component of infectious disease training not only in Ebola-susceptible countries but also in the medical schools and residencies of European, American, Canadian, South American, and Asian countries. The West African countries where Ebola infection prevailed still lack doctors. The dearth of basic equipment in Ebola-afflicted West Africa contributed to the large number of deaths and unsafe medical practices among healthcare workers. In addition, protective equipment—uniforms, gloves, and headgear—should always be available. Having trained individuals would speed up the control process and limit the spread of the infecting agent. During the 2013–16 Ebola outbreak, medical volunteers did not step forward in force to help until 2–3 months after the Ebola outbreak. An enhanced medical team could have prevented escalation of the epidemic. The Bill and Melinda Gates Foundation suggests, “We need to invest in better disease-surveillance and laboratory-testing capacity, for normal situations and for epidemics. Routine surveillance systems should be designed in such a way that they can detect early signs of an outbreak beyond their sentinel sites and be quickly scaled up during epidemics...and the data derived from such testing need to be made public immediately. Many laboratories in developing countries have been financed by the polio-eradication campaign, so we will have to determine what capacities will be needed once that campaign is over.”<sup>23</sup>

Finally, an improved education plan is an absolute requirement. Public understanding of how a virus spreads, the value of quarantine, and basic public health measures could stop the spread of an ongoing epidemic. An important lesson taught by the 2013–16 Ebola outbreak is that the susceptible populations must be educated in what and why public health measures are needed. The local heads of countries, districts, and most importantly village leaders, must understand how the disease travels, so that they can lead and guide their population in

turn. Surveillance in all areas including rural sites should be unrelenting along with acceptance of quarantines, appropriate treatments, and safe burial practices. Along with these recommendations, courage, grit, and prayer should provide the format and strength to complete the goals of successful medical control of future epidemics.

Lastly, what have we learned from the Ebola outbreak in West Africa 2013–16? The science and the underlying advances, management successes, along with the cultural and bureaucratic difficulties and failures come clear. But more than that, the numerous tales of humanity, the human story of native and foreign influx of healthcare workers, the role of KGH staff, Drs. Khan, Sabeti, and Garry, Doctors Without Borders, CDC, missionary hospitals as well as volunteers to fight the epidemic and care for the ill stand out front. Their stories reaffirm that all people are connected to other people and dependent on other people. These events in West Africa in 2013–16 resonate with lines written over 390 years ago by the English poet John Donne in his *Devotions upon Emergent Occasions*

*No man is an island,  
Entire of itself.  
Each is a piece of the continent,  
A part of the main.  
If a clod be washed away by the sea,  
Europe is the less.  
As well as if a promontory were.  
As well as if a manor of thine own  
Or of thine friend's were.  
Each man's death diminishes me,  
For I am involved in mankind.  
Therefore, send not to know  
For whom the bell tolls,  
It tolls for thee.*

*John Donne*

## REFERENCES

1. McSpadden, Kevin. WHO acknowledges failings of Ebola response. *Time*; 20 April 2015 [Web. 21.06.16].
2. World Health Organization admits it failed in handling Ebola. *NY Daily News* <<http://www.nydailynews.com/life-style/health/world-health-organization-admits-failed-handling-ebola-article-1.2191334>>; April 20, 2015 [accessed 21.06.16].
3. Oldstone MBA. *Severe acute respiratory syndrome (SARS): the first pandemic of the 21st century. Viruses, plagues, & history*. NY: Oxford University Press; 2010.

4. WHO 'failed to Alert' Global Community about Ebola Outbreak Allowing Virus to Spread Further – Panel. *RT International* <<https://www.rt.com/news/323113-ebola-outbreak-who-failure/>>; November 23, 2015 [accessed 21.06.16].
5. Goldberg, Eleanor. Ebola aid workers shocked by WHO's 'amateurism' in response to outbreak. *The Huffington Post* <[http://www.huffingtonpost.com/2014/10/06/who-poor-response-ebola\\_n\\_5933866.html](http://www.huffingtonpost.com/2014/10/06/who-poor-response-ebola_n_5933866.html)>; October 5, 2014 [accessed 21.06.16].
6. Hinshaw, Drew. Ebola virus: for want of gloves, doctors die. *WSJ* <<http://www.wsj.com/articles/ebola-doctors-with-no-rubber-gloves-1408142137>>; August 16, 2014 [accessed 21.06.16].
7. Duff, Michael. Ebola takes big toll on already poor health care. <<http://www.redding.com/news/ebola-takes-big-toll-on-already-poor-health-care-ep-585823658-362256141.html>>; August 30, 2014 [accessed 21.06.16].
8. Colen BD. An indictment of Ebola response. *Harvard Gazette* <<http://news.harvard.edu/gazette/story/2015/11/an-indictment-of-ebola-response/>>; November 22, 2015 [accessed 21.06.2016].
9. Ebola crisis: no impact from pledges of help, MSF Says. *BBC News* <<http://www.bbc.com/news/world-africa-29656417>>; October 17, 2014 [accessed 21.06.16].
10. Fink, Sheri. W.H.O. leader describes the agency's Ebola operations. *The New York Times* <<http://www.nytimes.com/2014/09/04/world/africa/who-leader-describes-the-agencys-ebola-operations.html>>; September 4, 2014 [accessed 21.06.16].
11. Elliott, Larry. Ebola crisis: global response has 'failed miserably', says World Bank Chief. *The Guardian* <<http://www.theguardian.com/world/2014/oct/08/ebola-crisis-world-bank-president-jim-kim-failure>>; October 9, 2014 [accessed 21.06.16].
12. Global 'failure' to grip Ebola crisis criticised by World Bank President | World News |. *NNWnet National News Wire* <<http://nnw.net/global-failure-to-grip-ebola-crisis-criticised-by-world-bank-president-world-news/>>; October 08, 2014 [accessed 21.06.16].
13. *Ebola*. African Development Bank Group <<http://www.afdb.org/en/topics-and-sectors/topics/ebola/>>; 2006 [accessed 21.06.16].
14. Ebola crisis: UN Envoy rejects criticism of agency's response. *BBC News* <<http://www.bbc.com/news/world-africa-29672179>>; October 18, 2014 [accessed 21.06.16].
15. *Action taken by the Netherlands and the International Community to tackle Ebola*. Information from the Government of The Netherlands <<https://www.government.nl/topics/ebola/contents/action-taken-by-the-netherlands-and-the-international-community-to-tackle-ebola>> [accessed 21.06.16].
16. Szklarz, Eduardo. Latin American health officials prepare to fight Ebola. *Diálogo* <[http://dialogo-americas.com/en\\_GB/articles/rmisa/features/2014/10/16/feature-01?source = most\\_viewed](http://dialogo-americas.com/en_GB/articles/rmisa/features/2014/10/16/feature-01?source = most_viewed)>; October 16, 2014 [accessed 21.06.16].
17. Rajagopalan, Megha. China's companies, billionaires must step up to fight Ebola: WFP. *Business Insider* <<http://www.businessinsider.com/r-chinas-companies-billionaires-must-step-up-to-fight-ebola-wfp-2014-10>>; October 20, 2014 [accessed 21.06.16].
18. Sanchez, Raf. What countries have pledged to fight Ebola... and how much they've paid into the fund. *The Telegraph* <<http://www.telegraph.co.uk/news/worldnews/ebola/11179135/What-countries-have-pledged-to-fight-Ebola...-and-how-much-theyve-paid-into-the-fund.html>>; October 22, 2014 [accessed 21.06.16].
19. *Non-Governmental Organizations responding to Ebola*. USAID Center for International Disaster Information CIDI <[http://www.cidi.org/ebola-ngos/#.V0yr\\_4-cGrM](http://www.cidi.org/ebola-ngos/#.V0yr_4-cGrM)>; 2015 [accessed 21.06.16].
20. Rooney, Ben. UN asks \$1 billion for Ebola, gets \$14 million so far. *CNNMoney* <<http://money.cnn.com/2014/10/17/news/un-ebola-funding/index.html>>; October 21, 2014 [accessed 21.06.16].

21. Cheng, Maria. Ebola outbreak: WHO admits it botched early attempt to stop disease. *CBC News* <<http://www.cbc.ca/news/world/ebola-outbreak-who-admits-it-botched-early-attempt-to-stop-disease-1.2802432>>; October 17, 2014 [accessed 21.06.16].
22. Rull, Monica, Ilona Kickbusch, and Helen Lauer. *International Development Policy Revue Internationale De Politique De Développement*. Policy Debate <<https://poldev.revues.org/2178#tocto2n3>>; June 2, 2015 [accessed 21.06.16].
23. Gates Bill. The Next Epidemic Lessons from Ebola—NEJM. *New Engl J Med* 2015. [accessed 21.06.16] <<http://www.nejm.org/doi/full/10.1056/NEJMp1502918>>.
24. Oldstone MBA. *Viruses, plagues, & history*. New York, NY: Oxford University Press; 2010.
25. The World Bank. *Pandemic risk and one health* <<http://www.worldbank.org/en/topic/health/brief/pandemic-risk-one-health>>; October 23, 2013.
26. Holmer Edward, Dudas Gytis, Rambaut Andrew, Andersen Kristian. The evolution of Ebola virus: Insights from the 2013–2016 epidemic. *Nat Rev* 2016;**538**:193–200.

## FURTHER READING

Sanchez, Raf. What countries have pledged to fight Ebola. . . and how much they've paid into the fund. *The Telegraph* <<http://www.telegraph.co.uk/news/worldnews/ebola/11179135/What-countries-have-pledged-to-fight-Ebola...-and-how-much-theyve-paid-into-the-fund.html>>; October 22, 2014 [accessed 21.06.16].