

Lessons from Ebola

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After more than 11,000 deaths, according to the WHO, and about 30,000 infected people in West Africa, the spread of the Ebola virus has finally decreased since the summer of 2015. Why did it take so much time and loss of human lives before this last Ebola epidemic in West Africa was contained? Beyond the impact on human lives, we can see that it is a whole health, social and economic system that has been struck by such epidemics. Are we condemned to put up with them or can we contain these epidemics, which disregard borders between species and territories?

Looking Back at a Global Threat

Almost two years ago, on March 21st 2014, as we gathered for the annual steering committee of the Jean Mérieux-Inserm P4¹ Laboratory of Lyon, we received confirmation, thanks to the identification by Dr. Sylvain Baize from the Pasteur-Inserm team, that we were facing a new Ebola epidemic. The suspected samples came from the Forest region of Guinea and were brought by Médecins sans Frontières (MSF) teams in agreement with the Guinean crisis cell led by Dr. Aboubacar Sidiki Diakité².

Even if the World Health Organization (WHO) wasted no time in declaring the new epidemic on March 25th, most experts agreed that it wouldn't entail more than 500 cases, as with the 20 or so outbreaks over the past 40 years³. Despite repeated calls from MSF, on the front lines of this fight, it took until September 18th and resolution 2177⁴ from the UN Security Council for the international community to become truly mobilised to confront the "global threat" constituted by the Ebola virus. The international response to the United Nations call was substantial from September onwards, with the deployment of 3,000 U.S. troops to Liberia to establish several mobile hospitals, 150 million euros of financial backing from the European Union, the creation of treatment and training centers, including the Medical Staff Treatment Center in Guinea, supported by France, and the contribution of many other countries such as the United Kingdom, Brazil and China.

¹ For the "biosafety level 4 pathogens", i.e. viruses inducing hemorrhagic fevers (such as Ebola) or highly infectious diseases, with a strong death rate (such as smallpox). The Jean Mérieux-Inserm P4 Laboratory is the only civil BSL4 laboratory in France [editor's note].

² Read in this edition the article by Aboubacar Sidiki Diakité.

³ "Everyone (including the humble author of this text) predicted that, like the 20 some epidemics since 1976, which never surpassed 500 cases, the situation would settle down rapidly. Indeed, in May, the incidence rate had fallen...before skyrocketing!": Olivier Bouchaud, « Ebola 2014-2015 : le prix à payer d'un fiasco à tous les étages », *La lettre de l'Infectiologue*, Vol. XXIX, n°5, September-October 2014, p. 1161.

⁴ The main goals were to limit the virus's propagation, ensure core basic services, care for the sick, prevent the disease and help preserve stability.

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Even if there are many infectious diseases⁵ that cause more deaths each year than Ebola, humankind has not had to face since a long time ago an infectious agent causing such a high rate of mortality: up to 80 %⁶. This Ebola crisis resulted in a significant loss of medical staff, working on the front lines with infected patients, without any vaccine available and often without proper protective equipment⁷. The lack of preparedness and the weakness of the health systems had a considerable impact on the African populations that were affected. Many families lost a member and became economically vulnerable. The epidemic's human losses were tied to important economic losses due to hindrances in terms of transportation and the circulation of goods. As early as April 2014, "Action contre la Faim" (ACF) had to reinforce its interventions in the area of food security to face the risk of nutritional insecurity⁸. Medical staff suffering heavy losses from the virus and giving priority to the epidemic were not able to care for patients with other diseases. Ebola made the interactions between the medical staff and patients more complex since direct contact with patients was impossible, medical staff had to reduce exams to the strict minimum and systematically wear protective suits. As highlighted by ACF, the epidemic had an impact on the fight against malnutrition: "The Children are no longer measured or weighed, only the brachial measure (MUAC [Mid-Upper Arm Circumference]) and the appetite test are still performed"⁹. Although rehydration is very important for patients suffering from Ebola, a shortage of rehydration kits, essential for treating children with diarrhea¹⁰, was witnessed. The same secondary negative consequences of Ebola were observed for patients suffering from HIV, malaria or for infant vaccinations, with an interruption in care. Had health centers equipped with trained personnel been available in the spring of 2014, thousands of lives would have been spared and the virus would not have encountered as many available hosts. Indeed, the drop in Ebola virus transmission in West Africa, confirmed since the summer of 2015, is mainly due to the capacity to detect and isolate infected patients and to safe burial practices for the virus' victims¹¹.

Triple Crisis

Ebola is a health crisis that rapidly transformed into a humanitarian and economic crisis. Beyond the medical and scientific aspects, the social and anthropological dimension of an epidemic is far too often neglected, when an appropriate approach respecting the cultural context is needed. Due to the cross-cutting stakes, experts are obliged to pool their knowledge to design a response that is better adapted and supported by the local community and political leaders. If international attention has been justifiably focused on the absence of a vaccine and treatment, this should not overshadow the weakness of health systems and the importance of strengthening them. Health is a public good too often neglected by national and international leaders: it should become a priority for African policies if we wish to have the capacity to contain epidemics like Ebola and pandemics like AIDS.

MSF's action was particularly remarkable and substantial, due to flaws in the health systems of the three West African countries that were affected. Taking ownership of diagnosis and treatment

⁵ According to WHO, winter flu kills on average 300 to 500,000 people every year.

⁶ The Ebola virus identified in 1976 is characterized by a strong mortality rate, up to 90% in the past epidemic outbreaks. The mortality rate is the ratio between the number of people infected and the number of deaths. The mortality rate of the Ebola Makena outbreak (2014), similar to Ebola Zaire, is estimated at 60 to 70%. The Ebola virus belongs to the Filovirus family that includes the most dangerous viruses such as Marburg or the Lhasa Fever virus.

⁷ Dr. Christophe Peyrefitte's Report after his mission in Guinea in September 2014 to establish an inventory of the capacities of clinical biology laboratories. Source: RESAOLAB 2014.

⁸ www.actioncontrelafaim.org

⁹ Statement of Julie Calafat, ACF Program Coordinator in Liberia, November, 27, 2014, ACF website.

¹⁰ According to WHO, diarrhea kills each year throughout the world over 760,000 children.

<http://www.who.int/mediacentre/factsheets/fs330/en/>

¹¹ Interview of Sylvain Baize by Benoît Miribel at the Pasteur Institute in Wuhan (China) on January, 31, 2015.

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capacities is a major issue that depends on strong political will of Health ministries and on a long-term partnership to increase the level of skills and equipment. As an example, RESAOLAB¹² – the West African network of medical biology laboratories launched in 2009 in Mali, Senegal and Burkina-Faso, which now covers seven countries in the sub-region, including Guinea – showed that countries that invested in a good clinical biology network were able to fight against an epidemic's spread. This program is one of a few actions, engaging multiple partners from the public and private sectors, supported by the “Agence française de développement” (AFD), which must be encouraged and developed through local appropriation.

After Ebola

Overall, France has so far invested more than 200 million euros, with several hundred people involved in the “Ebola task force” and the implementation of numerous field projects. Inserm engaged in several major clinical and operational research projects, evaluating the efficacy of a treatment, favipiravir (alone or combined), participating in several vaccine trials in partnership with the European Commission and the British National Institute of Health (NIH), and establishing a cohort of survivors to be monitored. Research programs in human and social sciences, that were essential because of the utmost importance of social impact in this epidemic, were also launched. A Pasteur Institute will be created in Conakry. The Pasteur Institutes in Paris and Dakar played a major role in the molecular identification of the Ebola virus and its phylogenetic analysis, as well as in the virological diagnosis of patients.

A specificity of the French response is the integration of health relief activities and operational research. This was made possible through a close and novel collaboration between researchers and NGOs (Alima, MSF, French Red Cross, Waha, Solthis...). This NGO-researcher partnership model will be a fundamental part of the emergency research response that will be developed for the future, in particular for the REACTing (Aviesan) and the GloPID-R (Aviesan – Mérieux Foundation – European Commission) initiatives.

In the medium-term, the Ebola task force has contributed to setting up three major post-Ebola projects with the AFD and Expertise France and a number of NGOs: PREPARE – establishing regional response teams when suspected cases occur; RIPOST – the West African network of surveillance and alert, which is supported by the public health structures of participating countries, in partnership with the WHO – and a project for hospital hygiene and security.

However world health governance may evolve, without local action to establish genuine health systems, there will not be sufficient impact to effectively combat epidemics and, more globally, infectious diseases. The issue of the responsibility of governments and ministries that are confronted with public health challenges must be closely examined so that political leaders have incentive and are encouraged to take measures to protect the populations under their responsibility. The health risk of countries lacking health systems is also of concern for developed countries since they can be at any time exposed to emerging or re-emerging pathogens. The creation of an African surveillance and alert network will be key for future epidemics.

Translated from the French by Renny Ngo, revised by Koren Wolman-Tardy

¹² RESAOLAB: Réseau d'Afrique de l'Ouest des laboratoires d'analyses biologiques

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Biographies

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