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Ebola Virus Epidemic in West Africa: Global Health Economic Challenges, Lessons Learned, and Policy Recommendations

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ABSTRACT

The Ebola virus has spread across several Western Africa countries, adding a significant financial burden to their health systems and economies. In this article the experience with Ebola is reviewed, and economic challenges and policy recommendations are discussed to help curb the impact of other diseases in the future. The West African Ebola virus disease epidemic started in resource-constrained settings and caused thousands of fatalities during the last epidemic. Nevertheless, given population mobility, international travel, and an increasingly globalized economy, it has the potential to re-occur and evolve into a global pandemic. Struggling health systems in West African countries hinder the ability to reduce the causes and effects of the Ebola epidemic. The lessons learned include the need for strengthening health systems, mainly primary care systems, expedited access to treatments and vaccines to treat the Ebola virus disease, guidance on safety, efficacy, and regulatory standards for such treatments, and ensuring that research and development efforts

are directed toward existing needs. Other lessons include adopting policies that allow for better flow of relief, averting the adverse impact of strong quarantine policy that includes exaggerating the aversion behavior by alarming trade and business partners providing financial support to strengthen growth in the affected fragile economies by the Ebola outbreak. Curbing the impact of future Ebola epidemics, or comparable diseases, requires increased long-term investments in health system strengthening, better collaboration between different international organizations, more funding for research and development efforts aimed at developing vaccines and treatments, and tools to detect, treat, and prevent future epidemics.

Keywords: Ebola, health economic challenges, lessons learned, policy, recommendations.

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Introduction

The Ebola virus disease (EVD) has spread across several West African countries, adding a significant medical and financial burden to their health systems and economies. The virus has the potential to spread, and efforts to halt its progression are challenged by already struggling economies and health care systems. The EVD epidemic started in resource-constrained settings and caused thousands of fatalities. Nevertheless, given population mobility, international travel, and an increasingly globalized economy, the recent EVD epidemic has the potential to re-occur and evolve into a global pandemic [1]. Struggling health systems in West African countries pose a significant challenge to contain future EVD epidemics and to reduce their causes and effects.

Human outbreaks are usually initiated through direct human contact with an infected animal, and subsequent human-human transmission is then triggered by direct contact with bodily fluids of infected patients. During the recent EVD epidemic there were more than 20,000 confirmed, probable, and suspected cases of EVD in Guinea, Liberia and Sierra Leone (Table 1), with at least more than 8,000 deaths (deaths are under-reported) [2]. Keeping track of Ebola in West Africa is particularly challenging, given that so many patients either never visit a health facility or are turned away because of overcrowding. Stigmatization also prevents many patients from coming forward when they experience symptoms [3].

The clinical management of EVD encompasses the identification and isolation of suspected cases, laboratory confirmation of EVD, supportive management of presenting signs and symptoms,

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Table 1 – The number of cases per country during the period March 2014–November 2014 [2,4].

Country	Cases	Deaths
Guinea	2164	1327
Liberia	7635	3145
Sierra Leone	7312	1583
Nigeria	20	8
Spain	1	0
United States	4	1
Senegal	1	0
Mali	8	6

psychosocial support for patients who recover, and safe burial for those who succumb to the disease [4]. We examine the response to the latest EVD outbreak in West Africa, identify direct and indirect treatment costs to treat the patient from a public health system perspective, present key economic challenges and lessons learned, and highlight policy recommendations to further assist an already stretched health system in Africa. There were institutional failures of some international organizations that had grave consequences for global health in Sri Lanka in 2009, Haiti in 2010, South Sudan in 2013, and the multidrug-resistant tuberculosis response in Papua New Guinea at present [5,6]. It is important to reconsider how the global health architecture should be reshaped to allow for greater assurance of global health and to prevent future health crises.

Health Economic Challenges with Treatment Aspects

The clinical management of EVD consists of supportive treatment and includes oral rehydration salts and intravenous fluids for dehydration, potassium, anti-emetics, and parenteral antibiotics for bacterial infections or co-morbidities such as malaria [7–9]. Managing EVD requires a multidisciplinary team including doctors, nurses, hygienists, laboratory technologists, psychologists, and other support staff, many of whom are exposed to EVD through clinical or laboratory handling of patient fluids, blood, vomitus, urine, and stool. Prevention and control elements must be integrated into a system with facilities for barrier nursing and work organization, water and sanitation, hand hygiene infrastructure, waste management, and ventilation. Given that no treatment or vaccine is available, awareness and protective measures are the most effective approaches to curtail human infection and death [10].

In the United States, treatment costs have been reported to be as high as \$500,000 per patient treated [8]. These estimates include staff costs, ward isolation costs, and the opportunity costs from emptying other beds in the unit. Ebola treatment units (ETUs) in West Africa are very different in terms of access to resources and health worker staffing per patient. A 92-bed ETU in Sierra Leone was reported to have cost the UK government £2 million. There are no published data on the costs of treatment in the West African countries in which the toll of the outbreak was the greatest. Nevertheless, there are various costs that need to be considered, such as 1) infrastructure costs for establishing ETUs as well as smaller community care centers for isolation and management of patients, 2) ambulance costs for identifying patients within the community and taking them to hospital, 3) costs of training health workers, 4) costs of personal protective equipment, 5) costs of laboratory tests to diagnose EVD as well as other supportive laboratory tests, 6) costs of administering treatments and meals in the ETU, 7) costs of disinfectants and sanitation and the costs of facilities for burials, 8) costs of social,

psychological, and economic support that may be required after discharge of the patient, and 9) personnel costs.

Personnel costs are challenging to estimate. ETU teams often comprise a mix of local and international health workers funded by nonprofit organizations, international organizations, and national agencies that use different allowance rates, insurance plans, and compensation scales. A shortage of health workers and the use of occlusive personal protective equipment suits in tropical settings combine to limit the amount of time health workers can interact with an individual patient. In one report, patients may have less than 5 minutes of contact with physicians per day for assessment of needs to establish a care plan [11].

Several factors have a role in the deterioration of the affected countries' economies, high costs of treatment and virus control measures, loss of productivity of those infected, and behaviors related to concerns about infection that may result in the prevention of labor movement and supply of goods. A study estimated that the future productivity loss due to EVD-related mortality was \$156 million, with 27.86% attributable to Guinea, 34.84% to Liberia, and 36.96% to Sierra Leone [12]. A World Bank study analyzed the economic impact of the EVD outbreak in the three worst-affected countries—Guinea, Liberia, and Sierra Leone. The analysis shows that the short-term impact on gross domestic product will reduce growth in Guinea from 4.5% to 2.4%, in Liberia from 5.9% to 2.5%, and in Sierra Leone from 11.3% to 8% [13]. This reduction in growth represents approximately \$359 million in 2014 prices [13].

The World Bank analysis also estimated the medium-term impact of EVD—a “low Ebola” scenario that assumed a rapid containment in Guinea, Liberia, and Sierra Leone and a “high Ebola” scenario based on the upper ranges of epidemiological estimates. The low Ebola scenario estimated a medium-term impact on gross domestic product of 1% in Guinea, 4.2% in Liberia, and 1.2% in Sierra Leone, corresponding to \$97 million, whereas the high Ebola scenario estimated growth reduction of approximately \$809 million in the three countries alone (Table 2) [14]. The outbreak had less significant economic impact in Nigeria and Senegal, which may be related to their stronger health systems and ability to contain EVD or to the ability of larger economies to withstand economic shocks [15].

Lessons Learned

There are five lessons that have been learned from the Ebola outbreak. The first is the critical need to strengthen health systems overall, with a particular focus on low-income countries where infectious diseases spread easily. Weak health systems, health worker shortages, lack of appropriate equipment, limited knowledge and training, and inadequate information-sharing systems facilitated the EVD epidemic. Health systems and regional economies are interdependent, and models suggest significant future risk of mortality at a country level and among neighboring countries [16]. Second, mobilization and capacity strengthening toward control and prevention efforts against EVD should be developed at state, regional, and international levels. In the World Health Organization (WHO) Strategic Action Plan, collaborative mechanisms relating to communication, public relations, social mobilization, field, and cross-border coordination are being strengthened in the affected countries. Similar steps are being extended to countries at risk [17,18]. Such support takes the form of activating and testing preparedness plans, active surveillance, and strengthening laboratory diagnostic capacity, case management, infection prevention, and control capabilities.

Third, international collaboration should be led by several organizations and at different levels to facilitate policy

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