

The Realities Of Epidemic Control In Developing Economies: Prospects, Challenges And Sustainable Solutions

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ABSTRACT

This paper focused on the realities of epidemic control in developing economies: prospects, challenges, and sustainable solutions. The report disclosed how developing economies have managed epidemics, controlled disease outbreaks, tackled challenges, and proffered sustainable solutions to the challenges. The paper also discussed controlled measures such as anticipation of new and re-emerging diseases to facilitate faster detection and response; followed by early detection of emergency in animal and human populations; containment of the disease at the early stages of transmission; followed by the control and mitigation of the epidemic during its amplification; and the elimination of the risk of outbreak or eradication of the infectious diseases.

KEYWORDS: Developing economies, Epidemic control, Sustainable solutions.

INTRODUCTION

The world has faced many epidemics in time past. Yet many more infectious diseases are still surfacing in the world and causing great havoc. Some diseases are resurfacing while others are new ones or new strain of previous outbreaks. Some commonly faced epidemics are cholera, smallpox, yellow fever, Ebola virus, meningitis, monkey pox, Nipah virus, Zika virus, and Lassa fever etc. According to Fan, Jamison and Summers (2018) the most crucial aspect of an epidemic is, and will always remain, human suffering and the loss of lives. A number of studies focusing on the impact of epidemics found that these infectious diseases not only affect lives but cut across the economy of nations. The United States General Accounting Office (2001) disclosed that epidemics can be a substantial obstacle to economic and social advancement in developing countries, where the great majority of cases of such diseases occur. This is also agreed by Fan, et al., (2018) which asserted that the spread of a virus have significant important economic implications.

According to Bloom, Cadarette and Sevilla (2018) despite significant medical progress over the last centuries, infectious diseases still represent significant threats to modern societies. While some have been controlled successfully and are only found within a few geographical areas (endemics), others still have the ability to spread quickly from an initially limited outbreak, becoming epidemics or pandemics (Bloom et al., 2018). Epidemic control can be said to be reducing incidence, prevalence, or mortality to a locally acceptable level through effective interventions. When the causative organism, its source and route of transmission are known it will probably be easy to explain why the epidemic occurred. Control measures depend on the individual disease concerned.

Developing economies face more challenges in controlling and managing epidemics due to low per capita income and low gross domestic product (GDP). Developing economies are characterised with lower standard of living and less development of industries than other developed countries. At a microeconomic level, several studies found that poor health management have negative effects on economic prosperity and living conditions (Strauss & Thomas 2007). Several authors have considered that communicable diseases, among others, had contributed to slow down economic development of low-income countries. The latter

proposition is still hotly debated as some methodological issues are not satisfactorily addressed (Packard, 2009).

CONCEPTS CLARIFICATION

The early years of the 21st century have already been deeply scarred by so many major epidemics (World Health Organisation WHO, 2018). Take plague, one of the most ancient scourges. A thing of the past? By no means. A major outbreak in Madagascar in 2017 led to a total of at least 2,417 confirmed, probable and suspected cases, including 209 deaths. Most cases were of the more fatal pneumonic type which is also transmissible from person to person, but there were also several hundred cases of bubonic plague. Nine countries and territories with trade and travel links to Madagascar were put on plague preparedness alert (World Health Organisation WHO, 2018).

The lesson here is that, over time, diseases very rarely disappear. And there always seems to be room for new ones.

SARS – severe acute respiratory syndrome - was unheard of before 2003. But it affected more than 8,000 people, killing about one in ten of them, causing fear and panic across the world, and inflicting enormous economic damage, especially in Asian countries. In 2009, a novel influenza virus, H1N1, started to spread, creating the first influenza pandemic of the 21st century. But – and this is a reason for cautious hope - it was not as severe as expected thanks to recent preparedness efforts. The importance of these efforts is a core issue in this handbook.

In 2012-2013, a new virus surfaced in the Middle East, causing an epidemic of what became MERS – Middle East respiratory syndrome – that spreads fatally into many countries beyond that region.

The Ebola epidemic in West Africa (Guinea, Liberia, and Sierra Leone) in 2014 was unlike the previous 24 localized outbreaks observed since 1976. Instead of being restricted geographically, this one seriously affected three African countries and spread to six other countries in three continents, and sparked alarm worldwide. In 2015, the Zika virus, transmitted by the *Aedes Aegypti* mosquito, triggered a wave of microcephaly in Brazil. This disease causes dreadful damage in the brains of unborn babies. Almost 70 countries, one after another, then experienced their own Zika epidemic. There are probably many more to come, because most of the global intertropical zone has a high density of *Aedes Aegypti* that transports the disease.

And so a clear pattern continues to take shape. Old diseases – Cholera, Plague, Yellow fever among them – often return, and new ones invariably arrive to join them. About 40 outbreaks of cholera alone are reported to WHO every year (World Health Organisation WHO, 2018).

A whole-of-society approach is needed to tackle 21st century epidemics so that all the diverse disease drivers are taken into consideration: genetics and biological factors, ecology and the physical environment; human behaviour and demographics; social, political, and economic factors, and so on. This increasing convergence of many factors that drive and amplify outbreaks requires multidisciplinary, multi-sectorial and multi-faceted approaches.

Moreover, because epidemics are social problems as much as medical ones, we need to move beyond the traditional biomedical approaches to them. Social sciences should be an integral part of surge capacities adding anthropologists to the team of first responders. Such a change enables issues of fear and trust to be addressed within the social context. Engaging communities and empowering them in advance as part of preparedness ensures that there is a better understanding of the human ecology. This will link community and biomedical perspectives for enhancing effective partnerships, ensuring that pre-existing relationships are built to respond to epidemics. Because new infectious disease threats usually start locally, it is important to understand their dynamics in order to deny them the opportunity to spread further among people and overwhelm health systems. The dynamics of epidemic and pandemic diseases typically occur in four phases, although not all epidemic diseases necessarily go through each phase.

The first phase is the introduction or emergence in a community. The second phase is an outbreak with localized transmission, where sporadic infections with the pathogen occur. In the third phase, the outbreak amplifies into an epidemic or pandemic - the pathogen is able to transmit from human to human and causes a sustained outbreak in the community, threatening to spread beyond it. The fourth phase is reduced transmission when human-to-human transmission of the pathogen decreases, owing to acquired population immunity or effective interventions to control the disease. These four phases are illustrated as shown in Figure 1.

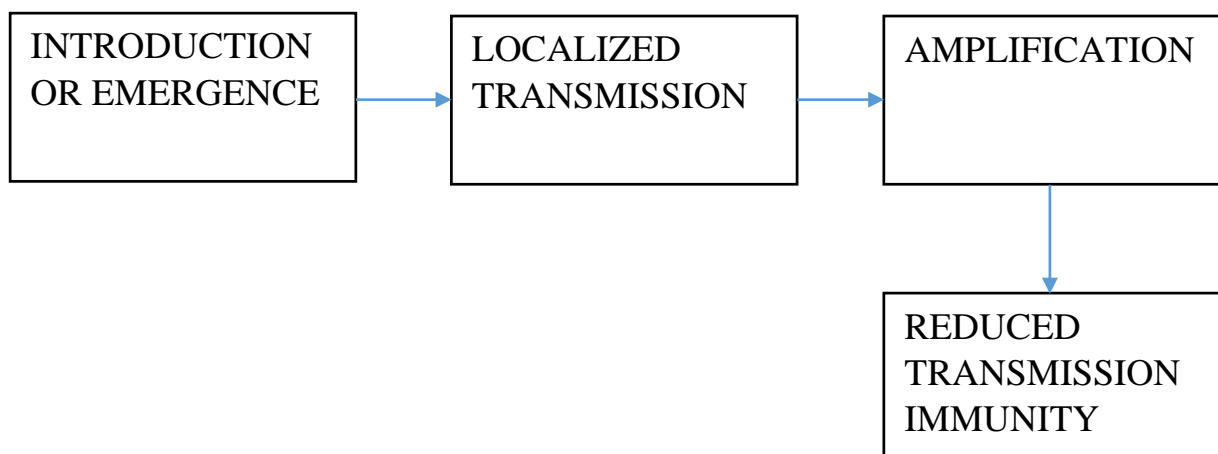


Figure 1. Epidemic phases

The dynamics of epidemics, as described above, define the response and the sequence of interventions that then become necessary. There are five crucial stages of epidemic response as shown in Figure 2.

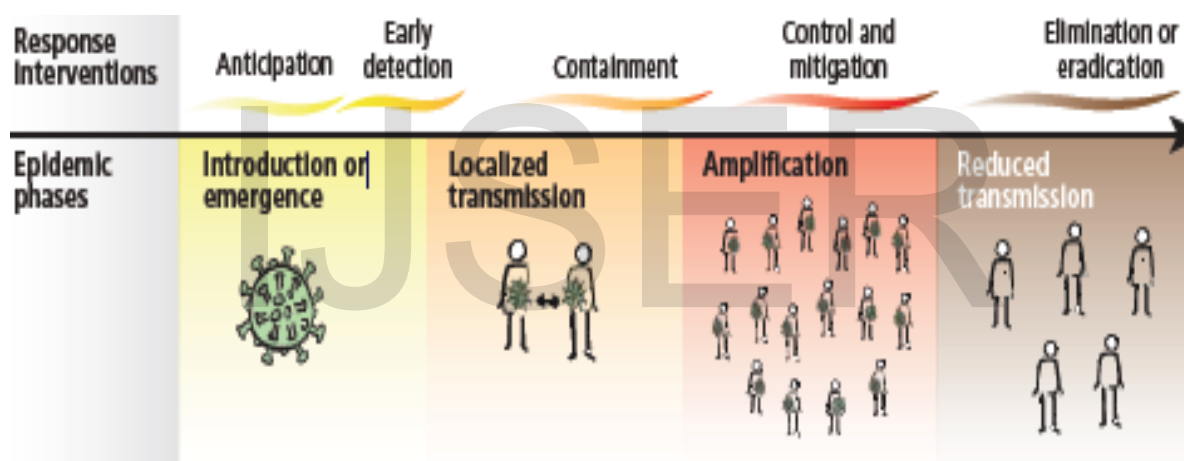


Figure 2. Epidemic phases and response interventions

First is the anticipation of new and re-emerging diseases to facilitate faster detection and response; followed by their early detection of emergence in animal and human populations; the third stage is the containment of the disease at the early stages of transmission; followed by the control and mitigation of the epidemic during its amplification; and fifth, the elimination of the risk of outbreak or eradication of the infectious disease.

Anticipation: In this first stage of response, emergence cannot be predicted, but it can certainly be anticipated, and the anticipation of risks enables a focus on the most likely threats. Anticipation encompasses forecasting the most likely diseases to emerge, and the quick identification of the drivers that will worsen the impact or facilitate the spread. Preparedness

plans, based on lessons learned from past experiences, should contain a variety of scenarios to allow for a reactive response to the unexpected.

Early detection: Emerging and re-emerging diseases include new ones about which there is little scientific knowledge. These, therefore, often require investigation into their sources at the same time as the use of coordinated, rapid-containment measures. New diseases require new interventions. And because they appear irregularly or rarely, there is a need for constant vigilance, proactive risk assessment and the development of new management tools.

Early detection allows the rapid implementation of containment measures, which are the key to reducing the risk of amplification and potential international spread. Early detection begins at the health care setting, so health care workers must be trained to recognize potential epidemic disease, report quickly an unusual event (such as an unusual cluster of cases or deaths). Their role is also to reduce the risk of community transmission by isolating severely-ill patients; to prevent household transmission by protecting health care givers at home; and to reduce the mortality rate. Health care workers must also know how to protect themselves and employ infection prevention and control measures and how to avoid outbreaks amplified in health care facilities.

Once a new disease is recognized by the health system, early laboratory confirmation is essential. When this cannot be done at country level, the affected countries must be confident they can count on the support of a network of more sophisticated regional or global laboratories. It is critically important for global health security that there is a system for safely taking samples and shipping specimens to relevant laboratories in full compliance with biosafety and biosecurity regulations.

Containment: Effective and rapid containment of emerging diseases is just as vital as early detection in order to avoid a large-scale epidemic. Rapid containment should start as soon as the first case is detected regardless of the aetiology, which is most likely to be unknown. It requires skilled professionals to safely implement the necessary countermeasures. Pre-training of these professionals is essential to guarantee the safety and efficiency of the operations.

Control and mitigation: Once the infectious disease threat reaches an epidemic or pandemic level, the goal of the response is to mitigate its impact and reduce its incidence, morbidity and mortality as well as disruptions to economic, political, and social systems.

Elimination or eradication: Control of a disease may lead to its elimination, which means that is sufficiently controlled to prevent an epidemic from occurring in a defined geographical area. Elimination means that the disease is no longer considered as a major public health issue. However, intervention measures (surveillance and control) should continue to prevent its re-emergence. Eradication of a disease – much more difficult and rarely achieved - involves the permanent elimination of its incidence worldwide. There is no longer a need for interventions measures. Three criteria need to be met in order to eradicate a disease: there must be an available intervention to interrupt its transmission; there must be available efficient diagnostic tools to detect cases that could lead to transmission; and humans must be the only reservoir.

PROSPECTS OF EPIDEMIC CONTROL IN DEVELOPING ECONOMICS

A world Health Organisation report found that increased investment in health would translate into hundreds of billions of dollars per year of additional income, which could be used to improve living conditions and social infrastructure in poorer countries. It is estimated that for every 10% increase in life expectancy at birth there is a corresponding rise in economic growth of 0.4% per year. Most developing economies are found in Africa, Southern America and Asia has marked improvements in health outcomes during the past decade. There has been a considerable decline in child, maternal and adult mortality rates, and substantial decreases in the burdens of several diseases. In the period 1990–2011, the developing economies in African have struggled with, and begun to overcome, the devastating epidemic caused by HIV, Ebola, Lassa fever, Yellow fever an Malaria etc.

There has been impressive progress in reducing mortality rates in children aged less than 5 years, which fell between 1990 and 2012 from 173 to 95 per 1000 live births. The worldwide reduction in the maternal death rate has also been achieved in sub-Saharan Africa, which has seen a decline of 41% between 1990 and 2010. The Millennium Development Goals (MDGs) are a powerful tool for focusing the world's attention on development issues, particularly those issues that need to change. Although it is likely that many countries in the Region will not reach the MDG targets set by 2015, considerable efforts have been made to achieve them.

Developing economies in Africa have put polices and strategies in place that guide investment decisions and activities of all stakeholders. Comprehensive monitoring and evaluation frameworks and other means of monitoring performance, such as joint annual reviews, which have been institutionalized in 37 countries, bring together all stakeholders, permitting inclusive assessment of sector performance and discussion of resource allocation. Comprehensive

human resources for health planning is being promoted in countries, linking needs, production and utilization with relevance and appropriateness of the mix of skills. Strengthening education and training of health workers is crucial, but so is providing viable, adequately supported positions to ensure that graduates are absorbed in the health system when they complete their training face various epidemic or outbreaks of diseases.

Several approaches to reducing financial obstacles to accessing health care have been adopted by countries, such as removing financial barriers, especially direct payments (user fees); providing financial coverage for people who cannot afford to contribute; making prepayment compulsory; and establishing large risk pools. Countries are developing national policies and plans to improve access to essential medicines. External quality assessment of national public health laboratories in almost all countries has enabled laboratories to improve their diagnostic performance. Efforts are underway to reach all the people who need health care, when they need it and where they need it, by scaling up efforts at universal coverage and by using innovative approaches, such as use of mobile clinics based on trains, and increasing service delivery through community workers.

Several countries have made progress in developing policy and strategic frameworks to improve their national health-information systems, national and health facility data sources as well as data management and dissemination. Innovative platforms such as the African Health Observatory and national health observatories support the strengthening of national health-information systems.

CHALLENGES OF EPIDEMIC CONTROL IN DEVELOPING ECONOMICS

Some health challenges for developing economies are how to share in the benefits of continually evolving and advancing medical technologies, how to control costs yet increase access to basic services, how to define and provide basic health prevention, control and care services, and how to create sustainable programs that improve the health of their people. Other issues include how to balance resource allocations for prevention relative to treatment, whether for epidemics, as well as how to deal with the workforce issues that drain developing economies of their limited health care professionals. For the international community in general, the new challenge goes beyond how to contribute to pilot programs in health that provide drugs, vaccines, and preventive or health care services that work in a given place. It is about how to do so in a way that is ultimately able to engage the local and national populations and enable

the programs to expand to a nationwide scale. Another critical concern is how successful programs can be sustainable over time.

The HIV and other epidemics in developing economies continues to be diverse with prevalence varying between and within countries, and between genders, groups and risk populations. HIV prevalence rates are much higher in women than men, with the largest differences being seen in the age group 15–24 years. Prevalence tends to be higher in urban than rural areas, although this difference is less in southern Africa. There are also wide variations across sub-regions and between countries. Southern Africa remains disproportionately affected by the epidemic, with just over one third of all people living with HIV in 2012 residing in the 10 countries of that sub-region. The same countries are home to 31% of people newly infected with HIV, and 34% of people dying from AIDS-related causes.

According to the World Health Organization (WHO), worldwide a total of 17,145 cases of EVD have been reported in five affected countries (Guinea, Liberia, Mali, Sierra Leone, and the United States) and three previously affected countries (Nigeria, Senegal, and Spain) up to November 30, 2014. Globally, there have been 6,070 reported deaths (WHO, 2014a). Liberia, Sierra Leone, and Guinea remain the epicentre of the disease. November 30, 2014, WHO reports 2,164 cumulative cases and 1,327 deaths in Guinea; 7,635 cumulative cases and 3,145 deaths in Liberia; and 7,312 cumulative cases and 1,583 cumulative deaths in Sierra Leone. Among the three countries at the epicentre of the disease, 17,111 cumulative cases and 6,055 cumulative deaths have been reported (WHO, 2014a). Although the number of new cases is reported to be stabilizing, the situation in these countries remains uncertain, with no treatment in sight.

Ebola has tested the readiness of health care systems around the world. The disease has especially drawn attention to the inadequacies of sub-Saharan African countries' health care systems and the lack of health care infrastructures to handle complex health emergencies in low-resourced, developing country settings. Because Ebola is an unprecedented disease that threatens the global community, international health agencies and the private sector are in a race with time to develop appropriate medications and potential vaccines to treat and prevent the disease.

Although the advancement of such solutions is paramount, it is important to look beyond the current epidemic by examining factors that have led to such inefficiencies in the affected countries' health care systems. All three affected countries are emerging from civil wars, which

has resulted in low levels of the availability of health resources and dysfunctional health care systems, largely resulting from the lack of adequately trained and available health care workers.

Sub-Saharan Africa accounts for 24% of the global burden of disease but with only 3% of the world's available health workforce (World Bank, 2013). Even before the Ebola outbreak, as democracy was being re-embraced in these countries, health care providers were overwhelmed with meeting system-wide needs and developing post-war capacities while economic growth and redevelopment were occurring. It is pertinent, then, to examine the challenges and opportunities for addressing the Ebola epidemic in the affected countries and propose strategies for strengthening these countries' health systems. Although the governments of the affected countries have worked to improve the economy and health status of their populations, life expectancy across this region remains low. Physician and hospital bed capacities are dismally inadequate from a comparative global perspective, minimally meeting the basic health care needs of the general population. Infant and maternal death rates remain high. Because of high levels of illiteracy, it becomes difficult to disseminate uniform health messages.

Many of the actions affecting epidemic control comes from outside the health sector, which highlights the importance of cooperation between sectors when undertaking activities to reduce the environmental health burden. Also, health-sector costs are increasing, and often demands cannot be met by small economies, so without cross-sector cooperation it is unlikely that progress will be sustainable in many health areas.

SUSTAINABLE SOLUTIONS

The existence of surveillance systems able to function as effective early warning systems is pivotal in preventing and control the spread of infectious diseases (Childs & Gordon 2009). So much so that early surveillance warning systems are widespread across Europe. It can also be implemented in countries with developing economic. So much so that early surveillance warning systems are widespread across Europe. The current Italian sentinel system for Bluetongue and the ornithological surveillance system for West Nile virus may be considered two typical examples of such surveillance programmes (Giovannini et al 2008; Calisti et al 2010).

However, data collection is costly and it is not possible to implement ubiquitous early warning systems. The resources are limited and the deployment of such systems is regulated so to achieve the maximum level of efficiency. Therefore, any tool improving the deployment of surveillance measures is fundamental, and the identification of risk factors for the introduction

and spread of infectious diseases is becoming a priority. Risk assessment methods and other provisional modelling techniques allow for calculating the probability of introduction and spread of infectious diseases in different geographical areas, as well as the epidemiological analysis of the available data on animal trade. Similarly, efficient information systems must be in place to support veterinary services in case of epidemic emergencies. In fact, the quick reaction of veterinary services and the rapid application of control measures are related to the prompt availability of reliable information.

CONCLUSION

Epidemics such as HIV, tuberculosis, malaria, Lassa fever, zika virus, cholera, yellow fever and Ebola virus etc. has presented a large mortality and morbidity burden in developing economies, are also responsible for poor economic development. In the past international agencies devoted resources and efforts to control these epidemics and other diseases without taking into account health-system performance and sustainability. Even assuming that global fund to fight epidemics – a recent international initiative – would provide the necessary funds, a poorly performing health-care system will not be able to use these funds optimally.

Environmental health interventions can also make a valuable and sustainable contribution towards reducing impact of epidemics in developing economies on already existing burden and improving the well-being of people everywhere. Both the health sector and non-health sector actors can, and need, to take joint action to effectively address causes of epidemic diseases. To do this, global partnerships are essential. Many such alliances already exist in the field of children's environmental health; occupational health; in joint health sector and environment sector linkages; and in actions in the water, chemical and air pollution sectors. Such global partnerships need to be strengthened and reinforced, harnessing the full range of policy tools, strategies and technologies that are already available – to achieve the interrelated goals of health, environmental sustainability, and development.

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