The re-emerging diseases and the accompanying epidemic and pandemic threats have been amongst the defining health events in past 15 yr. The responses to these diseases and threats have been variable across countries; however, by year 2016, the global health community seems to have learnt a few lessons and now there appears to be a better preparedness and response capacity. This editorial provides a brief overview of global events and the situation in India (as a country example) and proposes specific actions at country level (enhanced disease surveillance systems and public health capacity) and at global level (international collaboration and stronger health systems). Ten ‘areas of actions’ (AA-10) as checklist for preparedness and response have been suggested and a case has been made on why large emerging economies have to play role in response to such threats? The editorial concludes that in backdrop of globally agreed sustainable development goals (SDGs), if the actions are initiated now with global solidarity, it is possible to have sufficient global capacity to be prepared and respond to re-emerging health challenges and threats.

Emerging and re-emerging diseases, from different parts of the world have continuously posed the risks of epidemics and pandemics and nearly 30 such diseases had affected the world during last three decades1. Some of these (mostly viral) diseases such as severe acute respiratory syndrome (SARS), avian flu (H5N1), chikungunya virus, novel H1N1 flu virus, middle-east respiratory syndrome-corona virus (MERS-CoV), Ebola virus and Zika virus received more attention than others such as Crimean-Congo haemorrhagic virus fever (CCHF), etc1−4. These diseases affected local economy and health systems in the most vulnerable countries and posed a greater risk to the remaining countries as well. An imported case of yellow fever in China reported for the first time outside endemic countries in Africa is an important example, which raised an alarm for global health community5. No country remains unaffected by these emerging health threats and challenges, a situation which demands both local and global actions.

During the last decade, several re-emerging diseases have also been reported from India, e.g. CCHF, Nipah and Chandipura viral diseases1−4 and a few of these, viz. chikungunya (re-emergence in 2006) and dengue (first emergence in 1996), have almost become endemic in the country and are reported every year from different states.

These diseases pose a major economic challenge to national and global economy, as evident from the available estimates on impact of SARS and avian flu in past, which negatively impacted the economies of affected countries in range from 1 to 4 percentage of gross domestic products (GDPs)6−7. More recently, the estimates points that the three most affected countries in West Africa (Liberia, Sierra Leone and Guinea) lost 12% of their combined GDP because of Ebola epidemic6.

National level: Example of India

With re-emergence of chikungunya virus, in 2005–06, the public health experts and policy makers both at the national and global level underscored the need for improving disease surveillance system and laboratory facilities, training of manpower to respond to the diseases, conducting research to understand natural history of diseases, and the need for research and development (R&D) of effective antivirals and vaccines, and for strengthening the public health systems1−2,4,8. Ten years since then, in 2016 a number of (though not all) countries, across the world are better prepared to handle epidemics and pandemics. In India, a series of sustained efforts have been made by the Governments at both union and state levels for effectively tackling emerging and re-emerging diseases: (a) Epidemic and pandemic preparedness and response plans have been drafted9; (b) disease surveillance mechanisms have been strengthened including surveillance at the port of entries (mainly International Airports); and (c) Rapid response teams (RRTs)10 have been established at state and district level. There is greater preparedness at national and state levels for response to such diseases, than earlier.

In addition, enhanced financial and human resources, and an effective disease surveillance system, functioning

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across the country including in rural areas, is absolute essential for the overall preparedness and response. It is very likely that a new disease could spread to rural countryside even before the index case is detected and any action is initiated. The prevailing assumption that major cities and the state capitals are better prepared than rest of the areas is challenged by the epidemics of dengue and chikungunya in urban India\textsuperscript{11,12}.

The government expenditure on health in India at 1.15% of GDP is relatively low and one of the lowest in the world. More specifically, the expenditure on public health activities has been estimated around 2% of total expenditure on health in India which in terms of absolute amount turns approx. ₹100 per person per year, which is largely insufficient amount; hence, the proposed policy intention of the government to increase expenditure on health to approx. 2.5% of GDP\textsuperscript{13} should be implemented earnestly, which would be 110–170% increase over current government expenditure. In this background, increased allocation for expenditure on public health services (especially on disease surveillance and human resources) needs to be given more attention with at least three to five-fold increase in spending.

As the fastest growing large economy with extensive air travel (both in-and outbound), it is in India’s interest to invest more money to build a stronger disease surveillance system as well as improve its preparedness and response, in order to control epidemic and pandemic threats.

Global level: An International collaboration

A number of re-emerging diseases can be controlled by national level efforts; however, since disease in a country poses risk of spread to other countries, as highlighted by emergences of MERS-CoV, Ebola virus and Zika virus; there is need for coordinated efforts for preparedness and response at international level. The World Health Organization’s international health regulation (IHR) has been a tool for ensuring reporting of emerging health challenges and diseases at global level. The countries need to combine their national level efforts towards increasing compliance with IHR. The effective answer for preparedness and response requires international collaboration (both technical and financial) and a functioning disease surveillance system across countries, which meets the basic requirements. As the emergence of a disease could have a negative impact on a nation’s economy (in the beginning) as well as global economy, it is a very strong motive to collaborate. A lot of progress has been made at global level, but noticeable changes will take a few years to manifest. Hence, it is necessary to develop an agreed vision and ready roadmap of the activities amongst the international stakeholders and various countries, depending upon their resources and capacities. However, it is equally important that any discussions for strengthening disease surveillance systems and international collaborative efforts should not end up in vertical initiatives or a global funding mechanism only. Attention has to be paid on overall strengthening of health systems at all levels.

Another learning from the experience of disease emergence and spread is that the countries with weaker health systems have been hit the worst during the emergence of diseases\textsuperscript{11}. The Ebola crisis caught the global health community largely unprepared; however, a swifter and better coordinated response to Zika virus diseases indicated that lessons had been learnt from Ebola experience. While Ebola largely affected low and middle income countries (LMICs), Zika virus was first reported in Brazil and found its way to Singapore\textsuperscript{12}. These experiences have shown that epidemics can move swiftly from local to global level and that well prepared health systems play a vital role in dealing these health threats more quickly and effectively.

Ten ‘areas of action’ (AA-10)

To assess the preparedness and response to an emerging or re-emerging disease or epidemic threat, in any setting (country, regional and global level), 10 areas of action (AA-10) are proposed (Box 1). These can be used by countries to have a comprehensive review of the preparedness and response in specific settings and could be used by policy makers as check-list for planning purpose. While recognizing that transmission patterns of various diseases are different, there are essential and common strategies for majority of the diseases which needs to be given attention.

### Box 1: Ten ‘areas of action’ (AA-10) to strengthen health systems to tackle re-emerging diseases and epidemic threats

1. Develop epidemic and pandemic preparedness and response plan;
2. Build Public health response capacity including sufficiently trained health workforce;
3. Establish a functioning disease surveillance system, which covers entire geography including rural areas;
4. Allocate sufficient financial resources;
5. Increase community and civil society participation and support;
6. Enhance investment on research including engagement of academic institutions;
7. Investment and collaboration for research and development of effective medicines and vaccines;
8. Build sufficient local and global surge capacity;
9. International collaboration (both technical and financial); and
10. Stronger national and global stewardship for public health.
Role of large emerging economies at global level

The sustainable development goals (SDGs) agreed by global community in September 2015, provides a new opportunity and platform for advocacy and action to enhance preparedness and response to re-emerging diseases. In addition, the changing pattern in the global economic growth and that the erstwhile donor countries facing a slowdown in economic growth may mean reduced overseas development assistance (ODA) for the low and middle income countries (LMICs), in years ahead. Therefore, it is pragmatic that more financial resources are generated through domestic resources by countries and alternative financing mechanisms are explored. Additionally, the large emerging economies such as India and China have to show leadership, responsibility and solidarity to finance such efforts in other LMICs and to strengthen global public health, while continuing to increase investment for public health in their own countries.

Rapidly growing large economies need to play a bigger role than they have been doing till now. Strengthening epidemic and pandemic preparedness and response systems, and tackling antimicrobial resistance (AMR) could be considered priority health issues to start with. It is the national leadership of the large emerging economies, which have to assume bigger responsibilities, make sincere efforts and raise the global health issues at highest political forum such as G-20 or G-77, to achieve sustainability and ensure accountability in these efforts.

The global public health community has learnings from the experience in past 15 yr. These learnings could be used to establish necessary mechanisms and to ensure that world is better prepared to tackle any emerging public health threat and that countries have a stronger health systems. The SDG agenda provides an opportunity for actions at national and global level and there is definitive leadership role for emerging large economies. In the next 15 yr, with global solidarity, it is possible to have sufficient global capacity to be prepared and respond to challenges and threats posed by (re)-emerging diseases.

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REFERENCES