



Viewpoint

Policy

Pandemics & One Health: India's evolving response

“Ecological circumstance provides the opportunity for spillover. Evolution seizes the opportunity, explores the possibilities, and helps to convert spillovers into pandemics”¹. David Quammen provides this succinct description of the pathway that pathogens take in the journey from their natural habitat to human pandemics, in his book “Spillover: Animal infections and the next human pandemic” which was published in 2012¹. While some zoonotic viruses have posed a pandemic threat in the past few decades, the devastating effect of a prolonged global public health emergency has only now been experienced after the influenza pandemic of 1918-1920. The whole world has become more familiar with pandemic origins since December 2019, when the SARS-CoV2 virus announced its arrival to an unprepared world.

The stage was well set for the pandemic. An increase in the world population from 2.58 billion in 1951 to 6.1 billion in 2000, and further to 7.8 billion in 2020², has been accompanied by a rapidly growing urban segment which expanded from 46.7 per cent in 2000 to 56.2 per cent in 2020³. With this increase in urbanization and a greater contact between humans and wildlife, there is a rise of new virus outbreaks globally. Deforestation blurred the boundaries between the forest dwelling microbes, captive bred or domesticated veterinary population and human habitat. Along with urban growth, agricultural expansion, extractive mining and logging brought microbes from diminishing forests into direct contact with growing human and animal populations. These anthropogenic conveyor belts have enabled hitherto secluded viruses to infect humans in large numbers, while increasing speed and spread of travel enabled them commute far and fast along with people. Mobility of persons, within and between countries, has increased at an unprecedented scale over the last half century⁴, with the integration of global economy providing an impetus for trade and travel.

With a global burden of 2.5 billion cases of infection and 2.7 million human deaths worldwide each year⁵, zoonotic diseases constitute 60 per cent of known infectious diseases and up to 75 per cent of new infectious diseases⁶. In low-income countries 44 per cent of the total deaths are accounted for by infectious diseases⁷. Most recently the COVID-19 pandemic has been responsible for 2.55 million deaths by early 2021 and an increase in unemployment by 33 million in 2020⁸ with 93 per cent of the world's workers residing in countries with some form of workplace closure measures in place in early January 2021. Within countries, more geographically targeted and sector-specific measures have gradually become the norm over the course of the pandemic, and these were still affecting 77 per cent of workers at the start of the year (close to the peak of 85 per cent reached in late July 2020). The 2014 Ebola epidemic was responsible for 28,616 cases with a financial loss of \$2.2 billion⁹. Many of the respiratory viruses have pandemic potential, unless stopped early in their tracks.

To reduce the burden of these new and re-emerging diseases, the World Health Organization, together with Food and Agriculture Organisation (FAO), World Organization for Animal Health (OIE), United Nations Children's Fund (UNICEF), United Nations System Influenza Coordination, and the World Bank developed the framework on “One Health” in 2008. This is a global programme defined as “A collaborative, multi-sectoral, and trans-disciplinary approach - working at local, regional, national, and global levels - to achieve optimal health and well-being outcomes recognizing the interconnections between people, animals, plants and their shared environment”¹⁰.

One Health is an elaborate integrative concept which requires strong government support with adequate health financing and management of the healthcare system, with more attention to health

management and community-based caregivers. It also calls for coordination and collaboration between several agencies that are administered by different ministries, across both Central and State governments. The proposal to establish a National Institute for One Health will be a stepping stone for the much needed initiative to encapsulate the human health perspective into the agenda of economically desirable, socially secure and ecologically sustainable development.

Due to the combination of direct and indirect factors influencing zoonoses, a multidimensional effort is required to identify the precursors, pathways and precipitants of zoonoses, so that appropriate prevention and control strategies can be applied. One such effort, made by the Ministry of Health and Family Welfare and, the Ministry of Agriculture and the Wildlife Institute of India, Government of India is The Roadmap to Combat Zoonoses in India (RCZI) initiative which was launched in June 2008¹¹. The framework stresses the need to measure the morbidity, mortality, and economic burden of zoonotic diseases and provides rationale for adopting a One Health framework. It emphasises on the promotion of collaborative research to generate evidence, capacity building and health promotion. It also highlights the need for an evidence-based forum to appropriately use existing data and for reaching out to relevant subject matter experts. To manage ‘spillovers’ from animals to humans, the RCZI initiative also developed a five-year Strategic Research Agenda (SRA) to promote zoonotic research¹¹. A Database of Zoonotic Disease Research in India was also proposed for surveillance of zoonotic diseases¹².

Despite such initiatives, the recent COVID-19 pandemic revealed inadequate preparedness of the health system in providing an integrated One Health response. An under-resourced health system was already burdened by several health challenges which were being addressed through National Health Programmes. A multi-sectoral platform for a competent and coordinated One Health programme was not established as a priority. Still in the nascent stages of implementation, the lack of coherently connected One Health strategies posed the pandemic as a serious public health challenge for the second most populous country in the world. The National Health Policy (2017) did not pay the needed attention to this threat, with One Health missing in the policy document¹³. Scarcity of articles on One Health in the Indian scientific publications and popular media, till very recently, also denoted the lack of interest in the

subject. There was inadequate integration between physicians, veterinarians, forest departments, public health experts and the government¹⁴.

A coherent response to zoonotic pandemics requires a cohesive multi-disciplinary guidance to effectively implement coordinated multi-sectoral action. As per the World Health Organization “*there is a coexistence of humans in a complex, interdependent relationship with the companion, production, and wild animals we depend on for our food, livelihoods, and well-being, as well as with the environments we live and work in together*”¹⁵. An effective platform is required for collaboration and facilitation among various stakeholders within a diverse society’s complex health system. Challenges include: (i) shortage of trained personnel in the rural and urban areas; (ii) lack of health promotion, especially in rural areas; (iii) scarcity of interventions, innovations and technologies; (iv) absence of resource allocation; and (v) omission of One Health concept from national and State health policies. These are some of the reasons why the concept of One Health was not adequately integrated so far into the developmental discourse on health and environment.

The COVID-19 pandemic has started to dispel this inertia. The Union Budget of 2021 specifically provides an allocation for One Health¹⁶. The Department of Biotechnology’s National Institute of Animal Biotechnology (NIAB), at Hyderabad, inaugurated the Centre for One Health on November 3, 2020 with the motto “Animal health for Human Welfare”¹⁷. The Indian Council of Medical Research has commenced partnerships with agricultural universities¹⁸. Laboratory capacity is being ramped up across the country, extending from the block level, to enable district level surveillance of microbial infections using the One Health approach. Four new regionally located ‘National Institutes of Virology’ are proposed to be established, to support the existing National Institute of Virology at Pune¹⁹.

While these measures will build multidisciplinary research capacity, through multi-institutional partnerships, the challenges will lie in translational and implementation research. Multisectoral coordination calls for policy coherence and alignment of implementation pathways. While this calls for operational efficiency, policy and systems research is also needed to identify barriers to implementation and provide innovative solutions that enhance efficiency and equity. Implementation of the One Health programme

will require oversight and monitoring at higher levels of government to ensure shared ownership and joint accountability across several departments.

A strategy to promote One Health as a defence against zoonotic infections cannot be confined to our country alone. Even within India, a well laid out strategy is needed for collaborative research and coordinated action across all regions. Beyond that, global partnerships and surveillance are also needed, since microbes do not recognise or respect national boundaries. While India must develop bilateral and multi-lateral partnerships on its own, the WHO provides the most universally accepted and accessible platform for knowledge sharing and concerted action to counter pandemic threats that arise from zoonotic outbreaks in any country. With her abundant scientific expertise, India must play a leadership role in shaping and steering WHO's regional and global One Health strategies.

“Our wits versus their genes” was the pithy phrase used by Joshua Lederberg, while describing the challenge posed by microbes, in his seminal article on the history of infectious diseases published in 2000²⁰. As the winner of the 1958 Nobel Prize for Medicine, awarded for his pioneering work on microbial genetics, he was well positioned to advise on how best we can coexist in ecological harmony while warding off dangerous infections. Even as our understanding of microbial genetics expands exponentially, our wits cannot be focused only on developing vaccines and antiviral drugs. We also need our wits to promote and practice One Health approaches to prevent, predict, preempt and promptly terminate zoonotic pandemics.

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