

## Preventing future pandemics using "one health" approach in Nepal

Binod Dangal<sup>1</sup>, Man Bahadur Khadka<sup>2</sup>, Archana KC<sup>3</sup>, Rajesh Ghimire<sup>4</sup>

<sup>1</sup>MDGP Consultant, <sup>4</sup>MBBS, Pashupati Chaulagain Memorial Hospital, Charikot, Dolakha, Nepal, <sup>2</sup>Chief Administrative Officer, Bhimeshwor Municipality, Charikot, Dolakha, Nepal; <sup>3</sup>General Surgeon, Bir Hospital, National Academy of Medical Sciences, Kathmandu, Nepal

### ABSTRACT

Emerging and re-emerging infectious diseases are in rise due to rapid climate change, environmental changes and population increase. COVID-19 has taught us about different understanding of health. One Health is a concept that recognizes the interconnections and health interdependencies among humans, other animals and the shared environments. The concept of One Health is in embryonic stage in Nepal. With the One Health approach, implementing systematic zoonotic surveillance, regulated rational use of antibiotics, prevention strategies through wide vaccination campaigns, global collaboration, rapid control of outbreaks with containment measures, development of zoonotic registry in the country, multisector coordination can prevent future pandemics.

**Keywords:** COVID-19, one health, pandemic, surveillance

### CORRESPONDENCE

Dr. Binod Dangal

MDGP Consultant, Pashupati Chaulagain Memorial Hospital, Charikot, Dolakha, Nepal

Email:binod.dangal999@gmail.com

**INTRODUCTION**

Pandemics are large scale epidemics of infectious diseases over a wide geographic area which can cause significant morbidity and mortality. Few examples of pandemic in human history are the outbreaks of severe acute respiratory syndrome (SARS)<sup>1</sup>, Middle East Respiratory Syndrome (MERS)<sup>2</sup>, COVID-19<sup>3</sup>, shown in Table 1. With the increase in population, rapid urbanization and globalization, geopolitical problems, rapid exploitation of natural environment and global changes are accelerating damage of biodiversity

and ecosystems. These changes have led to the emergence of infectious and non-infectious diseases. (Fig 1). The relationship between environments, the host and the infectious agent are responsible for the occurrence of these situations<sup>4</sup>. And, the zoonotic diseases are posing major threats to the human health, even the COVID-19 pandemic, based on the analysis of first known case in Wuhan,China revealed the coexistence with wild animals facilitating spillover of zoonotic viruses.<sup>5</sup>

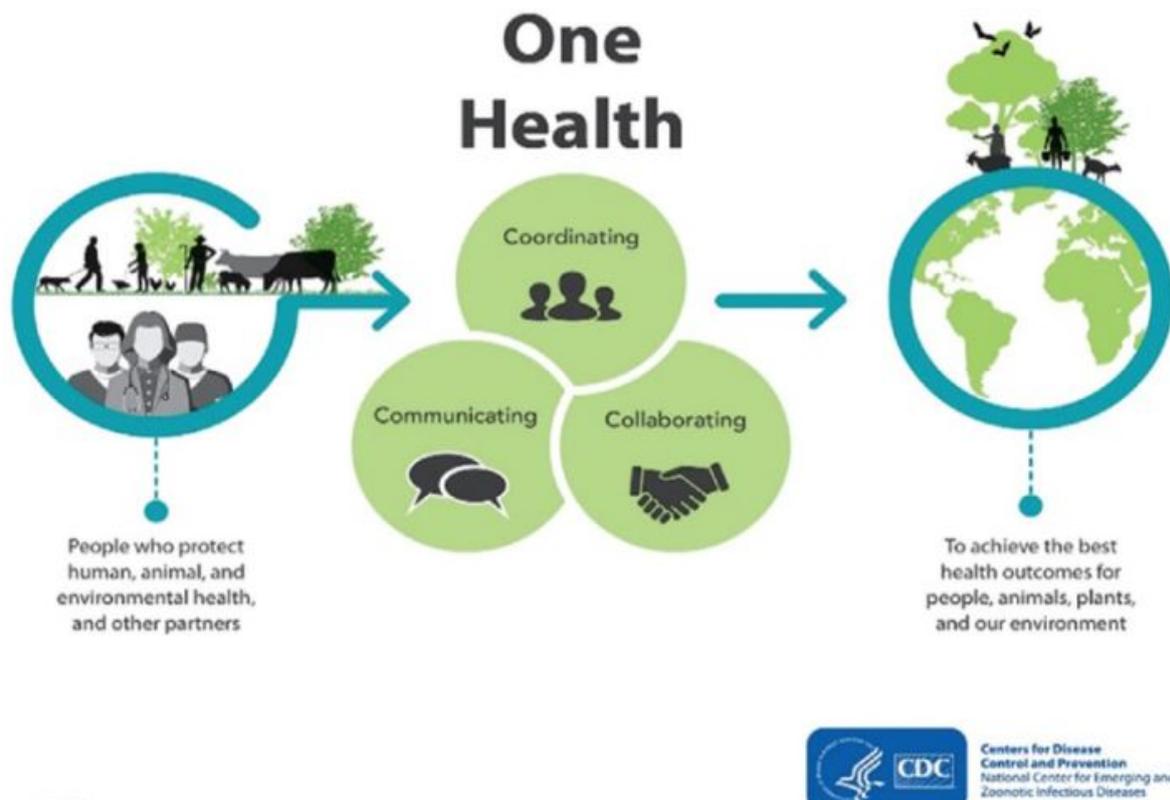


Figure 1. Concept of One Health approach, CDC<sup>6</sup>

Table 1. Major PANDEMIC IN HISTORY<sup>5</sup>

Pandemic	Etiology	Origin	Outbreak year	Total infected	Total death
COVID-19	SARS-CoV-2 virus	Possibly bats, penguins	2019 Dec	547 Million	6.34 million
Zika outbreak	Zika virus	Mosquito borne	2015-2016	2400 cases in Brazil <sup>#</sup>	29 deaths in Brazil <sup>#</sup>
Ebola Outbreak	Ebola virus	Wild animals (Fruits, bats)	2014-2016	28,652	11,325
MERS	Corona virus	Bats, Camels	2012	>2500	866
SARS	Corona virus	Bats, Civets	2002-2003	8098	774
Swine flu	Influenza virus, H1N1	Pigs	2009-2010	10% of global population	151,700-575,400
HIV	HIV virus	Chimpanzees	First in 1980s, ongoing	40 million	25-30 million
Bubonic plague	Yersinia Pestis	Rats, fleas	1347-1351	Not estimated	200 million

One Health (OH) is a collaborative, multisectoral, coordinated, and transdisciplinary approach – working at the local, regional, national, and global levels – with the goal of achieving optimal health outcomes by recognizing the interconnection between people, animals, plants, and their shared environment.<sup>7</sup> This concept is envisaged as a collaborative global approach to explore risks for human and animal health as well as health of ecosystem.

#### **One Health Approach to prevent future pandemics in Nepal:**

The concept of OH is in embryonic stage in Nepal but its gaining its popularity among health care professionals, veterinarians, policy makers and researchers. Zoonotic Disease Control Program has been formed by Epidemiology and Disease Control Division (EDCD). Food safety regulation began in Nepal in 1966. EDCD is responsible for outbreak management, control of epidemics, endemics, and pandemics. EWARS (Early Warning and Reporting System) was established in 1997 to strengthen the flow of information on vector-borne and other outbreak prone infectious diseases from the district to EDCD and Vector Borne Disease Research and Training Center.

Outbreak of zoonotic diseases are unavoidable due to existing human life style and many anthropogenic factors. So, the concept of OH approach is a need for public policy framework for intersectoral, interdisciplinary collaboration from government, non-government, multi-sectoral and transdisciplinary levels recognizing and interconnecting people, animals, plants and their shared environment.<sup>7</sup>

Some specific implementation strategies from OH perspective to prevent future occurrence of pandemics are- implementing systematic zoonotic surveillance, regulated rational use of antibiotics, communication and collaboration between human health professionals (doctors, nurse, public health practitioners and epidemiologists), animal health professionals (veterinarians and agricultural workers) and environmentalists (ecologists, wildlife experts), infrastructural changes through investment in technology and policy making, raising awareness of zoonosis through campaigning and media, implementing strict

monitoring and regulatory practices for food safety and quality, promoting sustainable management of natural resources and biodiversity through conservation of wildlife habitats and natural resources, strong political commitment, policy formulation, capacity enhancement, sustainable financing, program development, promoting economic security and social stability, prevention strategies through wide vaccination campaigns, establishing strong interdisciplinary network of partner to improve surveillance and monitoring through global collaboration, rapid control of outbreaks with containment measures, development of zoonotic registry in the country, multisector coordination can prevent future pandemics.<sup>8</sup>

**Financial support:** None

**Conflict of interest:** None

#### **REFERENCES**

1. Maunder, R.G., Lancee, W.J., Balderson, K.E et al (2006) Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerg. Infect. Dis.*, 12(12): 1924-1932.
2. Cowling, B.J., Park, M., Fang, V.J. et al (2015) Preliminary epidemiological assessment of MERS-CoV outbreak in South Korea, May to June 2015. *Eurosurveillance*, 20(25): 7-13.
3. Hoque, M.N., Chaudhury, A., Akanda, M.A.M., Hossain, M.A. and Islam, M.T. (2020) Genomic diversity and evolution, diagnosis, prevention, and therapeutics of the pandemic COVID-19 disease. *PeerJ*, 8 : e9689.
4. Dhama K, Chakraborty S, Kapoor S, Tiwari R, Kumar A, Deb R, et al. One world, one health-veterinary perspectives. *Adv Anim Vet Sci*. 2013;1(1):5–13
5. Sironi, V.A., Inglese, S. & Lavazza, A. The “One Health” approach in the face of Covid-19: how radical should it be?. *Philos Ethics Humanit Med* 17, 3 (2022). <https://doi.org/10.1186/s13010-022-00116-2>
6. One Health Basics Fact Sheet. Available from: <https://www.cdc.gov/onehealth/basics/index.html>. [Last accessed on 2022 July 1]
7. Gruetzmacher, K., Karesh, W.B., Amuasi, J.H et al (2021) The Berlin principles on one health-Bridging global health and conservation. *Sci. Total Environ.*, 764: 142919.
8. Hoque MN, Faisal GM, Chowdhury FR, Haque A, Islam T (2022) The urgency of wider adoption of one health approach for the prevention of a future pandemic, *Int. J. One Health*, 8(1): 20-33.