

Introduction

Biological threat reduction

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Animal diseases, including zoonoses, have the potential to negatively impact economies, the environment, society and public health. It is currently thought that over 60% of human diseases and over 80% of agents that can be used for bioterrorism are of animal origin. The emergence and spread of animal diseases, including zoonoses, is at an all-time high. This increase in disease emergence and spread is thought to be the result of an increase in intensive farming, global travel, human pressure on ecosystems and social unrest. As new diseases and/or strains emerge, they travel freely and do not respect political borders.

The last decade has brought significant change to all areas of our globe. Social unrest has led to the dissolution of governments and, in many areas, an uprising of terrorist factions. In addition, we have witnessed an increase in the incidence and severity of emerging and zoonotic infectious disease events. West Africa's Ebola virus outbreak (2014) reinforced what experts had been saying for more than two decades: that we live in a globalised world, and a disease that emerges in an underdeveloped nation half a world away can easily and quickly reach the shores of other, more developed countries. In other words, a lack of public and veterinary infrastructure in underdeveloped countries has the potential to affect nations around the globe.

The last decade has also ushered in significant advancements in biotechnology and the biomedical sciences. Technological advances have enabled the development of novel medical treatments and diagnostic assays, supported enhancements in agricultural production systems, and strengthened our ability to detect and respond to a biological threat agent. Genome-editing technologies such as CRISPR-Cas9 are promising developments that will have substantial impacts on human health and therapeutics. However, these same technologies also have the ability to be used in nefarious ways. In fact, a 2016 worldwide threat assessment report added gene editing to the list of threats posed by 'weapons of mass destruction and proliferation' (1). The relative ease with which the reagents can be purchased and their low-cost, and the accelerated pace of development of this dual-use technology could lead to far-reaching national security implications. Decades ago, biological threat reduction programmes were put in place to mediate and counteract biological attacks that would most likely originate from state actors. Today, we must also prepare for biological attacks from non-state actors, terrorist organisations and their affiliates.

The anthrax attacks of 2001 in the United States served as a wake-up call to the global community. States quickly realised their vulnerability to an emerging disease and/or a

biological attack and began allocating additional resources to support research and development in medical countermeasures, strengthen their public health and veterinary infrastructures, implement surveillance systems, and train first responders and medical personnel. Animal and zoonotic diseases, long known to be potential bioterrorist agents, were considered a priority and funding was allocated to address the top biological threats. Over time, with the world facing a global economic crisis and other societal challenges, funding for research and preparedness against biological threats has declined. However, in the face of decreasing budgets, the global community has stepped up and collaborated on a number of worldwide initiatives.

The World Health Organization (WHO), the World Organisation for Animal Health (OIE), and the Food and Agriculture Organization of the United Nations (FAO) have become partners in the effort to help build the global capacity for responding to biological threats. The 'One Health' initiative is gaining momentum worldwide, and this is helping to ensure greater coordination between the public health sector and veterinary health sector. In addition, there are numerous initiatives under way to help strengthen and build both public health and the veterinary health infrastructure globally. For example, the Global Health Security Agenda (GHSA), launched in 2014, has a mandate to build global capacity to create a world safe and secure from infectious disease threats and to elevate global health security as a national and global priority (2). Currently, over 50 nations, international organisations, and non-governmental stakeholders participate in the GHSA. Together, they use a multilateral and multi-sectoral approach to strengthen both the global capacity and the capacity of individual nations to prevent, detect, and respond to human and animal infectious disease threats, whether naturally occurring or accidentally or deliberately introduced.

The OIE, through its *Tool for the Evaluation of Performance of Veterinary Services* (PVS Tool), works with individual countries to assist their Veterinary Services in assessing their current performance; identifying gaps in performance, resources, policies and laws; and determining their ability to comply with OIE international standards. Recommendations from PVS evaluations are used to help prioritise resources and develop a roadmap for strengthening the Veterinary Services within a country. In addition, the OIE and FAO have joined forces to secure remaining stocks of the rinderpest virus. Rinderpest was eradicated in 2011 and since this time the OIE and FAO have worked with Member Countries to identify and secure remaining stocks in high-containment facilities around the globe.

Whether naturally or intentionally introduced, the best defence against a biological event is a strong public health and veterinary health infrastructure. Global efforts towards creating a more robust infrastructure have found tremendous success. It is only through continued support for these efforts and global cooperation that we will become a more resilient society.



References

1. Clapper J.R. (2016). – Worldwide threat assessment of the US intelligence community. Statement of Record to the U.S. Senate Armed Services Committee. 33 pp. Available at: www.dni.gov/files/documents/SASC_Unclassified_2016_ATA_SFR_FINAL.pdf (accessed on 25 September 2017).
 2. Global Health Security Agenda (GHSA). – Available at: www.ghsagenda.org (accessed on 15 April 2017).
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