

One Health: its recent evolution and driving issues



John Mackenzie

Faculty of Health Sciences
Curtin University
WA
Email J.Mackenzie@curtin.edu.au



Martyn Jeggo

Australian Animal Health
Laboratory
CSIRO Livestock Industries
PMB 24
Geelong Vic 3220
Tel 03 5227 5511
Fax 03 5227 5250
Email martyn.jeggo@csiro.au

Global health security has become a major concern, particularly the threats to human and animal health from the emergence and re-emergence of epidemic-prone infectious diseases, as well as the significant and growing impact of these outbreaks on national and international economies. It has long been known that many of these diseases can cross the species barrier between humans, wildlife and domestic animals, and indeed over 70% of novel emerging infectious diseases are zoonotic, that is, have their origins in animal reservoirs. There have been many recent examples of this trend, the most dramatic being recently the SARS epidemic – the first major threat to global health from a novel zoonotic disease in the new Millennium. Other recent examples include the H1N1 influenza virus pandemic; the spread of Nipah virus into Bangladesh and India; and perhaps the most important of all, the ongoing concerns of a highly virulent influenza pandemic due to avian influenza virus (H5N1).

The H5N1 threat has been one of the major drivers for the development of a holistic "One Health" concept, which recognises that the health of humans, animals and ecosystems are interconnected, and that to better understand and respond to diseases at the human-animal-environment interfaces requires coordinated, collaborative, multidisciplinary and cross-sectoral approaches. The concept of "One Health" (or previously "One Medicine" or "One World – One Health") is not new, but has been around in one form or another for more than 150 years since the 19th century physician Rudolf Virchow observed that "... between animal and human medicine there are no dividing lines – nor should there be". Virchow was also the first to use the term "zoonosis" in his studies of *Trichinella*. Much more recently in the mid-1960s, the eminent American veterinary epidemiologist,

Calvin Schwabe, also recognised that the health of humans, animals and ecosystems are interconnected, which he referred to as "One Medicine". The present momentum, however, can be traced to the 2004 meeting of the Wildlife Conservation Society on *One World, One Health: Building Inter-disciplinary Bridges to Health in a Globalized World*, and especially the need to recognise the essential link between human, domestic animal and wildlife health and the threat disease poses to people, their food supplies and economies. This was encapsulated in the outcomes – a series of 12 recommendations known as the Manhattan Principles. The momentum since 2004 has been maintained through a number of international meetings and interested groups, including the International Ministerial Conferences on Avian and Pandemic Influenza (IMCAPI), which have been held to discuss issues relating to the spread, transmission and possible containment of highly pathogenic avian influenza (H5N1), and culminating in the agreement between the Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE), and World Health Organization (WHO) entitled *The FAO-OIE-WHO Collaboration: Sharing Responsibilities and Coordinating Global Activities at the Animal-Human-Ecosystems Interfaces*. In addition, major scientific meetings held in Winnipeg and Stone Mountain and interested groups such as the European Commission, the World Bank, APEC, and the One Health Initiative have helped continue building and sustaining this momentum. National developments have also become widespread in both developed and developing economies. Further information on ongoing activities can be found at two international websites: the One Health Initiative website at <http://www.onehealthinitiative.com/> and the One Health Global Network portal at <http://www.onehealthglobal.net/>

Last year saw the 1st International Conference on One Health held in Melbourne, which attracted participants from around the world and provided an open forum not just to discuss the science but to link scientific outcomes to policy and organisational change.

Whilst there are many definitions of One Health, the current focus remains around emerging zoonotic infectious disease, and includes the importance of animals in the emergence of diseases affecting food safety and food security, but it also includes environmental factors, such as those important in the biology and epidemiology of vectors and their involvement in disease transmission. A full understanding of these processes, and the development of mitigating strategies to reduce the threats from EIDs, will require input and engagement from people with a diverse set of skills and a range of disciplines. The One Health approach strives to bring these together to provide the best possible solution to health risk management.

The purpose of this collection of In Focus and Under the Microscope papers will, we hope, provide some in-depth studies that provide not only an insight into the underpinning science but a much greater appreciation of the One Health concept, and particularly the need for greater collaboration and coordination between the medical, veterinary public health and wildlife health communities. Australia has a good relationship at government levels between health and animal diseases (as witnessed by the papers from the Chief Medical Officer and the Chief Veterinary Officer), and similarly the academic and research communities work well across the disciplines. The holding of the 1st International One Health Congress in Melbourne did much to highlight the issues and drive further collaboration, and the establishment of a One Health Special Interest Group as part of the activities of the Public Health Association of Australia provides further impetus at the national level for policy. Most recently in the middle of 2012, the Australian Society for Infectious Diseases held a very successful conference in Sydney. The conference report can be found in the ASM Affairs section of this issue. But there is still much to do. There are still major gaps at the 'action' levels of public health which will probably take time to resolve. There is also a critical need to bring the concept of One Health into mainstream medical and veterinary education and activities in wildlife and wildlife disease surveillance continue to remain a fringe activity and seriously under-resourced.

It is recognised that this collection of papers does not cover every facet of One Health, but it is hoped it will provide the reader with an update on the research and policy development around emerging and/or epidemic prone infectious diseases and food safety

Biographies

Prof Martyn Jeggo is the Director of CSIRO's Australian Animal Health Laboratory (AAHL) and has headed AAHL since September 2002. Prof Jeggo brings a wealth of experience in controlling and detecting exotic and emerging animal disease to his role of Director. In his time at the facility, some A\$55 million has been brought in to improve and upgrade the facility. Prior to joining AAHL from 1996-2002, Prof Jeggo was the Head of the Animal Production and Health Science Section of the Joint Food and Agricultural Organisation/ International Atomic Energy Agency (FAO/IAEA) Division of Agriculture, in Vienna, Austria. In that role, he managed a range of FAO/IAEA Coordinated Research Programs involving more than 200 research contracts relating to animal production and health. These were operational in some 130 countries. Among other international activities, Prof Jeggo also developed an international external quality-assurance program for veterinary laboratories. For more than 15 years, Prof Jeggo oversaw the management of laboratory networks dealing with, rinderpest and contagious bovine pleuropneumonia in Africa, foot and mouth disease in Asia and brucellosis worldwide. Prof Jeggo has visited more than 150 national veterinary laboratories in Africa, Asia and the Americas. He has held the positions of Director of the Veterinary Diagnostic Laboratories in the Yemen Arab Republic and Head of the Department of Immunology at the United Kingdom's Institute of Animal Health Pirbright Laboratories. Prof Jeggo has a Bachelor of Veterinary Medicine from the Royal Veterinary College, London, in the United Kingdom (UK); Master of Tropical Veterinary Science from the Centre for Tropical Veterinary Medicine, Edinburgh University, UK; Doctor of Philosophy from Surrey University, UK. Prof Jeggo's is also a leading member of the Foot and Mouth Disease (FMD) Global Research Alliance.

Prof. John Mackenzie was Professor of Tropical Infectious Diseases at Curtin University. He is currently a Research Associate at Curtin University, and is an Honorary Professor at the University of Queensland and Honorary Senior Principal Fellow of the Burnet Institute in Melbourne. He is a Past President of the Australian Society for Microbiology, and of the Asia Pacific Society for Medical Virology, and from 1999 to 2005 served as Secretary-General of the International Union of Microbiological Societies. He was appointed an Officer in the Order of Australia in 2002 for services to microbiology and research into public health implications of viruses and to education. He serves on the World Health Organization's Global Outbreak Alert and Response Network and the Technical Advisory Committee for the Bi-Regional Strategy for Emerging Diseases, and in 2009-10 was Chair of the International Health Regulations Emergency Committee for the Influenza H1N1 Pandemic.