Summary

Many countries use the term ‘exotic animal disease’ or ‘foreign animal disease’ to designate those diseases that could have disastrous consequences if they were to enter their territory because of direct losses to the domestic population suffering from the disease or required counterepidemic measures, loss in trade, or possibly from a potential zoonotic spill-over. From the point of view of the United Nations the preferred term is transboundary animal diseases (TADs), as nothing is of itself exotic or foreign in the global theatre. TADs are defined by veterinary experts as those diseases that are of significant economic, trade and/or food security importance for a considerable number of countries, which can easily spread to other countries and reach epidemic proportions, and where control/management, including exclusion, requires cooperation between several countries. Such a definition should include emerging infectious diseases (EIDs), most of which are likely to be zoonoses, but of uncertain impacts. FAO’s Emergency Prevention System – Animal Health (EMPRES-AH) focuses on some 12 to 14 diseases of transboundary nature (foot and mouth disease, rinderpest, contagious bovine pleuropneumonia, sheep and goat pox, peste des petits ruminants, highly pathogenic avian influenza, Rift Valley fever, Newcastle disease, African and classical swine fever, equine encephalitis, and under certain circumstances, rabies and brucellosis). The links between wildlife and livestock are seamless, and knowledge on management issues is imperative for future practitioners in understanding disease ecology. The key aspect to detection and containment of TADs and EIDs is to have all actors within the production and marketing chain linked with veterinary systems (encompassing those who teach at veterinary faculties, rural and urban practitioners, and regulatory authorities) to learn how to clinically suspect these diseases and call upon specialists in the case of uncertainty, and count on their active participation during emergency simulation exercises – at local or central levels. The common denominator for lowering risks and threats management of TADs (or other infectious diseases) is strategic epidemiology. This encompasses efforts to ensure that people heed warnings, communication of risk factors, disease recognition, detection and diagnosis, and cross-occupational efforts for response and eventual recovery. The role of the educator is to place importance on training future practitioners in investigative skills, open-mindedness in developing differential diagnosis lists, sample taking, risk analysis, care in not vectoring diseases off a premise, and knowing whom to contact in the event of mounting uncertainty. The new veterinary graduate should be well equipped to play a key role in globalised societies in the context of developed as well as developing countries.

Keywords: Animal – Transboundary disease – Veterinarian – Veterinary education.

Introduction

The mandate of the Food and Agriculture Organization of the United Nations (FAO) is to assure global food security and relieve hunger. FAO places a strong focus on policy dialogue and capacity-building to achieve its goals. As a result of this focus, during the 1970s and 1980s, a number of FAO-led projects in developing countries provided extensive assistance for capacity-building in animal health and production. In 1994, the FAO dedicated issue 80/81 of its World Animal Review to information exchange. One chapter was dedicated to veterinary education in developing countries (1). Much later, in 2005, the FAO updated an inventory of veterinary faculties worldwide, whose initial publication had been elaborated by the World
Emergency Prevention System and transboundary animal diseases

Transboundary animal diseases (TADs) are defined as epidemic animal diseases that are highly contagious or transmissible, with a potential for very rapid spread irrespective of national borders and causing serious socioeconomic impacts and, depending on the agent, potential public health consequences. The animal health component of FAO’s Emergency Prevention System (EMPRES) has led control and elimination programmes for numerous priority diseases. With the emergence of the H5N1 strain of highly pathogenic avian influenza (HPAI) virus in 2004, FAO – in conjunction with other agencies – led the initial disease mitigation responses in Southeast Asia and later in Eastern Europe and Africa. Arguably, after rinderpest, the HPAI activities and related operations at FAO represent the largest effort for progressive control and prevention of any animal disease. In fact, from 2004 to 2011, over US$330 million was mobilised and disbursed through FAO to contain the evolving pandemic, which affected poultry-dependent livelihoods as well as domestic and international commercial interests.

As the HPAI crisis progressed, a lack of sufficient expertise became evident, especially of professionals acquainted with veterinary epidemiology, emergency relief and crisis logistics, TADs and avian influenza, poultry production systems, and rural development. The poor availability of well-rounded animal health professionals highlighted the need to re-evaluate the profiles of national and international veterinarians. In view of this, there was an overall sense of agreement among experts that there should be integration of ‘new’ subjects or themes into the curricula of graduate and post-graduate veterinary education programmes, with specific emphasis on practical epidemiological training, enhancing communication skills, development of cultural sensitivity and local understanding, ability to engage in multidisciplinary teamwork, and strategic planning. Innovative techniques and creative methods by educators can include problem-based learning, use of case studies, and simulation exercises.

New veterinary professionals need to grasp that the overlap between TADs and veterinary public health is not limited to the pathogen being a zoonotic agent. It also derives from the fact that insidious animal diseases affect people’s livelihoods. TADs are a veterinary and a public health problem that has far reaching implications in terms of nutrition, human and economic development, trade and commerce, national stability, food security and food safety. The broad multidimensionality of diseases must be stressed.

The veterinary profession in the 21st Century

Fundamentally, veterinarians render their services to support both private and public goods. As the veterinary profession addresses the evolving needs of societies, the veterinary curriculum must therefore be creative and flexible to enable it to deliver veterinarians who are capable of addressing these rapidly changing needs. Over the last 40 years, much emphasis has been placed on clinical medicine – emulating that of physicians dealing with diseases in human beings – and the feminisation of the veterinary profession has led to more part-time employment and an emphasis on small animal practice. Notions on the importance of Veterinary Services as a public good are not often considered.

This important and overlooked fact needs emphasis: private and public veterinary practitioners are a pivotal component of the veterinary surveillance system, and their role as the first line of defence for the detection, early warning, and containment of any emerging or re-emerging animal disease is critical for the well-being of societies. For example, private practitioners need to provide timely reports of salient epidemiological or unclear events to Veterinary Authorities, and adhere to, and cooperate with, investigations, implementation of disease awareness, prevention and control measures. Their responsibility towards society as well as to their clients requires a shift in thinking, balancing private and public good activities, as the veterinary profession overall needs to protect human health and well-being while carefully weighing the economic and societal impact of diseases and their control measures.

There is increasing evidence that most emerging diseases are likely to have animal origins (4, 5), thus, veterinarians will require skills to detect problems when they are still small and recent, so they can alert authorities and possibly avert a pandemic or epizootic from occurring. It is for this same reason that FAO focuses on ‘tackling the disease at source’, which means epidemiological understanding and engagement at local level.
Furthermore, the veterinary profession needs to establish improved links with physicians, biologists and ecologists, and acquire other insights (into, for example, socioeconomics, regulation, legislation, oversight, efficient production practices, animal welfare, proper hygiene, pharmacology and herd health). National bodies, such as ministries of education, health and agriculture, and professional associations, should collaborate in the development of relevant curricula for veterinary students, and in-service training to address the present and future needs of countries/regions, including the drafting of profiles and credential reviews of veterinary faculty members. Veterinary faculties, for their part, should have appropriate infrastructure and personnel to carry out their work, and become more sophisticated according to agreed specificities. They must not lose sight of society’s needs.

Lastly, veterinary boards and veterinary faculty associations need to be created (where they are currently lacking) at national and regional levels. These boards and associations should establish a process of certification, promote continuous education, develop mechanisms of professional oversight, and ensure close alignment to the changing needs of society.

Cooperation between developed and developing country veterinary education

The international community, including FAO, the World Health Organization (WHO) and the World Organisation for Animal Health (OIE), should further facilitate the strengthening of cooperation between veterinary faculties in developing and developed countries through student and faculty exchanges, and research collaborations. The FAO continues to stimulate North–South and South–South cooperation, collaboration and exchange.

The exchange of academicians between countries gives them insights into different realities, familiarises them with the diagnosis and control of diseases that are not present in their own country, and provides practical experience (for example in field treatment methodologies, herd health programmes, field surgery and necropsy, slaughterhouse, border inspections and socio-cultural aspects) that affect or are affected by disease occurrence or risk. In a similar way, the exchange of students during the final years of their courses should provide them with a global outlook on disease prevention and control, equipping them with local sensitivities and language skills. To illustrate this point, FAO often accepts veterinary students to take on specific projects under a mentor. Similarly, it receives graduate veterinarians and visiting professors who delve into the international arena to gain a better understanding of global concerns and issues, while furthering their professional careers.

The developments of distance learning modules where students can receive credits at their faculties for successfully completing courses not available in their home country is a viable option for enabling veterinarians to develop new insights, gain exposure to broader issues, and get acquainted with international veterinary medicine. Also, the availability of online courses leading to master’s degrees, coupled with mentorship, presents tremendous potential for students from developing countries to further their education in specialty fields. The SAPUVETNET, a dynamic project linking five European and eleven Latin-American veterinary faculties, is a perfect example of the transcontinental coordination (www.sapuvetnet.org).

A global parameter

Since the 1800s educators and scientists have embraced the ‘One Health’ notion (7, 8). An 1856 quote from Rudolf Virchow highlights it neatly: ‘Between animal and human medicine there is no dividing line – nor should there be. The object is different but the experience obtained constitutes the solid basis of all medicine’ (6). Nowadays, with looming zoonotic diseases, this concept has been elevated to international discourse. This seems logical because we are tightly interrelated in the environment in which we live. With this in mind, ‘tackling diseases at source’ requires a better spatial and temporal understanding of crucial determining factors to deal with multidimensional risks and their targeted management. The epidemiological recognition of risk variables, human behaviour and socioeconomic drivers is critical for tailored interventions for TADs. Moreover, from an educational perspective, it is therefore essential that veterinary students understand disease drivers, animal production systems, and the complex process of safe products reaching consumers (from farm to fork), as well as the efficient use of natural resources.
A local parameter

Extension services at the regional and local level are paramount to provide authoritative aspects of disease prevention and control. In this regard more emphasis has been given by national or local entities to crop agriculture than to veterinary and food safety aspects. This emphasis should be balanced to reflect the reality that livestock contributes substantially to the national and global agricultural gross national product (GNP), where the global average is 40% and in some countries the contribution is much higher (9). With this in mind, it is warranted to make a concerted effort to protect livelihoods and livestock from the ravages of TADs, the presence of a chronic underlying zoonotic problem, or the emergence of a novel pathogen. Veterinarians and their auxiliaries should be well prepared to act appropriately in the event of an emergency – for instance the incursion of foot-and-mouth disease (FMD), cerebrospinal fluid diseases, rabies, or strains of influenza such as H5N1 HPAI.

Perception of the veterinarian

The relentless efforts undertaken by FAO and its partners, in particular OIE, nongovernmental organisations (NGOs) and donors, to protect poultry from the devastation of H5N1 HPAI (from 2004 to the present) and to elucidate the role of wildlife in transmission dynamics, has markedly underlined the importance of veterinarians to uphold and promote public goods by protecting people and their livelihoods. Despite the impressive achievements so far obtained, much more needs to be done to improve global veterinary education.

Although the overall public perception of the veterinarian is positive (based largely on the romanticised picture of the profession in literature, on film and in television programmes), the reality is that graduate veterinarians are not trained to the level of proficiency required, and that their services, both public and private, attract in most cases only minimal economic remuneration. In global terms, the rewards for veterinarians are substandard compared with those in other specialised professions that require the same degree of academic preparation. The plethora of veterinary faculties often produce veterinarians who are not qualified to practice, which further erodes confidence and limits their inputs when problems arise. It would therefore be most appropriate and beneficial to highlight the achievements of veterinarians in the promotion of the global public good. Also, outstanding alumni can be recognised by elected officials and the public at large as a way to generate pride and respect locally and internationally. If the veterinary profession is to remain honourable, essential, respectable and admirable, then its image must be absolutely impeccable.

The role of international organisations in veterinary education

International organisations such as the FAO, OIE and WHO play an essential role in providing a forum for discussing issues related to international veterinary medicine, and in finding ways to enhance veterinary education at the global level. Resources are required to make such discussions feasible and viable in a formal established system that properly mentors visiting students and provides new regional or global understanding of issues to those wishing to pursue sabbatical leave. For instance, the FAO/WHO/OIE electronic conference on Veterinary Public Health and Control of Zoonoses, which was implemented in developing countries, addressed education, training and extension for veterinary public health participants (2).

More emphasis on international aspects and ramifications of the veterinary medical profession, including the scope and activities of international technical agencies and regional organisations, would need to be included in existing programmes to make comprehensive agendas. As previously mentioned, the FAO regularly receives students for internships and academics during their sabbaticals. This initiative could be expanded through memorandums of understanding with specific institutions or veterinary associations seeking training opportunities for their candidates or launching collaborative research proposals for their researchers and faculty members. Furthermore, seasoned experts from international organisations could regularly provide lectures at veterinary faculties and associations to share their latest insights and field experiences. There is no doubt that it is desirable to do more to take advantage of internet-based technologies such as video conferencing, chat, electronic messaging and virtual classrooms as these reduce travel time for staffers and associated logistical costs.
Additionally, international organisations regularly receive group study tours. These visits build stronger networks with interested institutions in specific thematic areas. Relevant information, materials and contacts can be shared through such networks. FAO’s Veterinary Public Health Networks presently link over 1,500 subscribers and provide weekly updates on diseases, publications, events, training and employment opportunities (3). The FAO-EMPRES subscribers and Bulletin list contains details of over 3,000 individuals. These include professionals in the OIE, the United Nations Environment Programme (UNEP), the United Nations Children’s Emergency Fund (UNICEF), WHO, NGOs, financial institutions and veterinary academics, as well as senior foreign animal health officers. Veterinary education needs to wholly prepare veterinarians to be able to address new challenges that arise from globalisation, urbanisation and changing production systems, as well as the rise of emerging and re-emerging diseases worldwide. International organisations thus play an essential role in linking and supporting veterinary institutions in shaping the veterinarians of the 21st Century. Graduating veterinarians must possess knowledge of the international processes of the OIE, the existence of FAO/WHO Codex Alimentarius, the global animal health landscape, and the scope and breadth of assistance that technical agencies provide to their member countries.

**Conclusion**

The range of activities carried out by veterinarians is very wide. These activities should be pursued professionally in the context of society’s needs. Today we are faced with new and more complex challenges which include TADs and zoonoses. Veterinarians also undertake basic and applied research in pathogen characterisation, immunology, vaccinology, and do research work with animal subjects that is designed to find cures for debilitating human ailments. Veterinarians work in public and private settings as civil servants, teachers, instructors, professors, researchers, marketers, salespeople and entrepreneurs, as well as independent practitioners. From the perspective of the relationships between emerging infectious diseases and humans, the truth is that veterinarians are unsung heroes in their efforts to curb the effects of epidemics and endemic chronic animal diseases, which are transmissible irrespective of national borders and cause serious socioeconomic harm. This deep-seated conviction is the one driving an evolving veterinary education to make a better and safer world for all.

**References**