

IV. The Charge to the One Health Initiative Task Force (OHITF)

The AVMA Executive Board charged the OHITF to:

1. Articulate a vision of One Health that will enhance the integration of animal, human, and environmental health for the mutual benefit of all
2. Identify areas where such integration exists and where it is needed
3. Identify potential barriers or challenges to such integration
4. Identify potential solutions to overcoming barriers or meeting challenges
5. Prepare a comprehensive written report for the Executive Board detailing its findings and recommendations

V. Responding to the Charge

1. Articulate a vision for One Health

Vision Statement

To promote and improve the health of humans, animals and our environment, individually and collectively, by encouraging and ensuring the acceptance and adoption of One Health and its associated activities.

Definition of “One Health”

One Health is the collaborative effort of multiple disciplines-working locally, nationally, and globally – to attain optimal health for people, animals and our environment.

The Scope of “One Health”

The scope of One Health is impressive, broad, and growing. Some of the dimensions defining the scope of the concept are shown in the chart on the following page:



The Scope of One Health

agro-and bio-terrorism

animal agriculture and animal sciences

antimicrobial resistance

basic and translational research

biomedical research

clinical medicine

combating existing and emerging diseases and zoonoses

comparative medicine

conservation medicine

consumer support

diagnosis, surveillance, control, response and recovery directed at natural or intentional threats that are chemical, toxicological, or radiological in nature

entomology

ethics

food safety and security

global food and water systems

global trade and commerce

health communications

health of the environment and environmental preservation

implications of climate change

infectious disease ecology

integrated systems for detection

land use and production systems and practice

mental health

microbiology education

occupational health

public awareness and public communications

public health and public policy

regulatory enforcement

scientific discovery and knowledge creation

support of biodiversity

training

veterinary and environment health professionals and organizations

wildlife promotion and protection

2. Identify the areas where the integration of human, animal, and environmental health exists

Numerous organizations have recognized the need for integration of human and animal health, and the health of the environment and have taken steps to develop new programs and form new partnerships to support that integration. Some examples are highlighted below:

- In 2007, the Centers for Disease Control and Prevention (CDC), as part of its reorganization, created a National Center for Zoonotic, Vector-Borne and Enteric Diseases (NCZVED). This center has close to 1,000 employees focusing on infectious disease ecology and a One Health mission. They have cross-cutting programs in food-borne, water-borne, zoonotic, and vector-borne diseases, not to mention global health that integrate human, animal, and environmental domains in the areas of research, disease and outbreak investigations, laboratories, pathogen discovery, epidemiology, policy, and communication.
- The Environmental Protection Agency (EPA), United States Agency for International Development (USAID), Wildlife Conservation Society (WCS), Envirovet Summer Institutes, and National Science Foundation (NSF) have existing programs and research projects that have purposefully and effectively brought issues such as environmental degradation, pollution, climate change and ecological stress into the realm of both human and animal health. Poor environmental health conditions may lead to negative health consequences from contamination and pollution, and from the creation of environments that are more conducive to the survival and emergence of new infectious agents.
- The US military has historically linked their health operations in monitoring, surveillance, and lab systems. The US Public Health Service (USPHS), some FDA programs, the US Department of Agriculture Food Safety and Inspection Service (FSIS), and the CDC have integrated programs spanning human and animal health.
- The Global Center for One Health and the Center for Emerging Infectious Diseases have been established as focal points to bring disciplines, professions, and colleges together.
- Today, more than half of US veterinary colleges have formal dual Doctor of Veterinary Medicine (DVM or VMD)/Master of Public Health (MPH) degree programs. This has been a major change of emphasis and coordination just over the last five years.
- Many veterinary and human medical colleges have formed links with schools of public health and created programs in comparative medicine and biomedical research, facilitating further collaboration across the health professions.
- Biomedical research and laboratory animal and comparative medicine examples also highlight such integration. The development and use of animal models for research on the treatment and cures for many human diseases has been a major success, particularly with the development of genetically modified mouse models.
- Several laboratory systems are integrating diagnostics across health domains, including the Integrated Consortium of Laboratory Networks, National Animal Health Laboratory Network, Laboratory Response Network, Zoo Network, ArboNet, Global Avian Influenza Network for Surveillance, the National Biosurveillance Integration System, and the Food Emerging Response Network.



- Human and animal health corporations and pharmaceutical companies in the Kansas City corridor are sharing capacities and innovations linking the biosciences and animal health. In addition, many pharmaceutical companies have both animal and human health products and Research and Development systems that utilize both human and veterinary medical professionals collaboratively.
- One Health research, data, and programs are frequently highlighted in educational journals such as *Eco Health*, the *Journal of Emerging Infectious Diseases*, *Zoonoses and Public Health*, the *Public Health Reports Journal*, and the *International Journal of Zoonoses*. In addition, ProMed and the Canary Database provide disease reporting based on One Health strategies.
- There are several outstanding wildlife surveillance and conservation projects, such as the Global Avian Influenza Network for Surveillance operated by the Wildlife Conservation Society as well as other surveillance and diagnostic systems, that are working together to address both human and wildlife populations.
- Organizations such as the Delta Society have worked to promote human and animal health through the human-animal bond, facilitating human interactions with pets for the benefit of human health. The Delta Society has also worked to promote health benefits of this interaction, such as lowered blood pressure and increased survivability from heart attacks in people.
- Although still somewhat disconnected, the US preparedness efforts addressing the threat posed by H5N1 Avian (AI) and pandemic influenza has been more integrated than past programs. Planning, detection and parts of the surveillance strategies involve animal and public health and have supported further integration of diagnostic laboratories. The federal interagency planning and test exercises are also examples of where integration is working and, at least, animal and human populations are being considered together.
- At national and local levels, veterinarians, health care organizations, public health agencies, and other stakeholders are collaborating in areas of mutual interest to both—for example, awareness and prevention of pet and childhood obesity and exposure of pets, pet-owners, and their children to secondhand tobacco smoke. As human health benefits are more closely identified with animals in the home, other applications of One Health will continue to involve companion animals.

Finally, natural disaster response and lessons learned from Hurricane Katrina have stimulated more collaboration among animal, human and environmental communities and organizations. Emergency preparedness, both locally and nationally, is much better coordinated today but can still benefit from further integration.

3. Identify areas where the concept and operation of One Health are especially needed

In the article “Animal-Borne Epidemics out of Control”¹³ which appeared in *The Trust for America’s Health*, authors studied the incursion of five animal diseases into the US that were mostly zoonotic, and estimated that more than 200 different federal offices, agencies, and programs would have had some jurisdiction in response to these threats. Clearly, the responses were primarily ad hoc and lacked any effective integration. A One Health approach with key linkages and a national integrated strategy is a dramatic and critical need. Real life examples abound:

2006 E.coli outbreak

In 2006, approximately 200 people in 26 different states were diagnosed with a particularly virulent case of *E.coli* O157:H7.¹⁴ Almost half of the cases were hospitalized and almost 25% suffered from hemolytic uremic syndrome (HUS). If viewed only through only the lens of public health, this outbreak focused primarily on morbidity, mortality, outbreak investigation, laboratory diagnosis, and clinical treatment.

However, once viewed through the lens of animal health, the same causative organism with an exact laboratory finger-print match was found in cattle close to where the spinach was produced in the Salinas Valley of California. This exact strain was recovered from wild hogs that ran through the same fields. When considered through the lens of an ecologist and hydrologist, the ground water and surface water in this high-production agricultural region were being mixed together due, in part, to a drought followed by heavy rains, and a strain on the irrigation system which was trying to keep up with intensified agricultural production.

The same *E.coli* organism recovered from both patient and animal sources was then found in one of the water ditches close to the spinach fields in the area. Thus, when a One Health construct was used, we were able to understand that the spinach field was likely contaminated through irrigation water that contained *E. coli* from the infected hogs running through the fields, and that the organism could survive in the spinach plant throughout processing and distribution.

Only by integrating our knowledge of the environment and ecology could this investigation be completely understood. More importantly, only through this knowledge, can appropriate intervention and prevention strategies be properly implemented. A purely human health approach would have resulted in the focus on clinical care and individual treatment rather than on possible sites for prevention of contamination and infection.

Need for professionals targeting health of the environment

There is a need for additional programs to train health professionals on the promotion of the health of the environment. For example, Envirovet Summer Institutes could be a model for other programs to use in developing a field-training environment, within which professionals can be trained to utilize their skills for the health of the environment. Others could learn how to implement new programs by gaining an understanding of such examples that currently exist.

Rift Valley Fever

Rift Valley Fever is a vector-borne zoonotic disease that infects people, food, animals and some wildlife. It could likely turn into a devastating epidemic with immense economic, commercial, and health consequences across the country if it ever entered the US. A well-integrated public, animal, and environment health strategy is required to ensure appropriate detection, response, and recovery actions.

Emerging and re-emerging diseases

Emerging and re-emerging diseases, such as Hanta virus, plague, leptospirosis, West Nile virus, Lyme disease, and schistosomiasis, are all impacted by changing weather patterns and/or flooding, altered land use, and host-vector dynamics. A collaborative effort is required if they are to be detected and contained.

Bio- and agro-terrorism

Eighty percent (80%) of our recognized select agents, or those of greatest concern for use as bio-and agro-terrorism agents, are zoonotic pathogens. Clearly, these dangerous microbes may show up just as easily in a veterinary hospital or animal diagnostic laboratory as in a physician's



office or a human health lab. Yet, with a few exceptions, we approach these threats as separate and disconnected events and only now are surveillance systems attempting to integrate information.

In the vast majority of veterinary practices, there is no standardized electronic medical record keeping system. Therefore, the profession has not been able to establish a true, evidence-based medical system. Veterinary medicine is unable to coordinate national monitoring or develop an effective and comprehensive early detection system for the millions of companion animals across the country. This inability to bring this growing population into a cross-species surveillance system has created a barrier to One Health.

Collaboration at the local, national, and global levels

The inclusion of a variety of health professionals in local, national, and international organizations is key. For example, locally, veterinarians can provide guidance on issues of importance to local health boards. Local human and veterinary medical associations could meet more frequently to discuss topics of mutual interest in their communities. Nationally and internationally, One Health stakeholder leaders could catalyze the concept to trickle down to clinicians at the local levels.

Threats to the global food system

A One Health approach is needed to meet the challenges of the rapidly increasing supply and demand of our global food system. Two years ago, 21 billion food animals were produced to help feed 6.5 billion people,¹⁵ resulting in millions of tons of animal and agricultural products being transported worldwide. With almost 90% of future human population increases occurring in developing countries, unprecedented animal production is also increasing in these areas of the world. Unfortunately, these countries often do not have adequate human and animal infrastructures in place to control and address current disease, much less the emergence and detection of the next group of microbial threats.

A recent article¹⁶ in *Nature* (Feb 2008; Jones, et al) reports that there have been 335 emerging disease events since 1940. The report states that these events have been progressively increasing over the decades, and, except for emerging antimicrobial resistant organisms, most have originated in developing regions of the world and will likely continue this pattern well into the future.

Yet our existing surveillance systems have been developed and implemented with a bias toward richer and developed countries. Thus, we fail to consider those areas of world at greatest risk and with the highest probability of incubating the next emerging infection. The need to create and establish good surveillance and monitoring systems in developing countries as an integrated strategy and across domains is lacking at a time we need it most.

Water and sanitation systems

Our water and sanitation systems are also under pressure and over 1.5 million people, mostly children, die of diarrheal diseases worldwide each year.¹⁷ In the US, we have just experienced the largest number of outbreaks of cryptosporidia in our history, and the vast majority have been from chlorinated water sources. The ecology of water-borne diseases represents a critical area of study for the future in order to better understand and prevent further water-borne zoonoses. There are also growing issues about contamination of our water supplies with chemicals, toxins, and by-products of drugs and hormones. A One Health approach is critically needed.

A moral obligation

Dr. Mirta Roses, Director of the Pan American Health Organization (PAHO), recently reported that a substantial portion of the world's disease burden was due to the environment, and poor populations are at much greater risk and face greater consequences to their health and quality of life.¹⁸

She stated, "Millions of families in the world exist—or struggle to survive—in wretched, overcrowded and unsafe slums, shacks, tents, ghettos, and settlements. They are exposed to harsh weather. Rats and insects bring disease to their homes. Poor ventilation, little light and the need for constant repair aggravate the tragedy. These conditions are especially oppressive for children—their bodies, their growth, and development and their dreams. They live with no clean water, decent sanitation or basic services that many in the world would enjoy daily and take for granted. Yet they are our fellow human beings, a precious human capital and we have the mission to reduce the environmental hazards they face in order to improve their health."¹⁹

Today, approximately 800 million livestock and poultry keepers worldwide— primarily women and children—depend on their few animals for food, income and stability. Should these valuable assets contract a zoonotic disease, not only is the family's income at risk, but the keepers that are intimately associated with the animals have a high probability of contracting the illness. In addition, indigent populations suffer disproportionately from the negative consequences of environmental degradation, pollution, poor sanitation, and the impact of adverse weather conditions.

Health is an outcome shaped by a wide range of social, economic, natural, man-made, and political environments that form a complex and ever-changing dynamic. Understanding the epidemiology, maintenance, and spill-over mechanisms between vectors and hosts are all part of complex events found at the interface of human animal health and of health of the environment.

4. Identify Barriers or Challenges to One Health

There are significant barriers to the adoption of the One Health concept, perhaps the most important being the need for key leadership to embrace the concept of One Health, to obtain buy-in from medical, veterinary, industrial, and environmental partners, and to execute a change program on a global basis.

Success in adopting the One Health concept will require overcoming many other barriers, including difficulty in changing the mindset of healthcare providers from one of "disease care" to one of preventive medicine, the bias towards clinical care, increasing specialization and fragmentation of the field, as well as a general lack of awareness and education of physicians, and difficulty getting busy practitioners on board.

While we have made progress, additional barriers include differences in organizational cultures, competing priorities, and a lack of resources to promote and further develop One Health. In addition, we will have to address the need for a communication plan that could effectively influence public awareness and motivate a campaign to help influence Congress and key policy makers, the lack of effective models from which to build a national One Health program, and the lack of a critical mass to help evolve and inculcate the concept.

Disease care or preventive medicine?

Today's human health care system in the US is actually a disease care system. In 2005, personal healthcare expenditures in the US reached \$2 trillion.²⁰ This translates to approximately \$6,400 per person and 16% of this country's GDP. Almost 98% of all US expenditures in the system are spent on addressing diseases and only about 2% on prevention. We fail to adequately invest in protecting and promoting health, preventing diseases, injuries, disability, and preparing for new health threats. The concept of One Health is very much a strategy with a long-overdue bias

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The return-on-investment for this strategy is profound when we view the cost savings associated with prevention of diseases and the multiplier effect involved when we consider that a positive impact in one domain is often transferred to a positive benefit in other domains. Thus, One Health is a transformational strategy and is quite different from our traditional health care system. This transformation can be threatening and goes against our current training and mindsets regarding medicine and health care. One Health might be categorized (unfairly) as a “fringe or alternative medicine” because it is non-traditional and its precepts may be considered too avant-garde.

Bias toward clinical care

The concept of One Health is a very different view of health when one compares the mindset, education, and training of health professionals in the past with those of today. There remains a strong bias, in both human and veterinary medicine, toward clinical care of individual patients and a significant shift to areas of specialization. This professional orientation and interest will be difficult to overcome in order to embrace the broader vision of One Health. Therefore, academic institutions will need to respond by adopting new ways to educate the next generation of health science professionals.

In addition, there is a growing emphasis in specialization and clinical practice focusing either on humans or animals to the detriment of understanding and applying One Health principles. Yet, practitioners in both human and veterinary practice can successfully practice One Health if they have the mindset and educational background to appreciate the concept.

In clinical settings, few One Health teams have been assembled to address the new challenges brought about by the convergence of health domains. For instance, a special need exists today for an integrated surveillance system that rapidly and accurately detects both potential pathogens and non-infectious threats such as toxicants and contaminants in human, animal, and environmental domains.

Although some progress is being made, the separation of the human and animal health education and training systems is still difficult to bridge. Health professionals continue to be educated and trained in professional-centric academic institutions with seemingly little appreciation for the integration and coordination of disciplines especially beyond their own professions.

Specialization increases fragmentation

Today, both human and veterinary health systems are composites of multiple specialties. This is especially an issue in veterinary medicine, where fragmentation of the profession is accelerating and the ability to create and support a national plan and strategy like One Health will be challenging. A few years ago, Dr. Calvin Schwabe, a pioneer in One Health, characterized the veterinary profession as a “big field, small profession.” The diverse obligations, responsibilities, and opportunities in veterinary medicine are difficult to fulfill even though societal expectation and needs are unparalleled and growing.

Veterinary medicine is approximately one-tenth the size of the human medical profession and its ability to be optimally and simultaneously successful in areas such as biomedical research, agro-terrorism, food safety and security, and public health is challenging at best. Incorporating One Health into their existing specialties will be daunting.

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The need for leadership

One Health is very much an overarching concept that spans many disciplines, professions, and areas of interest. While most understand the need to effectively connect these diverse areas into a single coalesced plan, the ability to accept the ideas and then to execute or implement critical strategies that produce One Health is, perhaps, the most difficult challenge. One Health is, in essence, a vision, and a blueprint to guide implementation or to transform the vision into action, although a challenge, is essential to manage and lead change of this magnitude.

The successful adoption and implementation of One Health will be predicated on the leadership ability of its advocates. In order to achieve buy-in across the domains of One Health, key leadership will need to be established, engaged, and empowered.

In his book, “The New Rules,”²¹ John Kotter addresses the necessity to muster the courage to overcome complacency, the knowledge and skills to envision a strategic future, and in our rapidly changing world, make changes to the foundation of our culture. Leadership skills are fundamental to the One Health vision and implementation.

5. Identify Potential Solutions to Overcoming Barriers or Meeting Challenges

We now stand at the precipice of health care transformation where disease prevention and health promotion in people, animals, and our environment have become a critical, strategic need. The most pressing need for transformation is almost always vision and leadership. The OHITF recommendations, found in the next section of this report, can serve as an action plan to guide individuals, institutions, and professions during the process of change. But, most importantly, while the AVMA and AMA are eager and willing to take the lead on this effort, we cannot succeed without support from others.

The opportunity to meet continuing challenges to health through the concept and implementation of new strategies is both exciting and troubling. One Health has the potential to meet critical societal needs and demands, but our health professionals might not appreciate or realize the urgency or need to coalesce and confront the complex issues threatening health.

We need to stop trying to figure what to do by looking at what we have always done, and now focus on what is truly needed and possible. Most new opportunities do not fit neatly into existing organizational boxes or departments. Yet at the intersection of differences can always be found opportunities for creative ideas, innovations and profound transformation—One Health is that challenge.

Decisions made today impact events of tomorrow. We live in a world in which the difference between what can be imagined and what can be accomplished has never been smaller. Veterinary medicine is in a unique position. Veterinarians are well grounded in population health, comparative medicine, and preventive medicine. The profession has the potential to take a major leadership role in the efforts of One Health. However, this is not a given, and a reluctance by our profession or by the other health sciences to take this step, will, without question, be a lost opportunity that will be picked up by other groups.

The Veterinarian’s Oath, to which all veterinarians have pledged our professional lives, can be considered a position description for One Health. Failure to assume the leadership role of One Health is a decision not to uphold the principles of the oath, namely, “the protection of animal health, the relief of animal suffering, the conservation of livestock resources, the promotion of public health, and the advancement of medical knowledge.”

Much of the responsibility sits clearly on our shoulders. The human medical profession is faced with the same dilemma—it also must decide on its future role in One Health. Every profession has its defining moments—special points in time when talented individuals work cooperatively to influence the course of events for generations to come. For veterinary medicine and the other health sciences — that time is now.

“...the protection of animal health, the relief of animal suffering, the conservation of livestock resources, the promotion of public health, and the advancement of medical knowledge.”

