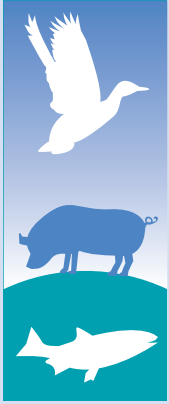




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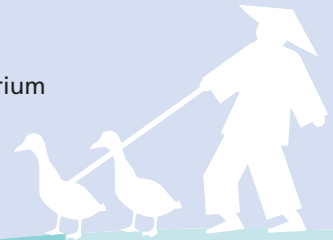


A tribute to the late Martin Kaplan, VMD

*The Livestock Revolution,
Sustainable Development,
and Zoonotic Disease*

Thursday–Friday
November 9 & 10, 2006

University of Pennsylvania
Annenberg Center, Zellerbach Auditorium
Philadelphia, PA



The International Conference on the
Challenges Facing Veterinary Medicine
in an Integrated Global Economy

A Tribute to Martin Kaplan

by Lord Soulsby of Swaffham Prior

It is a particular honor to prepare this tribute to Martin Kaplan at the commencement of the important Conference on Veterinary Public Health in a Global Economy and in celebration of the opening of the new Hill Pavilion at the University of Pennsylvania School of Veterinary Medicine.

Martin Kaplan was born in Philadelphia, PA, on June 23, 1915 and died on October 16, 2004 in Geneva, Switzerland, aged 89 years. He received his professional education at Penn's School of Veterinary Medicine, graduating in 1940.

After a brief period in private practice in Philadelphia, he joined the United Nations Relief and Rehabilitation Administration (UNRRA), and on VE day 1945, sailed to Greece escorting six prize bulls donated by the Brethren Society of Pennsylvania for the purpose of re-stocking the decimated cattle population of Greece. He then joined the Food and Agriculture Organization (FAO) in Rome where he performed similar work in various countries.

Martin Kaplan was a friend of Albert Einstein and on his return home was, at Einstein's behest, induced to take the Deanship of the veterinary school of what is now Brandeis University. However, through no fault of Martin's, the project fell through and Einstein withdrew his support. Nevertheless, Einstein had a strong influence on Martin Kaplan, encouraging him to take a stand against injustice, and to reach across national barriers in search of peaceful solutions to the world's conflicts. This led him to join the Pugwash Conferences on Science and World Affairs later in his career.

In 1947 Martin Kaplan rejoined FAO and while bound for an assignment in China was asked to stop in Poland to organize a symposium. During the next few months the Chinese revolution moved towards its final stages and he was forced to cancel his China plans. In 1949 he joined the then evolving World Health Organization (WHO) in Geneva, to form a Veterinary Division. The following years were the most formative in Kaplan's veterinary career and were important to world veterinary public health. He created a most effective Veterinary Division in WHO, recruiting distinguished veterinary scientists from around the world. He also pioneered investigations on influenza in birds, and with Dr. Hilary Koprowski at the Wistar Institute, on a successful vaccine for rabies.

Kaplan's accomplishments in the Veterinary Division of WHO led him to become Director of Science and Technology in the Office of the Director General of WHO. He believed strongly that human health and animal health are closely associated and neither can prosper effectively without the other, especially in the developing world. His essay in 1971 on Science and Social Values is as valid today as it was then, to quote, *"and yet we are faced with war, poverty, increasing disorder and social alienation, distorted priorities, declining freedoms and individual powerlessness. These are products not of man's inherent evil but of the inexorable grinding of the national machines with their imperatives of growth, profit and glory."*

In 1958 Kaplan joined the Pugwash Movement on Science and World Affairs, a movement dedicated to bringing together scientists of the world in the interests of peace and in particular the control of weapons of mass destruction. In 1976 he retired from WHO and became Secretary General of the Pugwash Conferences and devoted the next dozen years to its cause, leading in 1997 to the award of the Nobel Peace Prize for the organization and its founder, Sir Joseph Rotblat.

Martin Kaplan through his work in science, at the WHO in veterinary medicine and public health, and finally in the Pugwash Movement was a man of giant intellect and global influence. Penn's School of Veterinary Medicine is proud of its alumnus and strives to perpetuate the outstanding work and ideals for which he stood.

Thursday, November 9

9:45 a.m.	Introduction and Welcome <i>Ronald Daniels, Provost, University of Pennsylvania</i>
10:00 a.m.	Contributions of Martin Kaplan to International Veterinary Public Health and to the Effective Prohibition of Chemical and Biological Weapons <i>Matthew Meselson, PhD, Thomas Dudley Cabot Professor of the Natural Sciences, Harvard University</i>

Session 1, Moderator, *Dr. Joan Hendricks, Gilbert S. Kahn Dean of Veterinary Medicine, University of Pennsylvania*

Changing Risk Factors in Veterinary Public Health

10:30–11:00 a.m.	Global Livestock Sector Trends and Implications for the Veterinary Profession <i>Dr. Henning Steinfeld, FAO</i>
11:10–11:45 a.m.	The Main Environmental and Health Impact of the Livestock Revolution <i>Dr. Cees de Haan, The World Bank</i>
11:45 a.m.–12:10 p.m.	Globalization: What Caused It and How Will the Story End? <i>Dr. Stephen Kobrin, Wharton Business School</i>
12:10–12:30 p.m.	Discussion

12:30–1:15 p.m. Lunch Break

Session 2, Moderator, *Dr. Robert Marshak, Dean Emeritus, University of Pennsylvania School of Veterinary Medicine*

The Changing Face of Global Food Production and Delivery

1:15–1:40 p.m.	The Global Animal Health Industry—Active Partner in Protecting Public Health <i>Dr. Edward Kanara, Pfizer Animal Health</i>
1:40–2:05 p.m.	Attributes of Technologies in Animal Agriculture <i>Dr. David Galligan, University of Pennsylvania Doyle Waybright, Mason Dixon Farms</i>
2:05–2:30 p.m.	Crossing Borders: Social Implications with the Rise of US Supermarkets in Latin America <i>Dr. Candace Jacobs, Vice President, HEB Foods</i>
2:30–2:55 p.m.	Opportunities and Challenges for Farming the Deep Blue <i>Dr. Richard Langan, University of New Hampshire</i>
2:55–3:10 p.m.	Discussion

3:10–3:30 p.m. Break

Session 3, Moderator, *Drs. Tom Parsons and James Serpell, University of Pennsylvania School of Veterinary Medicine*

Perceptions of Modern Food Production Systems

3:30–3:55 p.m.	The Sea Change for Animal Welfare in Livestock Production: Implications for Producers, Consumers and Public Health <i>Dr. Paul Thompson, Michigan State University</i>
3:55–4:20 p.m.	Animal Waste <i>Sandra Cointreau, The World Bank</i>
4:20–4:45 p.m.	Global Food Systems—Challenges and Opportunities <i>David Harlan, Cargill</i>
4:45–5:10 p.m.	The Global Impact of Multiple Antibiotic Resistant Bacteria <i>Dr. Shelley Rankin, University of Pennsylvania</i>

6:30 p.m. Reception and Dinner Bodek Lounge, Houston Hall

8:00–9:00 p.m. What the Future Will Bring and How We Get Ready
Dr. Gregg W. BeVier, AgGlobalVision

Friday, November 10

Session 4A, Moderator, *Dr. Hilary Koprowski, Professor of Immunology, Thomas Jefferson University*

Emerging Threats from Zoonotic, Non-zoonotic, and Food Borne Diseases

8:30–9:00 a.m.	Wildlife Diseases—Emerging and Re-emerging Zoonoses from Wildlife Reservoirs <i>Dr. Bruno Chomel, University of California, Davis</i>
9:00–9:25 a.m.	Ecological Investigations into Sylvatic Reservoirs of Human Monkeypox and Other Viral Zoonoses <i>Dr. Darin Carroll, CDC</i>
9:25–9:50 a.m.	Globalization, Zoonoses, and the Rabies Paradigm <i>Dr. Chuck Rupprecht, CDC</i>
9:50–10:15 a.m.	Bats and Emergence of SARS <i>Dr. Lin-Fa Wang, Australian Animal Health Lab</i>

10:15–10:35 Coffee Break

Session 4B, Moderator, *Dr. Peter Kaplan, Dept. of Neurology, John Hopkins Medical School*

Emerging Threats from Zoonotic, Non-zoonotic, and Food Borne Diseases

10:35–11:00 a.m.	Farming Systems, Trade and Cultural Practices in Developing Countries that Influence the Emergence of Avian Influenza <i>Dr. Vincent Martin, FAO</i>
11:00–11:25 a.m.	Avian Influenza: the Moving Target <i>Dr. Ilaria Capua, FAO and OIE, Italy</i>
11:25–11:50 a.m.	Avian Influenza at the Wildlife-Human-Domestic Animal Interface <i>Dr. Bruce Rideout, Wildlife Park, San Diego</i>

11:50 a.m. –12:40 p.m. Lunch

12:40–1:05 p.m.	Causes and Consequences of Ebola Virus Emergence in Central Africa <i>Dr. Roman Biek, Emory University</i>
1:05–1:30 p.m.	The Impact of Non-Zoonotic Animal Disease Epidemics on Public Health and Well Being <i>Dr. Gary Smith, University of Pennsylvania</i>

1:30–1:50 p.m. Discussion Sessions and Break

Session 5, Moderator, *Dr. Alan M. Kelly, Dean Emeritus, University of Pennsylvania School of Veterinary Medicine*

Global Responses

1:50–2:15 p.m.	Addressing Contemporary Public Health Issues through CDC's National Center for Zoonotic, Vector-Borne & Enteric Diseases <i>Dr. Lonnie King, Director, CDC</i>
2:15–2:40 p.m.	International Efforts in Early Detection, Surveillance and Response <i>Dr. Corrie Brown, University of Georgia</i>
2:40–3:05 p.m.	New Approaches to the Control of Zoonotic Diseases <i>Dr. Francois-Xavier Meslin, WHO Geneva</i>
3:05–3:30 p.m.	The Role of Environmental Systems in Applied Preventive Medicine: Responsibilities and Opportunities for the Veterinary Public Health Practitioner <i>Dr. Hugh Mainzer, CDC</i>
3:30–4:00 p.m.	Discussion

4:00 p.m. Summary and Closing

Dr. Alan M. Kelly

Speakers



Roman Biek, PhD
Dept. of Biology, Emory University

rbiek@emory.edu

“Causes and Consequences of Ebola Virus Emergence in Central Africa”

Because of its high human fatality rate and enigmatic epidemiology, Ebola virus exemplifies the threat of emerging zoonotic diseases. I will present some of the recent findings on Ebola virus ecology and epidemiology and describe the mechanisms thought to be critical for its emergence. I will further identify some important gaps in our current understanding of this zoonotic pathogen that hinder our ability to predict and prevent future outbreaks.



Gregg BeVier, DVM
AgGlobalVision

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“What the Future Will Bring and How We Get Ready”

Food security in developing countries is an enigma given the vast resources available to us on Earth. It is estimated that almost 50% of our global population (6.5B) lives on less than \$2/day. Poverty causes hunger, not lack of food supply. Today, we have the technical capability to produce enough food to supply 10 billion people. Veterinarians have an enormous opportunity to provide the leadership needed for the technology transfer required to improve food production efficiency. In order to provide this leadership, veterinarians will need to enhance their training in the areas of business and operations management.



Corrie Brown, DVM, PhD, DACVP

Josiah Meigs Distinguished Teaching Professor and Coordinator of International Activities, University of Georgia College of Veterinary Medicine

corbrown@vet.UGA.edu

“International Efforts in Early Detection, Surveillance and Response”

Weaknesses of early detection and rapid response are responsible for the spread of many emerging diseases. The Global Early Warning System (GLEWS), developed and launched jointly by the World Health Organization, the Food and Agriculture Organization, and World Organisation for Animal Health, seeks to establish mechanisms for tracking and verifying unusual syndromes that warrant early dissemination of warnings.



Ilaria Capua, DVM

Head of the Virology Department at Istituto Zooprofilattico Sperimentale delle Venezie, Padova, Italy and Head of the National, FAO and OIE

icapua@izsvenezie.it

“Avian Influenza: The Moving Target”

Avian Influenza viruses of the H5N1 subtype have become endemic in the poultry population of vast areas of the world in three continents. This opportunity given to the virus has greatly increased its potentials, affecting the health of wild and domestic animals and of humans. Currently, human health is affected both in terms of the reduction of food security and of the infection of humans as a prelude to the emergence of a new pandemic virus. An extraordinary effort to control this panzootic is necessary – in which the veterinary community plays a crucial role.



Darin S. Carroll, MS, PhD

Evolutionary Biologist, Poxvirus Program, CDC

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“Ecological Investigations into Sylvatic Reservoirs of Human Monkeypox and Other Viral Zoonoses”

The taxonomy and ecology of many zoonotic disease reservoirs systems (including monkeypox) are poorly understood. Studies contributing to a more thorough understanding of these systems would no doubt shed considerable light on the primary zoonotic transmission of various zoonoses and facilitate the development of more efficient surveillance and intervention strategies.



Bruno Chomel, DVM, PhD

Professor of Zoonoses, University of California, Davis

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“Wildlife Diseases—Emerging and Re-emerging Zoonoses from Wildlife Reservoirs”

Most emerging infectious diseases are zoonotic, with wildlife constituting a large and often unknown reservoir. Wildlife can also be a source for re-emergence of previously controlled zoonoses. Although the discovery of such zoonoses is often related to better diagnostic tools, man-made modifications to natural habitats and human behaviors are the leading causes of emergence. It includes expansion of human populations and encroachment on wildlife habitat, changes in agricultural practices and trade globalization. However, wildlife trade and translocation, live animal and bushmeat markets, consumption of exotic foods, development of ecotourism, and access to petting zoos, as well as ownership of exotic pets are now important factors to consider for such an emergence. Education of the general public about the risks associated with wildlife, bushmeat and exotic pet trades as well as the implementation of proper surveillance systems are greatly needed to reduce the risk of emerging zoonoses.



Sandra Cointreau

**Solid Waste Management
Advisor, The World Bank**

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“Animal Waste”

Recent zoonotic disease outbreaks of devastating consequences to animal health and trade in livestock products, and including some human disease incidents and mortalities, have affected more than tens of developing countries. In the last decade, hundreds of millions of livestock have lost their lives through culling activities and economic costs have significantly reduced the gross domestic product of some countries. The Bank has conducted emergency projects for several Foot-and-Mouth outbreaks, and is now involved in highly pathogenic avian influenza (HPAI) prevention and containment projects in tens of countries. As part of this work, new studies are examining waste management for livestock manure and slaughter wastes, as these wastes are key in several major outbreaks, including SARS, Mad Cow, Foot-in-Mouth, and HPAI. This presentation discusses the issues faced and some of the Bank's efforts.



Cees de Haan

**Agriculture and Rural
Development Department,
The World Bank**

cdehaan@worldbank.org

**“The Main Environmental and
Health Impact of the Livestock
Revolution”**

Following the introductory paper by Dr. Steinfeld on the overall changes in the global livestock sector, this talk will look more specifically at the veterinary policies and institutions needed in the developing world to produce safe and affordable milk and meat for domestic and international markets. This will include a discussion on the options and issues regarding the required veterinary service infrastructure for different categories of countries according to their development level and access to world markets.



David T. Galligan, VMD, MBA

**Professor of Animal Health
Economics, University of
Pennsylvania School of
Veterinary Medicine**

galligan@vet.upenn.edu

**“Attributes of Technologies in
Animal Agriculture”**

Modern animal agriculture is the fruit of man's historic evolution in the discovery and implementation of new technologies throughout the ages.

As in the past, animal agriculture is on yet another precipice of new emerging technology that will forever change how mankind interacts with food animals. In this presentation we will discuss the fundamental attributes of technology applied in the animal production sector and how they can affect these industries.



David Harlan

**Director of Global Animal
Health & Food Safety, Cargill**

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**“Global Food Systems –
Challenges & Opportunities”**

Global consumption of meat and poultry is projected to increase by 75% in the next 25 years as population and economic growth in developing societies advance. The manner by which this increased animal protein is produced, processed and traded will have dramatic consequences on global public health. Public-private partnerships are desperately needed to ensure the development and implementation of solutions that optimize the health of people, food producing animals, wildlife and the environment. The veterinary public health community must take a central role in leading these partnerships.



**Candace A. Jacobs, DVM, MPH,
Diplomate ACVPM**

**Vice President, Quality
Assurance and Environmental
Affairs, H-E-B**

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**“Crossing Borders: Social
Implications with the Rise of US
Supermarkets in Latin America”**

Retailers think that outside the box and outside their country have the biggest potential for growth. Understanding the national culture of the “foreign” country is key to success. Arriving at a proper balance between locally sourced lines and globally sourced lines, especially in food, is extremely important. How do standards of food safety and quality transfer across the border?



**Edward W. Kanara, DVM,
DABVP**

**Senior Director, Strategic
Initiatives, Veterinary Medicine
Research and Development,
Pfizer Animal Health**

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**“The Global Animal Health
Industry—Active Partner in
Protecting Public Health”**

To help protect public health, the global animal health industry now collaborates more actively than ever with governments, international bodies, academia, the veterinary profession, livestock producers and pet owners. An overview of collaborations in areas including food safety, antimicrobial resistance, newly emergent diseases, and bioterrorism highlights current activities and suggests possible future developments.



Lonnie King, DVM

**Director, CDC's National Center
for Zoonotic, Vector-Borne &
Enteric Diseases**

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**“Addressing Contemporary
Public Health Issues through
CDC's National Center for
Zoonotic, Vector-Borne &
Enteric Diseases”**

The convergence of animal and human health has created a new era for global public health that's characterized by unprecedented challenges and opportunities. CDC has responded to this reality by creating the National Center for Zoonotic, Vector-Borne and Enteric Diseases. This talk discusses these challenges and responses as well as the focus, functions, and roles of the new Center.

Speakers



Stephen J. Kobrin, PhD, MBA,
William Wurster Professor of
Multinational Management,
The Wharton School, University
of Pennsylvania

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“Globalization: What Caused It and How Will the Story End?”

One can look at the current wave of globalization as a cyclical phenomena, a product of political choice and American hegemony or as structural change brought on by technology. To an important extent, the future of globalization depends on which narrative you choose. I will argue that globalization represents irreversible structural change over the medium to longer run.



Richard Langan, PhD, Director,
Open Ocean Aquaculture
Project, University of New
Hampshire

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“Opportunities and Challenges for Farming the Deep Blue”

It is widely acknowledged that future increases in seafood production will likely come from farming, not fishing. The growth of land-based and near shore marine aquaculture, however, is constrained by space, economics, and environmental concerns. For aquaculture to expand, the potential of farming offshore ocean waters must be explored. This presentation examines the current state of offshore aquaculture, and its opportunities and challenges.



Hugh Mainzer, M.S., DVM, Dipl.
ACVPM

U.S. Centers for Disease Control

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“The Role of Environmental Systems in Applied Preventive Medicine: Responsibilities and Opportunities for the Veterinary Public Health Practitioner”

Contemporary public health practitioners investigate the interactions between host physical and social susceptibilities, the agents causing disease and disability, and the environmental factors contributing to adverse health outcomes. In response to the emergence or re-emergence of health threats to global populations, veterinarians are demonstrating the proficiencies needed to implement effective disease prevention and health promotion interventions. This presentation will illustrate several processes that link simple population health concepts with the priorities of a complex public health infrastructure.



Vincent Martin, DVM, MSc.

EMPRES Group, FAO

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“Farming Systems, Trade and Cultural Practices in Developing Countries that Influence the Emergence of Avian Influenza “

The emergence of Highly Pathogenic Avian Influenza, H5N1 strain in Asia and its subsequent spread is the result of years of fast, unregulated development of animal production to meet increased demands for animal protein. Highly concentrated domestic poultry production in densely populated regions, a rapid evolution of animal and farming production systems linked to

traditional practices that place humans and poultry in close proximity, and the evolving nature of the virus have provided ideal conditions for new pathogenic strains of AI to emerge.

Understanding the farming and cultural practices that influence the emergence and spread of AI in developing countries are instrumental for developing effective risk reduction measures. Better understanding of farming systems, trade, market chains and cultural practices in Asia show that control efforts should focus on production sectors with low biosecurity standards, i.e. sector three (free-ranging chickens and ducks, pond ducks) and four (scavenging chickens and ducks) as they represent a greater challenge, from a disease management and cultural perspective, for reducing the risk of AI occurrence and spread.



Matthew Meselson, PhD

Thomas Dudley Cabot Professor
of the Natural Sciences, Harvard
University

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“Contributions of Martin Kaplan to International Veterinary Public Health and to the Effective Prohibition of Chemical and Biological Weapons”



Francois-Xavier Meslin, DVM,
PhD

World Health Organization,
Department of Food Safety

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“New Approaches to the Control of Zoonotic Diseases”

Emerging zoonotic diseases are recognized as global and regional issues with potentially serious

human health and economic impacts; their current upward trend is likely to continue. Each time, the cascade of events leading to the emergence of a new disease is different, but factors known to be important include microbiological adaptation; environmental changes; globalization of agriculture, food production and trade; and human behavioural changes. Hence, predicting threats of zoonotic diseases is difficult.

Early and accurate detection of new outbreaks of epidemic diseases and an improved capacity for understanding the underlying causes will assist in effective prevention or containment of future emergencies. New mechanisms for early warning, surveillance and response are required: using new tools such as GIS, mathematical modelling and satellite remote sensing data. In addition, different disciplines must learn to work together (e.g. physicians and veterinarians, population and wildlife biologists, with social scientists, economists, and diagnosticians).



Shelley Rankin, PhD

University of Pennsylvania
School of Veterinary Medicine

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“The Global Impact of Multiple Antibiotic Resistant Bacteria”

The use of veterinary pharmaceuticals has become integral to the global animal food industry. The worldwide increase in antibiotic resistant bacteria has led to widespread concern that the use of antibiotics in agriculture is largely responsible for this trend.



**Bruce A. Rideout, DVM, PhD,
Dipl. ACVP.**

Zoological Society of San Diego

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“Avian Influenza at the Wildlife-Human-Domestic Animal Interface”

Wildlife disease agents normally remain ecologically compartmentalized based on life-history traits of the natural host. Disease outbreaks can occur when compartment barriers break down, bringing natural hosts into contact with new susceptible hosts. The global spread of H5N1 influenza reveals the complex interplay between wild birds, domestic animals, humans, and other wildlife as multiple compartment barriers are breached.



**Charles Rupprecht, VMD, PhD
Chief, Rabies Section, CDC**

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“Globalization, Zoonoses, and the Rabies Paradigm”

Wildlife is implicated in multiple viral zoonoses, including coronoviruses, paramyxoviruses, filoviruses, and lyssaviruses, with recognition of the latter on all inhabited continents. As one of the oldest infectious diseases, rabies remains a model paradigm for pathogen emergence and a novel example of disease prevention and control in free-ranging wild animals.



**Gary Smith, MA, DPhil
Professor of Population Biology and Epidemiology, University of Pennsylvania School of Veterinary Medicine**

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“The Impact of Non-Zoonotic Animal Disease Epidemics on Public Health and Well Being”

The consequences of large scale non-zoonotic infectious disease epidemics in domestic animals can be summarized by the following categories: direct economic losses; indirect multiplier effects (for example to agriculture-related industries, trade and tourism); logistical, environmental, social and political difficulties associated with the disposal of carcasses; controversy concerning methods and loss of confidence in government; public anxiety in the face of diseases whose direct health consequences for people are misunderstood; multiple opportunities for fraud and other criminal acts; damaging academic controversy; and changes in the incidence of other animal diseases several of which may be zoonotic. These consequences pervasive, and adversely influence human health and well being in multiple ways.



**Henning Steinfeld, PhD
Chief, Livestock Information, Sector Analysis and Policy Branch, FAO**

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“Global Livestock Sector Trends and Implications for the Veterinary Profession”

Global demand for livestock products is expected to double by 2050. Demand and production of livestock products are increasing rapidly in developing countries, which have outpaced developed countries. A few large countries, in particular China, India and Brazil are taking centre stage. Growth is not uniform among the species, and poultry is the one with the highest growth rate in most countries. This increasing demand is associated with important structural changes in countries' livestock sectors, such as intensification of production, vertical integration, geographic concentration and up-scaling of production units. These trends, in combination with external factors, bring about new challenges for the veterinary profession.



**Paul Thompson, PhD
W.K. Kellogg Chair in Agricultural, Food and Community Ethics, Michigan State University**

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“The Sea Change for Animal Welfare in Livestock Production: Implications for Producers, Consumers and Public Health”

After decades of resistance to the demands of animal protectionists, livestock producers are currently undertaking a variety of initiatives to improve the welfare of animals in their care. The diversity in these approaches can be seen as a

welcome development, but the sheer number of approaches suggests that there will be confusion and contestation as competing visions vie for supremacy.



**Lin-Fa Wang, PhD
CSIRO Livestock Industries, Australian Animal Health Laboratory**

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“Bats and Emergence of SARS”

Bats have been implicated as natural reservoirs of an increasing number of emerging zoonotic viruses. We have identified horseshoe bats (genus *Rhinolophus*) as the reservoir host of SARS-like viruses. The significance of this finding in relation to the prevention of SARS and other emerging diseases of bat origin will be discussed.



**Doyle Waybright
Vice President, Mason Dixon Farms, Inc.**

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“Look, No Hands”

The future of dairy farming all across the world is fast changing with a greater emphasis on decreasing the hard physical work of milking and caring for cows. Mason Dixon Farms is milking 500 cows with 10 robots, improving labor efficiency and providing a future for the 9th generation.