ZOONOTIC INFECTIONS - A VETERINARY’S PERSPECTIVE

emerging infectious disease threats

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Introduction

- Department of Veterinary Services (DVS) - one of the department under Ministry of Agriculture and Agro-based Industry (MOA) Malaysia
- DVS is the competent authority in managing animal health and veterinary services in Malaysia
- Comprise of Federal Level (Putrajaya) and State Level (Peninsular Malaysia - 11 states)
- Technical (Veterinary Officer, Assistant Veterinary Officer, Veterinary Assistant), Researcher and Administrative Staffs
- HQ is located at Precinct 4, Putrajaya
Vision and Mission

- **Vision** - A competent veterinary authority serving the animal industry
- **Mission** - Provide quality veterinary services as an assurance for public health and sustainable livestock industry to ensure the safety of human welfare
Functions (Empowered under Animal Act 1953)

1. Control, prevent and eradicate animal and zoonotic diseases.
2. Production of livestock, livestock produce and animal feed.
3. Inspection of meat, milk, eggs, animal feed, abattoirs and veterinary product processing plant
4. Control of import and export of livestock and animal produce and quarantine services
5. Training for the livestock and domestic animal industries.
6. Expand livestock production and animal health as well as general veterinary health.
7. Research on animal diseases and animal genetic sources
8. Control the welfare of animals welfare and conservation of animal's genetic materials

FROM FARM TO PROCESSING PLANT
FROM FARM TO FORK
The interaction between human and animal health is not a new phenomenon but the birth of a new era of emerging and re-emerging diseases, and the significant potential impact of these diseases on public health. Most of the emerging diseases have an animal origin, and almost all of them have zoonotic potential which must be addressed through coordinated actions between animal and public health authorities. In fact, emerging and re-emerging zoonotic diseases will become a progressively greater factor in the demands on the activities of Veterinary Services, thus impacting on future partnerships, resources, and programmes. This will imply cooperative actions between the three bodies that are - OIE, FAO and WHO – to provide important international linkages.

One cannot forget that the fight against zoonoses starts by eliminating the pathogen at its animal source. Thus, provides Veterinary Services, veterinarians, farmers, managers of wildlife and the OIE, with a leading role at both national and international level.
Globalization, land encroachment and climate change contribute to outbreaks of **zoonotic diseases** – e.g. brucellosis, bovine TB, parasitic illnesses, anthrax, BSE and certain strains of influenza viruses. High-impact animal diseases such as foot-and-mouth disease, peste des petits ruminants, classical or African swine fevers, while not directly affecting human health, do affect **food and nutrition security** and **livestock production and trade**. Therefore, seriously compromised food security and causing a high **socioeconomic impact** on agricultural exporting nations increased the need to focusing **animal health services** on the early epidemiological investigation and prevention of zoonoses through a **holistic and transdisciplinary joint initiative** called the “One Health”.

*Human health and animal health are interdependent and bound to the health of the ecosystems in which they exist*
Animals, Humans and Diseases

Diseases of animal origin that can be transmitted to humans, such as avian influenza, rabies, Rift Valley fever and brucellosis, pose worldwide risks to public health. Other diseases which are mainly transmitted from person to person also circulate in animals or have an animal reservoir, and can cause serious health emergencies, such as the recent epidemic of Ebola virus. These risks increase with globalisation, climate change and changes in human behaviour, giving pathogens numerous opportunities to colonise new territories and evolve into new forms.

OIE 2016
ONE HEALTH
BY PROTECTING ANIMALS, WE PRESERVE OUR FUTURE

Animal and human sectors work together to protect health and ensure food safety and security

60% of human pathogens are of animal origin
5 new human diseases appear each year
20% of animal production losses are caused by diseases globally

With regards to animal health, veterinarians are key players of the ‘One Health’ concept

- Early detection of diseases and infections at animal source can prevent their transmission to humans or introduction of pathogens into the food chain

FROM FARM
Healthy animals raised in humane conditions

1. PRODUCTION
- Surveillance, prevention and control of animal diseases
- Animal welfare management to ensure robust and healthier animals
- Feed quality control
- Safe use of veterinary drugs

2. TRANSPORT
Before slaughter:
- Analysis of the health data from the farm
- Clinical examination
- After slaughter:
- Inspection of the carcass
- Laboratory analysis

3. SLAUGHTERHOUSE
- Verification of hygiene
- Cold chain integrity

4. PROCESSING, STORAGE AND DISTRIBUTION
- Verification of hygiene
- Cold chain integrity

5. SUPERMARKET
- Safe food for consumers

TO FORK

Open cooperation with all the actors involved along the food chain is essential

THROUGHOUT THE FOOD CHAIN
Veterinarians are responsible for regulations on animal health, animal welfare, traceability, food safety and safe trade of animal products

OTHER EXAMPLES OF VETERINARIANS PROTECTING THE HEALTH AND WELFARE OF ANIMALS, AND THEREFORE THE HEALTH OF HUMANS

- Rabies
  - Eliminating diseases and infections at their animal source to save human lives
  - Antibiotics are drugs used to treat infections in both humans and animals
  - Antibiotics are crucial in the treatment of diseases caused by bacteria, which can spread to humans from animals

- Avian influenza
  - Avian influenza can cause severe illness in birds and humans
  - Surveillance and early detection of avian events, including wild birds
  - Rapidly controlling such outbreaks is necessary to prevent potential mutations of the virus and risks of transmission to people

- Antibiotics
  - Antibiotics are drugs used to treat infections in both humans and animals
  - Antibiotics are crucial in the treatment of diseases caused by bacteria, which can spread to humans from animals

- Prevention and control of animal diseases
  - Surveillance and early detection of avian events, including wild birds
  - Surveillance and early detection of diseases in animals

- Other examples of veterinarians protecting the health and welfare of animals, and thus also protecting the health of humans

European Commission
OECD
WSSD
OEH
FAO
VETMED
WMO
World Organisation for Animal Health
OECD Working Group on International Standards for Veterinary Health and Safety
FAO Animal Health Policy and Standards Division
WSSD World Veterinary Association
OEH World Organization for Animal Health
VETMED World Organisation for Animal Health
WMO World Meteorological Organization
FAO Animal Health Policy and Standards Division
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FAO Animal Health Policy and Standards Division
WSSD World Veterinary Association
What is zoonotic and emerging disease?

OIE-Terrestrial Animal Health Code defines zoonotic and emerging as:

**Zoonotic**: Any disease or infection which is naturally transmissible from animals to humans

**Emerging Disease**: new occurrence of a disease, infection or infestation, causing a significant impact on animal or public health.

Most of the emerging diseases have an animal origin, and almost all of them have zoonotic potential.
Important of Animal Diseases

60% of existing human infectious diseases are zoonotic

At least 75% of emerging infectious diseases of humans (including Ebola, HIV, and influenza) have an animal origin

5 new human diseases appear every year. Three are of animal origin

80% of agents with potential bioterrorist use are zoonotic pathogens
ZOOTIC AND EMERGING DISEASE THREATS

- HUMAN AND ANIMAL HEALTH IS CLOSELY LINKED
- THREATS RELATED TO ANIMAL DISEASE & PATHOGENS
  - animal health,
  - economy,
  - biodiversity,
  - food security,
  - food safety, and
  - public health
  - Bio-threat/Agro-threat
  - Invasive alien species (IAS)
  - AMR
ZOONOTIC & EMERGING THREATS

- Disruption of the epidemiological triad balance (agent-host-environment) - cause disease occurrence
- Animals play an important role as biosensors for accidental or deliberate releases of infectious agents and toxins, and for emerging diseases.
- Animal disease surveillance of natural outbreaks in animals, can be used to detect occurrence of zoonotic and emerging diseases
ECONOMIC/FOOD SAFETY AND FOOD SECURITY IMPACT

- Animal diseases have very huge impact on economy (farmers to country)
- Trade
- Socio-economy
- Tourism
- Food supply
- Human Health
BIO/AGRO THREATS

- Animal pathogens being used as bioweapon
- Impact on human population
- Impact on agriculture
- Impact on socio-economy
- Impact on tourism
- Impact on trade
- Impact on public health
Invasive Alien Species

1. New or emerging threats to environment and human population
2. Invasive alien species (IAS) are species whose introduction and/or spread outside their natural past or present distribution threatens biological diversity.
3. IAS occur in all taxonomic groups, including animals, plants, reptiles, amphibians, fungi, bacteria and microorganisms, and can affect all types of ecosystems
4. Can be a threat - destroying the eco-system/biodiversity
Malaysia experiences of Emerging & Re-Emerging Zoonoses

1. 1998-1999 – Nipah Encephalitis Virus
2. 2004-2007 & 2017 – Highly Pathogenic Avian Influenza H5N1
3. 2009 – Swine Influenza Virus H1N1
4. 2012 – Q-fever
5. 2012 - Tuberculosis
6. 2013 – Brucella abortus
7. 2014 – Brucella melitensis
8. 2015 – Rabies and Equine Influenza Virus
9. Salmonellosis

Listed are some of zoonotic diseases present in Malaysia that have impact on both human health and economy.
List of Strategy for Preventing Diseases

i. Establishing National Disease Control and Surveillance Programme
ii. Import Risk Analysis
iii. Quality Assurance – MyGap and VHM
iv. Audit – Processing Plant Inspection
v. Border Control – collaboration between DVS Enforcement, MAQIS, LE (Police, Army etc) Custom and Immigrations
List of Strategy for Preventing Diseases

vi. Sharing Information on zoonoses – regular meeting between DVS and MOH


viii. Bilateral Collaborations
List of Strategy for Preventing Diseases

ix. Disease Management – Animal Disease cases will be monitored until disease resolved and freedom gained.

x. Stamping out for highly economic and zoonotic disease e.g HPAI and Nipah Encephalitis.

xi. Culling policy – Brucellosis, Salmonellosis, Tuberculosis, Rabies.

xii. Vaccination – animal disease more of preventing the herd rather than treating individual animal.
List of Strategy for Preventing Diseases

xiii. Identification of outbreak area and surveillance
xiv. Gazetting the outbreak area/states
xv. Movement control
xvi. Quarantine
xvii. Rabies in immune belt area – leash/harnessing and licensing of dogs (dogs have to be kept indoors)
CHALLENGES

1. To change policy makers perspective
2. Multi disciplines' collaboration
3. Capability to diagnose intentional occurrence
4. Public awareness
5. Lack of experience of foreign diseases or intentional disease occurrence. Will delay recognition of symptoms in case of outbreaks
6. To predict/forecast emerging or re-emerging of diseases
Summary

Protecting animals to preserve our future

Controlling zoonotic pathogens at their animal source—that is, pathogens that can be transmitted from animals to humans and vice versa—is the most effective and economic way of protecting people. Consequently, global strategies to prevent and control pathogens must be developed if we are to protect public health. These should be coordinated at the human-animal-ecosystems interface and applied at the national, regional and global levels, through the implementation of appropriate policies.
Conclusion

Veterinary Services, in both their public and private components, play an essential role in the development and implementation of policies to manage animal health risks. In protecting animal health and welfare, they meaningfully contribute towards improving human health, as well as food safety and security.

For that reason, they need appropriate and effective methods to prevent and control animal diseases (emerging zoonoses & TADs), and must be able to communicate and work in close collaboration with a wide range of stakeholders, in order for joint action to be taken (OIE).
THANK YOU