World Health Day

Ensuring Health & Sustainability in Europe: Doctors and Veterinarians emphasize “prevention is better than cure”

Rui Lemos Silva, MD/DVM
Lisbon, Portugal

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The Importance of One Health Approach as a Key to Ensure Health and Sustainability

Rui Lemos Silva, MD/DVM
Lisbon, Portugal
The “One Health” concept is a worldwide strategy linking human, animal and environmental health.

The objective is to promote the health and well-being of all species.
ONE HEALTH

Promotes interdisciplinary collaboration and communication among health professionals, science academies, institutions, policy makers and civil society organizations (medical, veterinary, nurses, environmental associations, etc)
Zoonoses are infections and diseases that are naturally transmissible between animals and humans, directly or indirectly (e.g. contaminated foodstuffs, vectors, contact with polluted environment).

Most effective and economic solution to protect human health is to control zoonotic pathogens at the animal health level.
About 60% of human pathogens and 75% of recent emerging diseases are zoonotic.
Most of the reported outbreaks (5,363) in Europe in 2012 were caused by *Salmonella*, *Campylobacter*, bacterial toxins and viruses.

Main food sources were eggs, mixed foods and fish and fishery products.
EMERGING INFECTIONS

• Described for the first time
• Appear in new geographic areas
• Have an abrupt increase in incidence

REEMERGING INFECTIONS

Have been completely or relatively dormant in a specific geographic area and then reappear with a substantial incidence
EMERGING AND REEMERGING ZOONOSSES

CLASSIFICATIONS

- **TYPE 1**
  From wild animals to human beings - Monkey Pox, Hemorragic fevers/ Hantavirus, Lassa fever, Dengue, West Nile fever

- **TYPE 1+**
  From wild animals to humans, with further human-to-human transmission
  - *P. knowlesi* (the 5th human malaria parasite), AIDS

- **TYPE 2**
  From wild to domestic animals, then to human beings - Rabies

- **TYPE 2+**
  From wild to domestic animals to humans, with further human-to-human transmission
  - SARS coronavirus, avian Influenza, H1N1 swine influenza

THREATS AND TRENDS

- Relationship between humans and animals
- World population growth and poverty
- Global climate change
- Intensive animal production
- Globalization: movement of people, animals and food trade
- Political instability in certain geographic areas
- Antimicrobial resistance
KEY INSTITUTIONS

International - OIE, WHO and FAO (UN)

EU level - EU/DG SANCO, ECDC, EFSA, EMA

USA level - CDC, FDA

National level (Portugal)

- Ministry of Health, Directorate-General of Health, National Institute of Health, Regional Health Administrations, Hospitals and Primary Healthcare Centers

- Ministry of Agriculture, Directorate-General for Food and Veterinary Issues, Regional Directorates, Local Municipalities
**CASE STUDY 1**

**AVIAN INFLUENZA OUTBREAK (H5N1)**
China (Qinghai Lake) 2005-2006

1 - Attempt from EU to control the outbreak within European borders

2 - Recognition from EU that problem could not be treated at a national level

3 - EU decision, due to lack of Chinese capacity, to send experts (pathologists, epidemiologists, physicians, veterinarians) to China to provide local expertise and support to health professionals working in field and labs (blood tests, vaccination, stamping-out/cull, etc)
INFLUENZA H5N1

CONCLUSIONS

Was this successful?
What specific actions made it so?
Could it have been improved?

Support for the Veterinary and Human Health Services, in Low and Middle-Income Countries (LMICs), is crucial to control the diseases at their origin.
CASE STUDY 2

WEST NILE VIRUS OUTBREAK

JULY 2010

Woman, 55 years old, Caucasian, Setúbal

Bitten by several mosquitoes, presented with fever, rash and lymphadenopathies

Three weeks later - worsening of symptoms admitted to the hospital

A positive test for WNV (IFA IgM+) was confirmed at National Reference Laboratory (INSA), and later confirmed at Robert Koch - Germany (ENIVD – ECDC)

AUGUST 2010

Symptoms improved, patient was discharged from the hospital and followed as outpatient

R. Amador, DGAV, International Forum WNF, 2011
WEST NILE VIRUS
Horses, Palmela

JULY 2010

Meeting between DGS and DGAV. Strategy implemented:
- 20km surveillance radius of herds and equine centers (481 animals)
- Investigation into 46 potential equine cases
- Distribution of instructions through the ICNB (Nature Protection Services) on the collection of dead wild birds
- Collection of mosquitoes by DGS+INSA within a 5km radius of first infection location
- Testing of mosquitoes (PCR) - WNV negative

Two months later (4km distance) – 1st horse with symptoms and positive lab (WNV IgM, IgG, neutralization (+)
Focus Zone established in Palmela by DGAV/INIAV

Two weeks later – 2nd horse with symptoms and with positive lab – results compared with outbreaks in Italy and Hungary - Secondary Zone established

Alves,M.J., Poças, M. et al, RPD1 2012, 8:46-51
R.Amador, DGAV, International Forum on WNF, 2011
NATIONAL COOPERATION

WEST NILE VIRUS

CONCLUSIONS

This case proves that there was a certain level, although low, of viral activity in the region, given that all mosquitoes tested were negative for Flavivirus, and only the patient and two horses were positive.

Increased awareness of GPs and vets due to institutional alerts (DGS and DGAV)
Number of WNV tests increased
Strict control of vectors (REVIVE)
The antimicrobial classes used are largely the same in Human Medicine (HM) and Veterinary Medicine (VM)

However, some classes of antimicrobials, such as carbapenems (e.g., imipenem, meropenem, ertapenem and doripenem), monobactams (e.g., aztreonam), oxazolidinones (linezolid) and glycyclines (tigecycline) are used exclusively in HM

RESISTANT BACTERIA

MAIN DETERMINANTS
- Mutations in bacteria
- Selection pressure from antibiotic use which provides a competitive advantage for mutated strains
- Suboptimum antibiotic doses which help stepwise selection of resistance

PATHWAYS
- Food - most studied and important transmission route (Campylobacter, Salmonella, E. coli)
- Poor hygiene (hospital and community levels) and sanitation
- Direct contact between animals and humans (MRSA)
- Environmental contamination - manure, run-off from fertilized land or directly from sewage (Salmonella, Campylobacter)

EVIDENCE OF SPREAD OF RESISTANCE

Meticillin-resistant *Staph. aureus* (MRSA) ST22-IV
From animals to humans and from humans to animals (community or hospital-associated)

Vancomycin-resistant *Enterococci* (VRE)
Isolates from animals and humans

*E. coli* ESBL and AmpC
Companion animals, horses, food production and humans
Netherlands - 20% of isolates from people, suggesting food contamination

Carbapenemases in *Enterobacteriaceae*
Appearance in animals through use of any B-lactam (genes amplified, co-selection and spread in animals)

Vancomycin-resistant *Staph. aureus* (VRSA)
13 cases in USA and 1 in Europe!

ANTIBIOTIC RESISTANCE

PERTINENT ISSUES

ON THE VET SIDE (terrestrial animals)
- Variety of animal species and production systems (individual or group)
- Different regulatory systems, clinical practices, methods of acquisition and prescription

ON THE HUMAN SIDE
- Appropriate prescription of medicines, correct availability and dispensation, taken in the right dose, intervals and duration
CONCLUSIONS

In the Field

- Promote closer work between physicians and veterinarians, institutionally and in their clinical practice, keeping in mind the One Health concept and its Public Health impact.

- Dispense with the “blame culture” between physicians and veterinarians and accept that both play parts in the propagation and control of antimicrobial resistances.

- Be conscious that the solution is not the prohibition of antibiotic use by veterinarians. Animals fall ill and must be treated, and healthy animals are an integral part of getting safe food onto the table.

- Strict control of “prescription-only medicines” at all distribution levels.
CONCLUSIONS

In Clinical Practice

- Prudent use of antimicrobials in human clinical practice (primary care and hospitals), as well as in veterinary medicine (farm and companion animals)

- Combination therapy (e.g. co-trimoxazole, amoxicillin+clavulanic acid) to slow the emergence of resistances

- Better and faster diagnostics and notification systems

- Novel vaccines to reduce the need for antibiotic treatment

- Probiotics
CONCLUSIONS

Research and Development

- Innovation (i.e. new antibiotics) from researchers, academia, decision makers and the industry
- Improvement of data collection, evaluation and integrated management of human and veterinary health information

Politics and Legislation

- Sustainable political support for coordinated actions of public health and diseases impacting animals, at the human-animal interface
- Political effort to create technical boards, nationally and internationally, combining physicians and veterinarians in a One Health Perspective
- Use of media as a tool to raise awareness in the general population about food safety and zoonotic diseases transmission

Human Health, Animal Health and the Environment are undoubtedly interlinked.

Zoonoses, as a growing problem, demands a greater dialogue between physicians and veterinarians.
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MUITO OBRIGADO

THANK YOU

Rui Lemos Silva, MD/DVM
Lisbon, Portugal