Emerging Zoonoses of Public Health Concern

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Content

1. The OIE
   1. History and obligation of notification
   2. OIE listed diseases, including zoonosis and emergent diseases
   3. World animal health information system: WAHIS

2. Example of zoonoses of PH concern notified to the OIE by Mediterranean countries
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   4. Crimean-Congo haemorrhagic fever
   5. Highly pathogenic avian influenza H5N1

3. Discussion

OIE’s origin and mandate

The OIE was created in 1924 following the incursion of rinderpest in 1920 in Europe

To prevent animal diseases from spreading around the world

• 28 countries in 1924
• 175 countries in 2010

The 4th Strategic Plan 2006/2010 extended the OIE’s global mandate to

“the improvement of animal health all over the world including zoonoses”
OIE objectives

One of OIE’s missions is to ensure transparency on animal health situation worldwide, including zoonoses. Among the formal obligations of OIE Members is the need to submit information on the relevant animal disease situation – including on zoonoses present on their territory - in the most timely and transparent way.

Members’ obligations

By deciding to join the OIE, a Member agrees to fulfil its international commitment to notify to the OIE as laid down in the Chapter 1.2.1 of the OIE’s Terrestrial Animal Health Code - “Notification and Epidemiological Information”

Including zoonoses
Notifiable diseases to the OIE: the OIE’s single list of diseases

Criteria for listing diseases / infections:

- Capacity for international spread
- Capacity for significant spread within naïve populations
- Zoonotic potential
- Emerging disease

Similar criteria apply

Decision Tree used to determine the list

INTERNATIONAL SPREAD

- Has international spread been proven on 3 or more occasions? OR
- Are more than 3 countries with populations of susceptible animals free of the disease or facing impending freedom (based on Code provisions, especially Appendix 3.8.1)? OR
- Do OIE annual reports indicate that at least 3 countries with susceptible populations are reporting absence of the disease?

NO

YES

ZOONOTIC

- Has transmission to humans been proven? (with the exception of artificial circumstances) AND
- Is human infection associated with severe consequences? (death or prolonged illness)

YES

EXCLUDE

NO

SIGNIFICANT SPREAD IN NAIVE POPULATIONS

- Does the disease exhibit significant mortality at level of a country or zone? OR
- Does the disease exhibit significant morbidity at level of a country or zone?

NO

EXCLUDE

YES

INCLUDE
Emerging Disease

… a new infection resulting from the evolution or change of an existing pathogenic agent,

… a known infection spreading to a new geographic area or population, or

… a previously unrecognized pathogenic agent or disease diagnosed for the first time and which has a significant impact on animal or public health


Challenges for Veterinary Services?

Factors of Emergence and Re-emergence

- International travel and commerce: 77%
- Globalization of agriculture and trade: 70%
- Microbial adaptation: 66%
- Climate and weather: 57%
- Changing ecosystems: 49%
- Changing host susceptibility: 43%
- Poverty: 38%
- Economic development: 32%
- Technology: 20%
- Intent to harm: 18%

Results of the compilation of a questionnaire sent to OIE Member Countries and designed to assess the occurrence of emerging and re-emerging zoonotic diseases. Dr. L. King, 2005, CDC
Global Distribution of Relative Risk of an EID Event Caused by Zoonotic Pathogens

EID events = classified by the temporal origin of the original case or cluster of cases that represents a disease emerging in the human population.

Maps are derived for EID events caused by:
   a) zoonotic pathogens from wildlife and
   b) zoonotic pathogens from non-wildlife, mapped on a linear scale from green (lower) to red (higher).


OIE Information System
WAHIS - WAHID

Promote transparency in and knowledge of global animal disease situation.
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Some zoonoses of public concern notified to the OIE by Mediterranean countries

Emerging and Re-emerging diseases

1. Rabies
2. West Nile fever
3. Bovine tuberculosis
4. Crimean Congo Hemorrhagic fever
5. Highly pathogenic avian influenza (H5N1)
Rabies

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<th>Rabies 2009</th>
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<tr>
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<td>Number of cases</td>
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<td></td>
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<td>Wild</td>
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</tr>
<tr>
<td>Jordan</td>
<td>yes</td>
<td>3*</td>
</tr>
</tbody>
</table>


Legend:
* Time reference - first semester 2009
** France reported cases of EBLV1 in bats.
Cases were reported in serotine (Eptesicus serotinus) belonging to the Family Vespertilionidae

Rabies situation in animals in 2009 in the region covered by EpiSouth
Rabies

In Europe, the area around the Italian and Slovenian borders deserves particular attention in light of the epidemiological evolution of rabies since its start in 2008.

Rabies

Rabies index case in Italy (October 2008)

Spreading of rabies in Italy (April 2010)
Rabies: quantitative data

Number of rabies cases in Italy by species from 2008 to 2010.

West Nile Fever

West Nile virus is now distributed in many regions of the world, with infections observed in birds, horses and humans.

Between August and September of 2008, human cases of West Nile fever were also reported in Italy (3), Hungary (14) and Romania (2) (source: meeting report of expert consultation on West Nile virus infection held in Stockholm, on 21–22 April 2009).

West Nile virus (WNV) has been causing a large human epidemics in North America, mainly in the USA, since it was first detected in 1999 and is now an important vector-borne disease in this continent. In 2009, a total of 663 human cases were reported to the Center for Disease Control as of December 8, 2009 and 8 cases in Canada as of October 3, 2009.
Surveillance findings occurring between January 1, 2007 through December 31, 2007, reported to CDC’s ArboNET system for public distribution by state and local health departments.

Map shows the distribution of avian, animal, or mosquito infection occurring during 2007 with number of human cases if any, by state. If West Nile virus infection is reported to CDC from any area of a state, that entire state is shaded.

West Nile fever situation in animals

Spain reported a total of 4 cases in 2009 in species belonging to the Family Accipitridae. The country reported the disease limited to certain zones such as La Mancha (3 cases) and Castile and León (1 case). The case occurred in Castile and León was identified in a booted eagle (*Hieraaetus pennatus*).
West Nile fever: qualitative data

The highest numbers of cases were registered in black-billed magpie (*Pica pica*) belonging to the family Corvidae with 32 cases.

West Nile fever surveillance
Bovine tuberculosis in Animals and Humans

Trend of animal outbreaks from 1996 to 2008

Trend of human cases from 1996 to 2008

Source: Handistatus and WAHID data

Crimean-Congo hemorrhagic fever

Endemic in the Balkans and the Middle East in humans

Distribution area of the Hyalomma tick

Transmission

- through tick bites and contact with crushed infected ticks,
- through contact with viraemic tissues of infected wild or domestic animals during and immediately post-slaughter or
- through person to person transmission by contact with infectious blood or body fluids.

-Nosocomial transmission.

Trends over the last several years: increase of the report of sporadic human cases with higher case fatality rates
Animals transiently infected with CCHF without clinical signs

Notifiable to the World Organisation for Animal Health (OIE)
(risk posed by its zoonotic potential rather than consequences of its spread within the animal population) Chapter 1.2.1. of the OIE Terrestrial Animal Health Code.

Better monitoring of CCHF in animals by Veterinary Services is an important step to avoid human fatalities.
HPAI H5N1

1. Still an animal and public health issue
2. Endemic in Egypt
3. Sporadic reoccurrence in Israel
4. Recent reoccurrence in Romania and Bulgaria. First reoccurrence since the beginning of 2008 in Europe
5. Evolution year after year in Episouth region

First occurrence of HPAI H5N1 in the region in October 2005
Spread during the year 2006

Situation in the region in 2007
Situation in 2008
Egypt declared itself endemic

Situation in 2010: Egypt still endemic, reoccurrence in Israel, Romania and Bulgaria
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Complex interfaces:
Animal-Human-Pathogen-Ecosystem Interfaces

Ecosystem
Animal (wild/domestic)
Pathogen
Human
Human-Animal-Ecosystem Domain Interface

Many factors to keep into account

Ex: climatic events

• Occurrence of Bluetongue in Sardinia, Italy in August 2000
• Main hypothesis of introduction: sand storm coming from North-Africa
Source: Images from “SeaWiFS Project”, NASA/Goddard Space Flight Center, and ORBIMAGE

Satellite: OrbView-2
Sensor: SeaWiFS
• Few diseases have little information on the situation in animals because of little surveillance in livestock, in wildlife, in vectors.

Increase surveillance in animals is a key to protect human health

• Improve the collaboration between public health and animal health sectors