ZOONOTIC POXVIRUSES
by

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Annex 3

DISCONTOOLS LIST OF 51 DISEASES

Group 1: Epizootic diseases
- African Horse Sickness
- African Swine Fever
- Avian Influenza
- Bluetongue
- Contagious Bovine Pleuro Pneumonia
- Classical Swine Fever
- Foot & Mouth Disease
- Peste des Petits Ruminants
- Rift Valley Fever
- Sheep and Goat Pox
- Swine Vesicular Disease
- West-Nile Virus infection
- Zoonotic pox viruses (Parapox and Orthopox)

Group 2: Zoonotic diseases
- Rabies
- Nipah virus infection
- Anthrax
- Brucellosis
- Bovine Tuberculosis
- Q Fever
- Trypanosomiasis
- Leishmaniosis
- Leptospirosis
- Chlamydirosis
- Cysticercosis
- Echinococcosis
- Food-borne bacterial:
  - Salmonella
  - E. Coli
  - Campylobacter
- Cryptosporidiosis
- Food-borne viral (Hepatitis E. Virus)
- Bovine Spongiform Encephalopathies
- Crimean Congo Haemorrhagic Fever
- Tuberculosis
- Trypanosomiasis
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Group 3: Major food-producing animal disease complexes
- Paratuberculosis (Johnne’s)
- Parasitic gastro-intestinal diseases:
  - Liver Fluke
  - Coccidiosis
  - Nematodes
- Mastitis:
  - Staphylococcus areus mastitis
  - Environmental/Streptococcal mastitis
  - Small ruminant mastitis
- Swine respiratory:
  - PRRS – CG3 + HN
  - PCV II
  - SIV
  - A. Pleuropneumonia
  - Swine Mycoplasma
- Bovine respiratory:
  - BVDV
  - BRSV
  - BHV-1 (IBR)
  - Mycoplasma bovis
  - Theileria
What’s new in the field of OPVs since 2010

• An outbreak of Vaccinia virus was recently described in horses in Brazil.

• Subclinical infections either caused by OPXV have been recently reported in cattle and goats. Subclinically infected animals may play the role of reservoirs.

• The number of reports on human infections linked to contact with domestic animals is increasing.

• Cantagalovirus in Brazil is suspected to be an escape of the smallpox vaccine (vaccinia virus) back into cattle therefore potentially providing a cycle of infection from humans to cattle and back again?
Detection of Vaccinia virus during an outbreak of exanthemous oral lesions in Brazilian equids


Evidence of zoonotic Poxviridae coinfections in clinically diagnosed papillomas using a newly developed mini-array test.


NOT REMOVABLE FROM THE ENVIRONMENT
Reservoir species do not show symptoms
Wildlife reservoir species in contact with humans

EASY TO HANDLE POTENTIAL HARM

NOT INCLUDED IN OIE LIST

15-24 MONTHS DURATION
21-50% SUFFER SERIOUS IMPACT
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<tr>
<th>COX positive</th>
<th>PPV COX positive</th>
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<tr>
<td>PPV OPV Negative</td>
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<tr>
<th>OPV COX positive</th>
<th>PPV COX OPV positive</th>
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**PPV (BPSV, ORFV, PCPV):** B2L

Internal control: COX

**OPV (MPXV, CPXV, VACV):** HA
Control Tools

Diagnostics availability

Commercial diagnostic kits available worldwide

No universal diagnostic test in use when available, is mainly performed at academic institutions or in public health reference laboratories.

**GAP:** rapid (validated), point-of-care tests are not available.

Commercial diagnostic kits available in Europe

No universal diagnostic test in use when available, is mainly performed at academic institutions or in public health reference laboratories.

**GAP:** rapid (validated), point-of-care tests are not available.

Diagnostic kits validated by International, European or National Standards

None.

Diagnostic method(s) described by International, European or National standards

None.

Commercial potential for diagnostic kits in Europe

Recently, possibly due to the increase in severe outbreaks of disease, labs across Europe, the US, Japan, India and South Africa have shown an interest in the parapoxviruses. In most instances this has been to confirm diagnosis of disease outbreaks, thereby reducing the incidence of misdiagnosis. At present there are no routine diagnostic tests in use for poxviruses and this can lead to misdiagnosis with other pathogens causing vesicular disease in ruminants. Practical problems emerged during the 2001 pan-asiatic type O FMD outbreak in the UK because of the difficulty of diagnosing FMD in sheep and cattle. Nowadays this can be again a cause of concern due to the recent spread of Bluetongue virus in Northern Europe and vaccinia-like outbreaks in cattle in several countries.

**GAP:** these zoonotic infections share clinical manifestations and exposure risks with other, potentially life-threatening zoonoses (e.g., cutaneous anthrax) and are likely under-recognized because of a lack of clinical suspicion and widely available diagnostics.
What’s new in the field of PPVs since 2010

• A new GC rich Poxvirus resembling a PPV was isolated from a human case possibly linked to a contact with horses.
• Subclinical infections either caused by PPVs have been recently reported in cattle, horse and red deer. Subclinically infected animals may play the role of reservoirs
• Several LAMP techniques, a new mini array method able to simultaneously detect OPXV and PPV and an OPV ELISA detection have been recently published STILL NO TRANSLATION INTO COMMERCIAL PRODUCTS
• The number of reports on complicated orf virus infections, after religious slaughtering, seem to suggest that predisposing factors related to the ethnic background may contribute to the condition
A case of human to human transmission of orf between mother and child

V. Rajkomar,¹ M. Hannah,² I. H. Coulson¹ and C. M. Owen¹

Erythema multiforme after orf virus infection.

Case Report
A Case of Orf Disease Complicated with Erythema Multiforme and Bullous Pemphigoid-Like Eruptions

Shahriar Alian, Fatemeh Ahangarkani, and Sara Arbsheybani
Diagnosis may be difficult in reservoir species. Not removable from the environment. Possible long-term with complications, may require hospitalisation. Frequently unrecognized and unreported. Not included in OIE list. 15-24 months duration. 21-50% suffer serious impact. Due to the lack of diagnostics, human disease is frequently unreported and unrecognized.
Vaccine tools

-51, Env Mastitis
-50, S. Aureus Mastitis
46, ParaTB
10, S&G pox
13, Zoonotic PPV
34, E Coli (VTEC)
49, Nematodes
13, Zoonotic Orthopox
1. VACCINES
Product gap analysis evidenced that there is a need to improve current vaccines against OV, while the lack of commercially available products for prevention and control of Orthopoxvirus infections suggests there are opportunities particularly for overseas markets in highly affected regions.

2. DIAGNOSTICS
There is a need to develop rapid tests to distinguish poxviruses from other agents causing vesicular diseases in animals and life-threatening cutaneous zoonoses in humans.

3. THERAPEUTICS
Promising antivirals, developed under the auspices of bioterrorism preparedness, are currently under investigation but there has been little consideration of their potential application to the prevention and treatment of neglected poxvirus zoonoses. The acceptability of using antivirals in food animals is unknown, but the use of these compounds for humans, companion and other high value animals (zoo animals) could be explored.
Summary

• “Disease scoring model” Despite their zoonotic nature, their economic impact and capability to spread by direct and indirect contact they fall in the category of NEGLECTED ZOONOSES

• “Product scoring model” Gave score to market potential

• ZPs are nowadays mostly regarded as viral vectors than as contagious agents……..

• Less research is being carried out on diseases than there was in 2010 - in the developed countries