KENYA WILDLIFE SERVICE

Bovine diseases in livestock and wildlife

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Outline

- Background
- Introduction

- Viral diseases – FMD, MCF, RVF
- Bacterial diseases – Anthrax, Brucellosis, Bovine TB
- Protozoan - Tick borne diseases

Introduction

- Many pathogens can infect both domestic animals and wildlife
  - ❑ With more than 77% of livestock pathogens known to infect multiple hosts including wildlife
- Multi host pathogens can have significant consequences on livestock economics and wildlife conservation:
  - ❑ high mortality and production losses in livestock
  - ❑ In wildlife diseases can cause population decline, increased predation and reduced reproduction rates
- Multi host pathogens provide a potential risk for disease emergence

Intro..

- Understanding disease transmission dynamics at the wildlife/ livestock interface is critical in designing control strategies:
  - ❑ For certain pathogens wildlife can act as reservoirs
  - ❑ Conversely, domestic animals can act as maintenance hosts for pathogens,
- ❑ Climate change, population growth and human development have significant impact on the interface

- ❑ Here we review important bovine diseases at the wildlife/ livestock interface

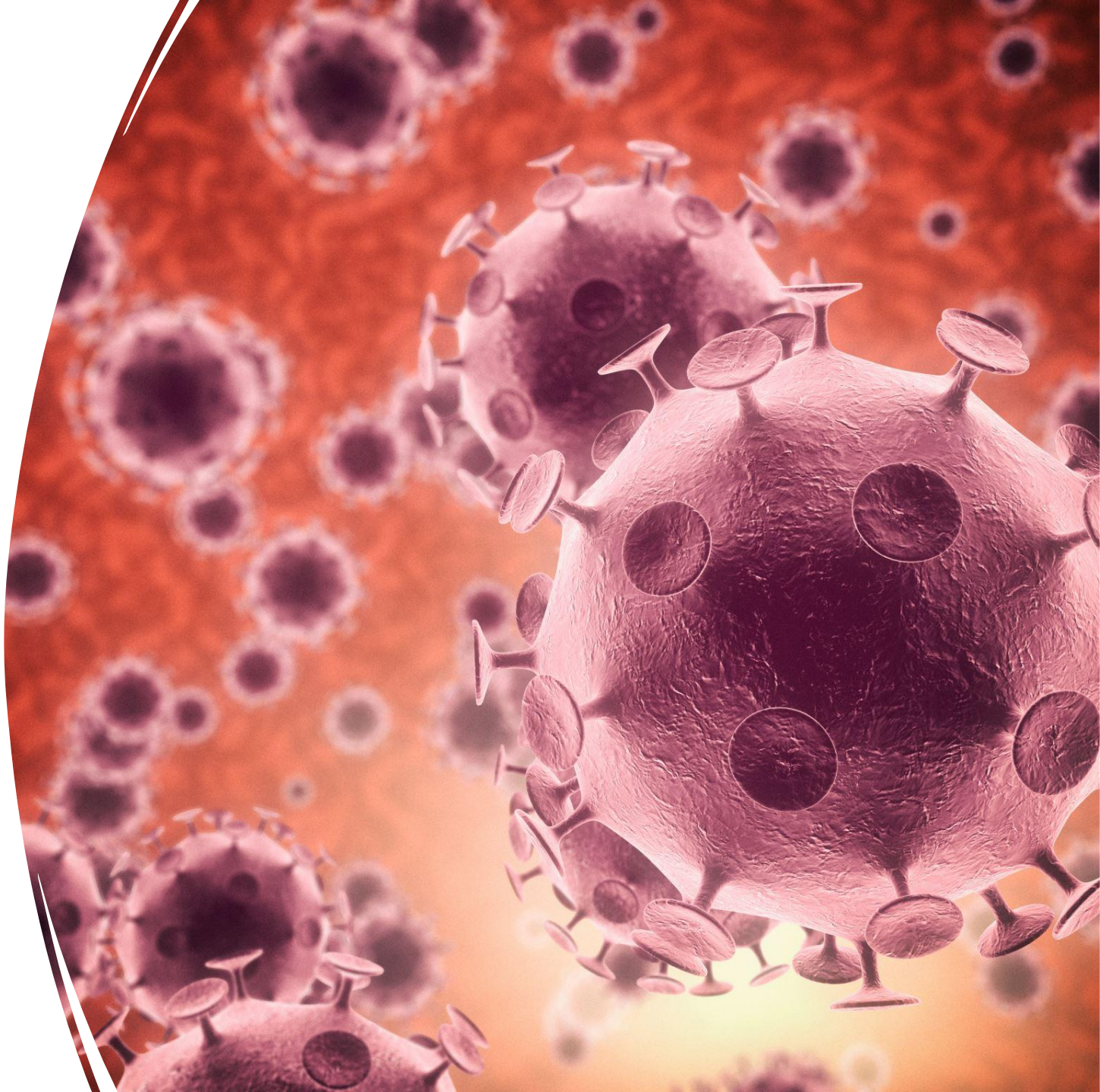
Introduction

Viral diseases

Bacterial diseases

Vector borne diseases

Viral disease



1. Rinderpest

- Status: **Eradicated** globally
- Declaration made on **27th May 2011** at OIE 79th World Assembly in Paris
- 2nd disease to have been eradicated
- Viral disease of cattle and wild ruminants thought to have originated from Asia
- Caused devastating epizootics in the late 19th century

Driven to Extinction, J. Science Volume: 319, Issue: 5870,

Impact of Rinderpest outbreaks

i. High mortality of cattle and loss of livelihood

ii. **Decimated wild populations** of buffalo, giraffe, wildebeest, antelopes

- ❑ In 1990s outbreak, 60% of buffalo population died in Tsavo ecosystem
- ❑ Endangered Roan antelope population

iii. **altered ecological balance** by reducing number of grazers

- Grassland turned into thickets, proliferation of tsetse fly

2. Foot and Mouth Disease

- Extremely contagious acute viral disease of domestic and wild cloven hoofed mammals
  - ❑ Endemic in Kenya with outbreaks reported in many parts of the country

- 7 distinct serotypes: O,A,C and Asia 1 and SAT 1,2,3
  - ❑ Buffalos are reservoirs of SAT 1, 2 and 3 serotypes
  - ❑ Only SAT 1 and 2 have been isolated in Kenya

- Recent evidence suggest that transmission of FMDV between buffalo and cattle is rare
  - ❑ Outbreaks of disease occur through maintenance in cattle population

George Omondi et al., 2020. Transboundary and Emerging Diseases

Impact of FMD

- High mortality and production losses
- Affects international trade in livestock and livestock products
- High cost of control
    - ❑ Effective vaccines are available

3. Malignant catarrhal fever

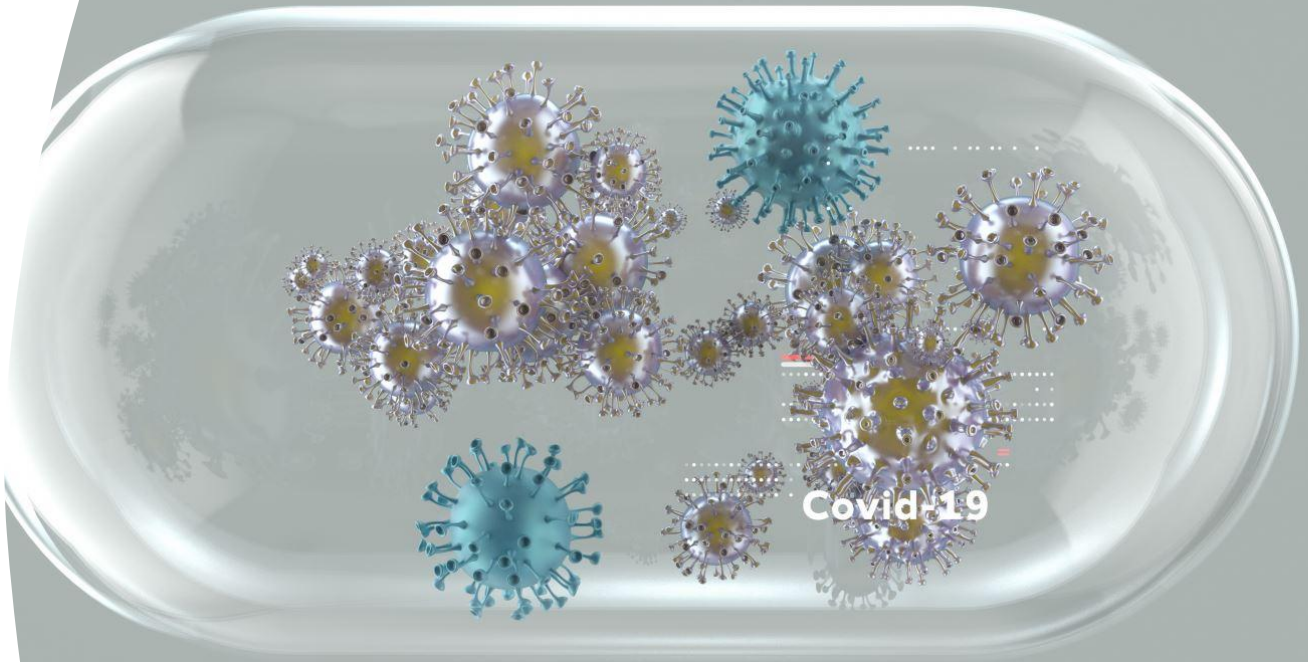
Malignant catarrhal fever

- Fatal lymphoproliferative disease of cattle and other ungulates
  - ❑ Alcelaphine Herpesvirus-1 (AlHV-1) and Ovine Herpesvirus-2 (OHV-2)
- Wildebeest are reservoir host of AlHV-1
  - ❑ Cattle contact the virus from wildebeest calves which shed the virus,
- Wildebeest associated MCF mainly occur in southern Kenya, northern Tanzania and southern African countries
  - ❑ Peak transmission occurs during calving season which coincides with wildebeest migration

Impact of MCF

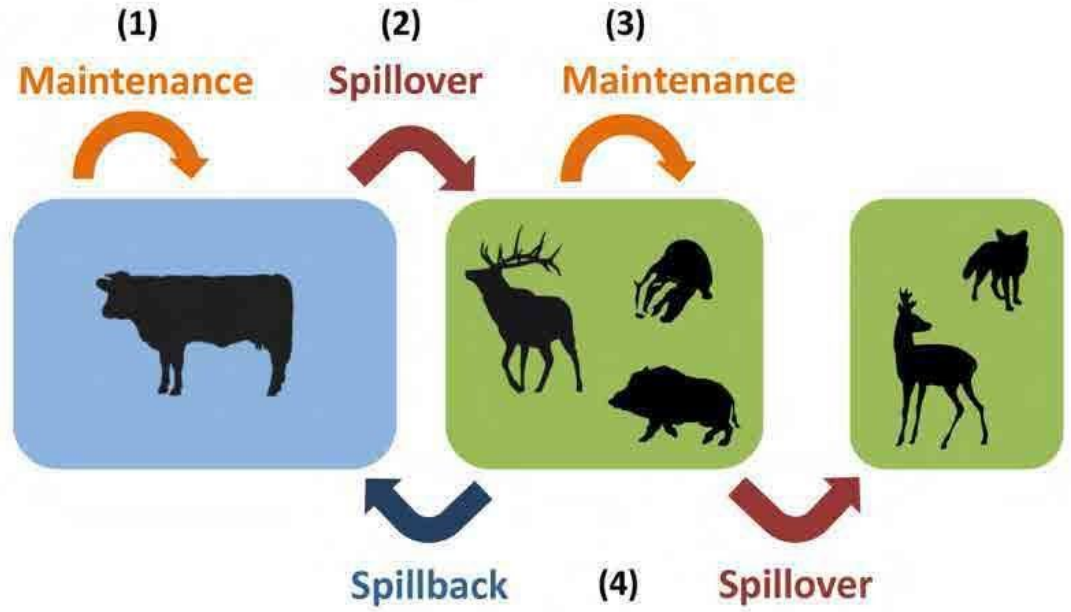
- High mortality and production losses in cattle
- Causes human – wildlife conflict
  - ❑ Diseases prevents community access to wildebeest grazing areas
  - ❑ Hinders development community conservancies and wildlife migration corridors
- There is no effective vaccine or treatment for MCF
- Effective control of the disease can be achieved through development of effective vaccines

Bacterial diseases



1. Anthrax

- Acute highly contagious disease of domestic and wild herbivores
  - ❑ Caused by spore forming *Bacillus anthracis,* spores persist in soil
  - ❑ Humans, suids and carnivores are incidental hosts
- Status: **endemic** in many conservation areas in Kenya
  - ❑ Threatens endangered wildlife population



Ryser-Degiorgis, M. 2015

Control of anthrax in wildlife

- Aim to break anthrax transmission cycle through

i. Proper carcass disposal – bury with calcium hypochlorite
ii. Decontamination of carcass sites
iii. Vaccination of endangered species? – technical and logistical challenges

2. Brucellosis

- Bacterial zoonotic disease with worldwide spread caused by Brucella spp.
  - ❑ Consist of six species, *Brucella abortus* causes disease in bovine
- A recent study in Kenya showed that of 16 wildlife species sampled ,
  - ❑ three species had antibodies to brucella
  - ❑ Overall sero-positivity of 13.7%
  - ❑ Buffalo had the had the highest proportion positive at 22%
- Transmission to humans is through contact with fetal material of infected livestock and consumption of raw milk

Impact of the disease

- Listed among top 5 priority zoonotic disease in Kenya
- In humans upto 500,000 new cases are reported annually in developing countries
- There is no effective vaccine in humans and no treatment in animals

Other examples

1. Bovine tuberculosis
2. Tick borne diseases –Crimean congo hemorrhagic fever
3. Bat associated viruses

General Interventions

- Vaccination:
- Managing disease in reservoir host –
- Minimizing contact with alternative host

Conclusion

- There is a need to understand disease dynamics in complex ecosystems to mitigate disease threats

- A multi disciplinary, multi sectoral One Health approach is vital in studying disease dynamics at the livestock/wildlife interface

Acknowledgements

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KWS veterinary department

1. Wildlife Health programs
   - Clinical interventions
   - Disease surveillance and control
   - Wildlife rescue
2. Species management programs
   - Population management – translocations
   - Wildlife monitoring technologies – e.g telemetric collars,
   - Assisted reproductive technologies
3. Research