Managing disease outbreaks

Gideon Brückner
Generic approach to disease control/ outbreak management

- Surveillance
- Early detection and diagnosis
- Isolate infected focus
- Contain disease – prevent escape of pathogen
- Vaccinate
- Cull where indicated
- Allow safe time to confirm no re-introductions/new cases
- Confirm absence of clinical cases and circulating pathogen
- Lift restrictions
Generic approach to disease control/ outbreak management

• Outbreak management aimed at restoring normality in the livestock population – as quickly as possible
• Main emphasis is to prevent economic losses and restore food production chain
• Trade concerns related to acceptance of control measures applied in the livestock population
• Guarantees for trade focussed on proof of absence/elimination of pathogen in the livestock population
Generic approach to disease control/outbreak management

• Outbreak in a temporary unstable but controllable environment
• Introduction and adaptation across continents
• Classical disease control measures usually sufficient to contain the disease and manage the outbreak
• Containment tools mostly readily available and easy to apply:
  – Vaccination
  – Serological surveillance
  – Movement control
  – Identification
  – Restraint and isolation
What are the challenges in managing outbreaks of diseases with wildlife involvement?

• Outbreaks often in a permanent unstable environment
• Offers a variety of scenarios and challenges:

  – Wildlife and/or livestock separated but not isolated
  – Wildlife contact can be effectively avoided/prevented
  – Wildlife contact can not be effectively avoided/prevented
  – Separation methods (e.g. fences) are challenged by wildlife
  – Pressure from wildlife invasion/re-invasion also subject/directed by natural driving forces – climate, floods, drought, migration
  – Concerns of multiple interest groups/stakeholders
What are the challenges in managing outbreaks of diseases with wildlife involvement?

- Generic/classical outbreak management strategies not always applicable or acceptable:
  - Culling of wildlife for disease control seldom an option for various reasons
  - Vaccines mostly not available for wildlife
  - Vaccination in domestic species to create an immune buffer between the wildlife vector and domestic animals/humans
  - Diagnostic tests in wildlife not always validated/reliable
  - Sampling/surveillance strategy dictated by species availability/access/cost implications/detection of clinical cases/multidisciplinary institutional involvement/public concerns and sensitivity
  - Wildlife to domestic or vice versa? – must seek and confirm source of infection to have an effective outbreak management policy
Culling/harvesting/disease control for managing disease outbreaks

- Need rational thinking and convincing of other role players
- Culling vs. harvesting – the difference
- Badger culling for TB
- Deer culling?
- Mongoose/Black backed jackal for rabies
- Role of controlled harvesting to maintain biodiversity equilibrium (controlled hunting, elephants KNP, South Africa)
- Culling/hunting for biodiversity equilibrium vs. culling for disease control??
Provisions in the *Terrestrial Code* for managing/mitigating outbreaks

- Risk-based and aimed at trade facilitating measures
- Surveillance guidelines where indicated to also include wildlife
- Zoning, compartmentalisation, containment zone
- Commodity trade
- If in place prior to outbreak, then more acceptable to trade partners when applied in the event of an outbreak
African swine fever

Trans-Stadial transmission

Eggs

Adult

Persistent infection

Sylvatic Cycle

Domestic Cycle
African Swine Fever – outbreak management options

- Separation possible – compartments
- Zoning is possible
- Virulence ranges from high to low
- “Live” with disease
- Culling of affected domestic stock often the choice – no reliable vaccine
- Can invade naïve wildlife population and become endemic – Georgia/Russia
- Outbreak management aimed at domestic pig population
Rift Valley fever

• Precipitating/trigger factors well known (floods, rise in water surface level, etc.)
• Wildlife as secondary invader (Alpacas)
• Vaccinate/cull/carrier state?
• Cost/sentimental/economic value
• Human (zoonotic) concerns
• Livestock trade concerns
• Trade in safe commodities
Multiple specie diseases – foot and mouth disease (FMD)

- OIE Code provides for facilitating measures such as zoning, compartmentalisation
- Traditional control is to separate wildlife source from domestic species (fencing)
- Control is aimed to secure virus free domestic population and accept presence in wildlife
- Culling of wildlife is not an option
- Sustainability of negative status in domestic population is subject to prevention of spill-over from wildlife
- Most outbreaks occur where break in separation
- Multiple potential sources in wildlife species
FMD Bulgaria: Wild boar
Faunal diversity

Capybara (Hydrochoerus hydrochaeris)

Brown Agouti (Dasyprocta variegata)

Borugo (Agouti taczanowskii)

Brazilian tapir Tapirus terrestris)

White-lipped peccary (Tayassu pecari)

Chacoan peccary (Catagonus wagneri)

Brocket deer (Mazama sp.)

Collared peccary (Pecari tajacu)

New species of 'Giant peccary' discovered in Brazil in 2000 ¹ 'Pecari maximus sp. nov.'

Feral swine (Sus scrofa)

Feral buffalo (Bubalus bubalis)


©P Roeder
Outbreaks of FMD recorded since 2005
Bwabwata Fence
(Permanent)

Shamangorwa Fence
(temporary; electric)
Affected crushes

Botswana Veterinary Districts
GUMARE/TUBU CATTLE BY THE FENCE
FLOODED FENCE

©DVS Botswana
DAMAGED FENCE BY ELEPHANTS

© DVS Botswana
Rabies

- Attempts of breaking the sylvatic cycle only successful in few countries (Europe, Canada) – bait vaccines
- Culling of wildlife species (Canis mesomelas → increase in population – move into empty zones
- In many instances “live” with disease in wildlife species
- Vaccination of canine population with at least a 75% threshold value
African horse sickness

- Vector-borne disease
- Accept continuous seasonal circulation in wildlife vector (Zebra)
- Vaccination only option or disease-free areas with no presence of competent vector
- No culling of wildlife source
Highly pathogenic avian influenza

- Migratory routes of wild birds well documented
- Managing outbreaks not aimed at wild bird population
- Control disease at source – domestic poultry population
- Accept presence in wild birds
- Country freedom aimed at freedom in domestic population
- Vaccination, separation – but not total isolation in all circumstances
Mitigating options to facilitate outbreak management

• Some diseases cannot be eradicated in wildlife (FMD, HPAI, rabies, MCF, ASF)

• Some options for risk mitigation:
  – Vaccination – create immune buffer
  – Separation – fencing (FMD, MCF)
  – Farming in harmonisation with wildlife vector (Nipah, FMD)
  – Breeding of disease-free wildlife (Buffalo, parrots)
  – Be sensitive to spatial and temporal risks associated with diseases in wildlife (MCF)
  – Continue to seek scientific backing for harmonising standards to accommodate wildlife/livestock interface
In conclusion: managing outbreaks in the wildlife/livestock ecosystem interface

- Must accept continuous challenge
- Classical control measures not always applicable
- Must strive to harmonise co-existence of both - to maintain biodiversity and respect trade concerns
- Maintain sentiment of Code to facilitate trade in production animals without detriment to wildlife and further refine trade facilitating measures
- Must remain sensitised to emergence and re-emergence of diseases in wildlife that may impact on disease outbreak management strategies
- Acknowledge the “love affair” between wildlife and domestic species – including Homo sapiens
Thank you!

Merci!

Gracias!

World Organisation for Animal Health (OIE)
12 Rue de Prony 75017
Paris
www.oie.int