Risk factors for brucellosis -Zimbabwean experiences-

Gift Matope
Department of Paraclinical Veterinary Studies
University of Zimbabwe
P.O. Box MP 167
Mount Pleasant
Harare
Brucellosis
A difficult condition caused by a “tricky bug”

- Aptly described as contagious abortion, but not sure on how to define incubation period

- Bacteriologists find the bug is extremely difficult to culture because it is fastidious

- And yet once isolated, it is highly infectious

- We often rely on imperfect serological tests
Historical background of brucellosis

- Brucellosis in cattle first suspected in 1906 and confirmed near Harare (Salisbury) in 1913
- Dr L. Bevan was attributed as the first to demonstrate that *B. abortus* was zoonotic (Anon. 1957)
- Cattle brucellosis was gazetted as a notifiable disease around 1930s
- Culminated with the introduction of the brucellosis accreditation scheme in the early 1980s

......and yet a pandora’s box was opened!
Brucelloses in domestic animals in Zimbabwe

- **Bovine** (*B. abortus*): Well documented by serology as well as by culture and isolation

- **Caprine/ovine** (*B. melitensis*): Yes but infrequent? Recent survey on about 500 goats from Beatrice area yielded negative results

- **Porcine** (*B. suis*): Unknown. Recent isolation?

- **Canine** (*B. canis*): Yes, but...relatively unknown (*Chinyoka et al., 2014. JSAVA*)
Brucellosis in animals in wildlife

- Serological evidence in several wildlife species has been documented; confirmed by isolations.

- Serological evidence in several species such as the buffalo (*Syncerus caffer*), impala (*Aepyceros melampus*), eland (*Taurotragus oryx*), etc.

- While in others, brucellosis has not been demonstrated.
Factors that may increase the animal's risk of infection with *Brucella* spp.
Factors related to the pathogen

- Currently, 10 *Brucella* species recognised, but atypical species continue to be identified.

- Although *Brucella* species tend to discern hosts in causing overt disease, cross-infections may occur.

- However, the species and strains circulating are relatively unknown.

- Where they are known, strain traceability becomes a major issue.
Host factors

- Within animal species: individual level (sex, breed, age) and herd-level factors (immune status, herd size)

- Between animal species; sharing same ecological space

- In wildlife, brucellosis consistently demonstrated in gregarious animals eg buffaloes, and less so in solitary species, eg the rhinoceros species
Factors related to the environment

- Survival and persistence of brucellae in the environment, dependent on $T^\circ C$, moisture, etc.
  - Not well documented in the tropics
  - Difficult to use habitat suitability modeling to predict risk of brucellosis
- Climate change: also linked to changes in land use
  - Changes on the environment; eg. grazing, etc.
Changes to land use and management

- Changes in agricultural practices/animal management practices

  - establishment of smallholder dairies in rural areas that were previously free from brucellosis

  - the agrarian reform programme in the year 2000

  - Increased animal movements
Changes to land use and management

- Changes in ecotourism and land management
  - The creation of large land mosaics under the transfrontier conservation area (TFCA) initiatives
  - Examples of brucellosis in Kafue lechwe (Kafue) and black lechwe in Bangwelu plains in Zambia

- Anthropogenic factors
  - Practices of people living on the edge of TFCAs
  - Traditional beliefs, eg medicinal value of goat milk
Information gaps and key questions......?

I have wings, but I can't fly. Santa's reindeer do not have wings, but they can fly. Can you explain this to me????
Information gaps and key questions

1. Patterns and drivers of brucellosis

   - What is the spatio-temporal epidemiology of brucellosis?

   - What are the key drivers of brucellosis in cattle?

   - Brucellosis in small ruminants?
Information gaps and key questions

2. The role of the interface in the TFCAs

- Mobility patterns and contacts between wildlife and domestic animals?
  - Is contact with wildlife a risk factor for brucellosis in domestic animals?
  - What are the ecological drivers of brucellosis at the interface?
Information gaps and key questions

3. *Brucella* spp. strain distribution and host range

- What are the important *Brucella* spp. associated with brucellosis?
- What is their host range?
- What is the molecular epidemiology of *Brucella* spp?
Information gaps and key questions

• 4. Socio-economic impact of brucellosis

  – What is the impact of brucellosis on livestock production and wildlife conservation?

  – What is the public health impact of brucellosis?

• We regard brucellosis as the world’s most widespread of all zoonoses and apart from its toll on people, it has an enormous impact on the animal industry

• WHO, 1998
Concluding remarks

1. Considering the economic and public health significance of brucellosis, there is need to control (or possibly eradicate it) in animals, but there is merit in:
   - Establishing spatial epidemiology
   - Determining the various drivers of brucellosis
   - Determining the host range for brucellae

2. Need to foster multistakeholder involvement
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