Bovine brucellosis-
the SHMPA story

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VIVA is an Irish non-profit organisation working with small-scale livestock farmers in the Developing World to improve livestock husbandry, health and welfare. VIVA uses a One Health approach in its work which recognises the interdependence between animal and human health and the environment they share.
Shire Highlands
Milk

Proven health benefits of milk, important nutritional value.
Vital source of income for small holder farmers.

However....

Milk is responsible for the spread of numerous, different foodborne bacterial pathogens from animals to humans
Pathogens from the cow and from the milk

- *Mycobacterium bovis*
- *Brucella* spp.
- *Bacillus anthracis*
- *Salmonella*
- *EHEC*
- *Streptococcus* spp.
- *Staphylococcus aureus*
- *Clostridium* spp.
- *Listeria* spp.
• Brucellosis in humans is characterised by intermittent fever, generalised pain and an influenza-like syndrome that is often misdiagnosed or under reported in Africa.

• The epidemiology of brucellosis in livestock in sub-Saharan Africa is poorly understood.
BVA calls for extra vigilance and stricter pet import measures after first confirmed dog-to-human case of Brucella canis in the UK

24 Aug 2022

BVA has issued advice for vet teams and members of the public following confirmation of spread of infection from an imported rescue dog to the foster carer and her pets.
Shire Highlands Milk Producers Association

• Grown to 12,700 SHMPA (female) farmers located over past 30 years.
• Small herds responsible for the bulk of milk production.
• Reproduction problems in cows which hinder milk production.
• Abortion is often the only sign observed by farmers in the case of brucellosis.
• Diagnostic capacity and disease reporting very challenging.
Field-friendly- ideally pen-side to allow action to be taken

Easy to use- 1 vet in SHMPA, 45 FLTs (Farm Livestock Technicians)

Herdscreen® Bovine Brucella/TB lateral flow antibody screening kit is a qualitative combination test for the detection of B.abortus, B.melitensis and M.bovis antibodies in bovine whole blood, plasma and serum.

<table>
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<th>Product Code</th>
<th>Pack Size</th>
<th>Product Name</th>
<th>Specimen</th>
<th>Detection Limit</th>
<th>Sensitivity</th>
<th>Specificity</th>
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</thead>
<tbody>
<tr>
<td>GDX57-2</td>
<td>10 Tests</td>
<td>Brucella TB</td>
<td>WB/P/S</td>
<td>120 IU/ml</td>
<td>94.8% vs ELISA</td>
<td>99.1% vs ELISA</td>
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<td>90.4% vs ELISA</td>
<td>93.9% vs ELISA</td>
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</table>
Start of sampling January 2020

• Farmer KAP (knowledge, attitude and practices) questionnaire- farmers knowledge of zoonotic disease, practices around milking and calving.

• “Suspicious” cohort of cows...all had negative for Brucella spp./ positive reactions to the TB skin test.

• Back to Global Dx...
The Covid Crisis

All field work was stopped

New Brucella spp. kit in development back in UK was put on hold during Covid

Need for more man power and to integrate the surveillance work more in to the workings of SHMPA

Creating employment for Malawi's first batch of “home-grown” veterinary graduates.
During 2021, before incurring further costs sending kits to Malawi, the Irish Regional Veterinary Laboratory in Cork offered to run the kits against stored Brucella spp. positive serum samples.

Cosme Sánchez-Miguel. Senior Veterinary Research Officer Kate O’Keffee, Senior Laboratory Technitian, Blood Test Laboratory, DAFM.
Take two

- Role of animal assistant as eyes on the ground, observing
- Foraging relationships
- Platform for increased engagement
- Opportunity for knowledge transfer
- Communicating between farmers and SHMPA staff
Sampling

- 431 farmers interviewed using a pretested KAP questionnaire
- 431 cows sampled
- Serology samples were screened for Brucella spp. using a lateral flow kit and Rose Bengal test.
Positivity

Serology results for the lateral flow kits showed 29% seropositivity (125/431).

The Rose Bengal test showed 24% seropositivity (105/431).

Overall prevalence for Brucella spp. was 22% (95/431).
Farmer Questionnaire

- Never heard of brucellosis, signs, transmission pathways.
- Causes of abortions misguided
- All households consume milk produced on farm
- 35% consume raw milk
- 65% consume “boiled” milk (TB)
Risky behaviors around seropositive Cows

- 79% had assisted calvings
- 90% of farmers remove placenta from the khola with a stick/instrument
- 7% use their hands
- 3% leave other animals eat it or pull it away.
- 76% AI breeding method - occupational hazard
- 78% of cows are vaccinated (LSD/Rabies/FMD)
Risk factors

Univariable analysis:

✓ age of farmer
✓ education level
✓ presence of small ruminants
✓ breeding methods (AI vs Natural)
✓ history of abortion

No risk factor statistically significant (Chi-squared, R studio) for seropositivity

Greater probability that the se of LF is higher than RB but it sp lower than Rb (Bayesian technique)
The Next Chapter

- **Continue**
  - Continue to build-up clinical picture of seropositive farms.
  - Understand what is happening within HH.

- **Develop**
  - Develop education on brucellosis with a One Health focus, various zoonotic pathogens share similar transmission pathways.

- **Explore**
  - Explore preventative measures such as vaccination.

- **Engage**
  - Engage with MSc students to continue with diagnostic correlation. Collect data for Cost-benefit analysis.

- **Collaborate**
  - Continue to forge contacts with partner organisations and institutions.
Where there is a will there’s a way...

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