Western Cape Government
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Animal Health

EPIDEMIOLOGY REPORT 2019

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EPIDEMIOLOGY REPORT

VETERINARY SERVICES
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Volume 11 Issue 1

Sheep scab comes out of hiding

Lesley van Helden

All skin conditions in sheep are classified as controlled diseases under the Animal Diseases Act (35 of 1984). This is because itching, wool loss and scaly skin are clinical signs shared by almost all skin conditions, the most important of which is sheep scab.

Sheep scab is caused by a parasitic mite, *Psoroptes ovis,* which feeds on the skin surface of the sheep and causes intense itching, scratching and wool loss (fig 4). In severe cases, sheep are so focussed on scratching that they stop all other activities, such as mating, caring for lambs and even eating, resulting in emaciation and death. Infested animals lose condition and grow poorly, resulting in reproduction and meat-production losses. Damage to the skin and wool can result in sheep being unable to protect themselves against the cold, as well as financial losses from potential wool and leather sales. Sheep scab is therefore a disease with significant welfare and economic consequences.

Fortunately, sheep scab is easily treatable. All sheep in an affected flock should be treated twice, seven to ten days apart, with an appropriate remedy. This can involve either dipping using an organophosphate or injection of a macrocyclic lactone, such as doramectin. Treatment is not without risk, however, as dipping can cause inhalation pneumonia or cold stress during winter. Treatment is also costly, in the form of labour, time and money. For adult sheep, a dose of an injectable remedy can cost 95c to R7.00 per animal, depending on the product used and the weight of the sheep.

If sheep scab is such a serious issue, but is easily treated, why does it remain a problem in the Western Cape? This month, nine infested properties were reported in the province, many of which appear to have been infested for months before the disease was reported. This outbreak is unusual in that sheep scab is more commonly detected in winter when mites become more active in the cooler weather.

A general pattern of higher numbers of reported outbreaks occurring during the cooler months can be seen in figure 1, but in some years there are very few reported outbreaks. Between 2007 and 2015, an average of 17 outbreaks were reported per year, ranging between nine and 21. Since 2016, however, this average dropped to only seven outbreaks reported per year. In these three years, no seasonal pattern can be seen anymore as the number of reported cases is so low.

According to Veterinary Services field staff involved with the latest outbreaks, the lack of reporting can be attributed mainly to the stigma associated with sheep scab. Many farmers believe that admitting they have a sheep scab infestation will ruin their reputations as competent farmers. When faced with clinical signs of a skin condition in their sheep, they will insist that the cause is something other than sheep scab, such as red lice or dermatophilosis ("klontwol"), apparently ignorant that these conditions are also notifiable. They will then attempt to treat these conditions themselves, often seeing a reduction in clinical signs as a result, as co-infections are common.

Many farmers who realise that they have sheep scab will keep it a secret and also try to treat it themselves, often using the wrong procedure or product. For instance, in

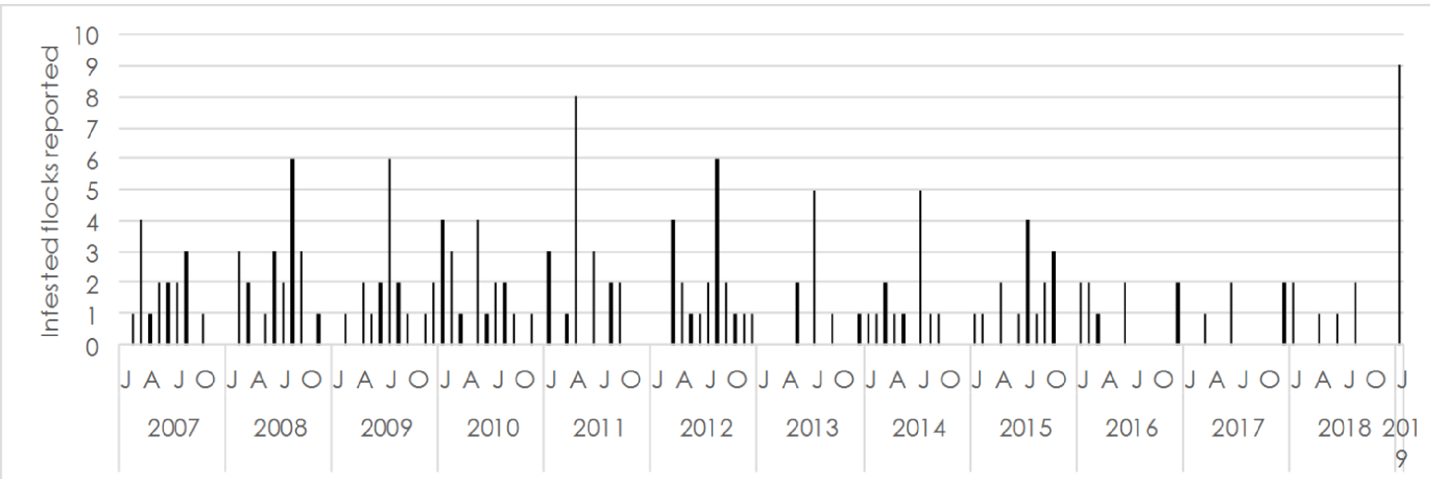


Figure 1: Sheep scab outbreaks reported in the Western Cape: 2007-2019

several cases the entire flock has been treated with the exception of the young lambs, or the flock is treated only once. The state vet is contacted as a last resort once all other options have been exhausted and the disease is in its advanced stages. This results in far higher production losses than necessary, wasting time and money of both the farmer and the state and contributing to the disease spreading to neighbouring farms.

Outbreaks of sheep skin conditions should therefore always be reported immediately upon detection. This is not only wise practice to prevent losses, but is required by law. Under the Animal Diseases Act, all farmers are obliged to inform the state vet, their neighbours and prospective buyers of skin conditions in their sheep. They are also obliged to take all reasonable steps to prevent any disease from spreading to someone else's property from theirs. Not reporting sheep scab can therefore result in a farmer being legally liable for his neighbour's losses.

Hopefully through education and peer pressure within the agricultural community, the stigma associated with sheep scab will fall away as farmers realise that early reporting leads to early intervention, assistance from the state and prevention of large-scale outbreaks.

Prevention of sheep scab can be achieved with basic external biosecurity measures and thus is a cheaper and more welfare-friendly option than treatment. In most cases that are reported in the Western Cape, the disease has been spread by contact between sheep sharing fences, so maintenance of fences is important, and the ideal is to build double fences to prevent contact with livestock on neighbouring properties.

Shearing teams or anyone else that moves from farm to farm and has contact with sheep can spread the mites. Trucks, paddocks and any other equipment that has had contact with infested sheep should also be cleaned and disinfected to kill any mites.

Sheep scab is often brought onto a property through introduction of new animals. The safest way to prevent introduction is to maintain a closed herd. However, many farmers that claim to run a closed herd system do not consider the fact that they buy in rams, which have just as much potential to be infested with sheep scab mites as ewes do. Sheep of unknown origin should preferably not be bought, and any new sheep should be isolated

Figure 2: Dipping sheep to treat sheep scab and red lice infestations (Photo: M Chapman)

from other animals on arrival and inspected and/or treated for sheep scab before being mixed with the rest of the flock.

What role do animals other than sheep, such as goats and cattle, play in the epidemiology and transmission of sheep scab? Several scientific studies that have attempted to answer this question have had inconsistent results. In some, there is no evidence of mites being able to survive on or cause disease in species other than sheep, but in other studies it appears that mites can be transmitted to sheep by other species. A precautionary approach on infested farms is perhaps wise. Other species in contact with the sheep can be treated at the same time, preferably by dipping, to prevent any mites surviving to re-infest the flock.

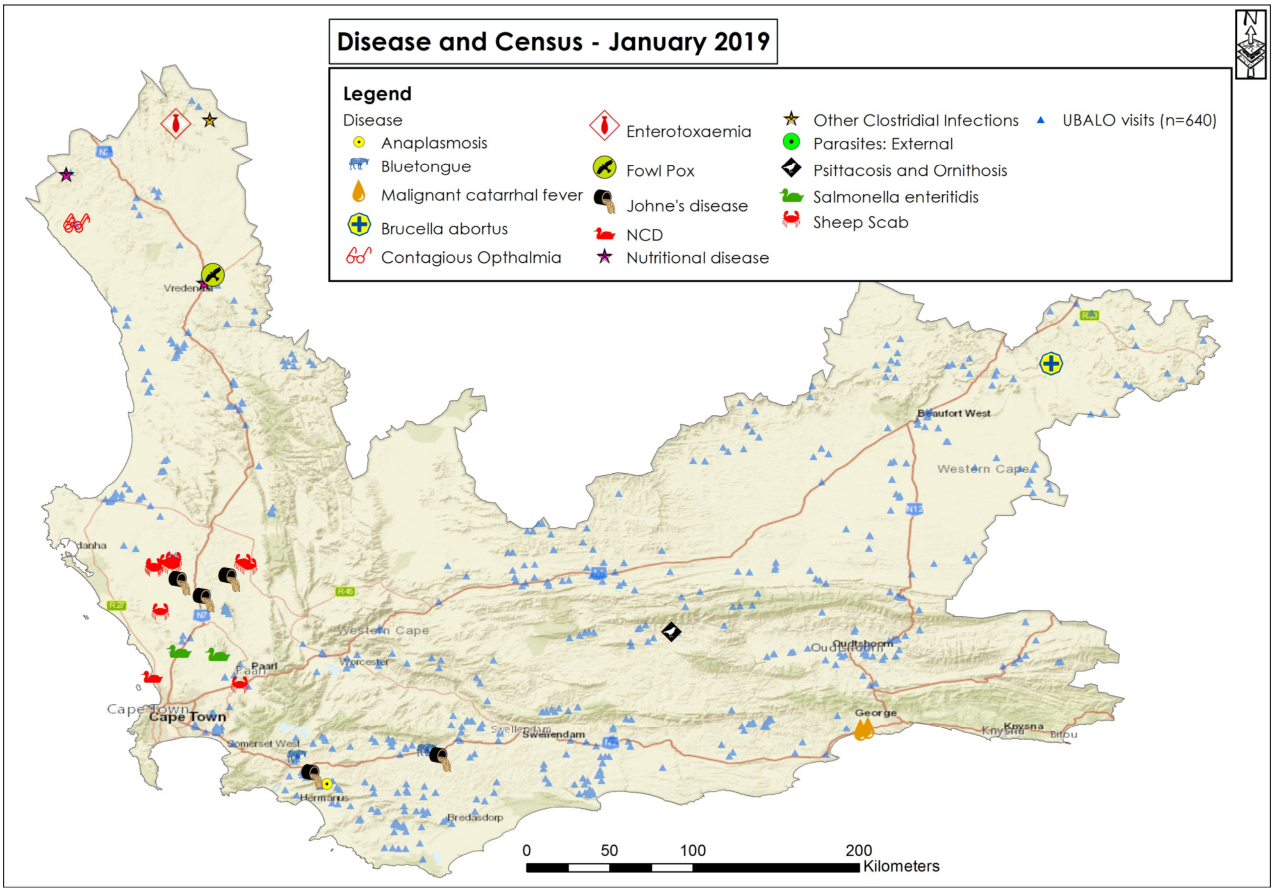
Another reason why prevention is better than control: A study published by Doherty et al. in 2018 from the United Kingdom provides evidence that mites on several farms have developed resistance to moxidectin, one of the macrocyclic lactones. There is therefore a risk that in the future, drug resistance will render treatment more difficult and less effective than it is currently. This situation can be delayed as long as possible through prudent use of preventive measures and early reporting of detected outbreaks.

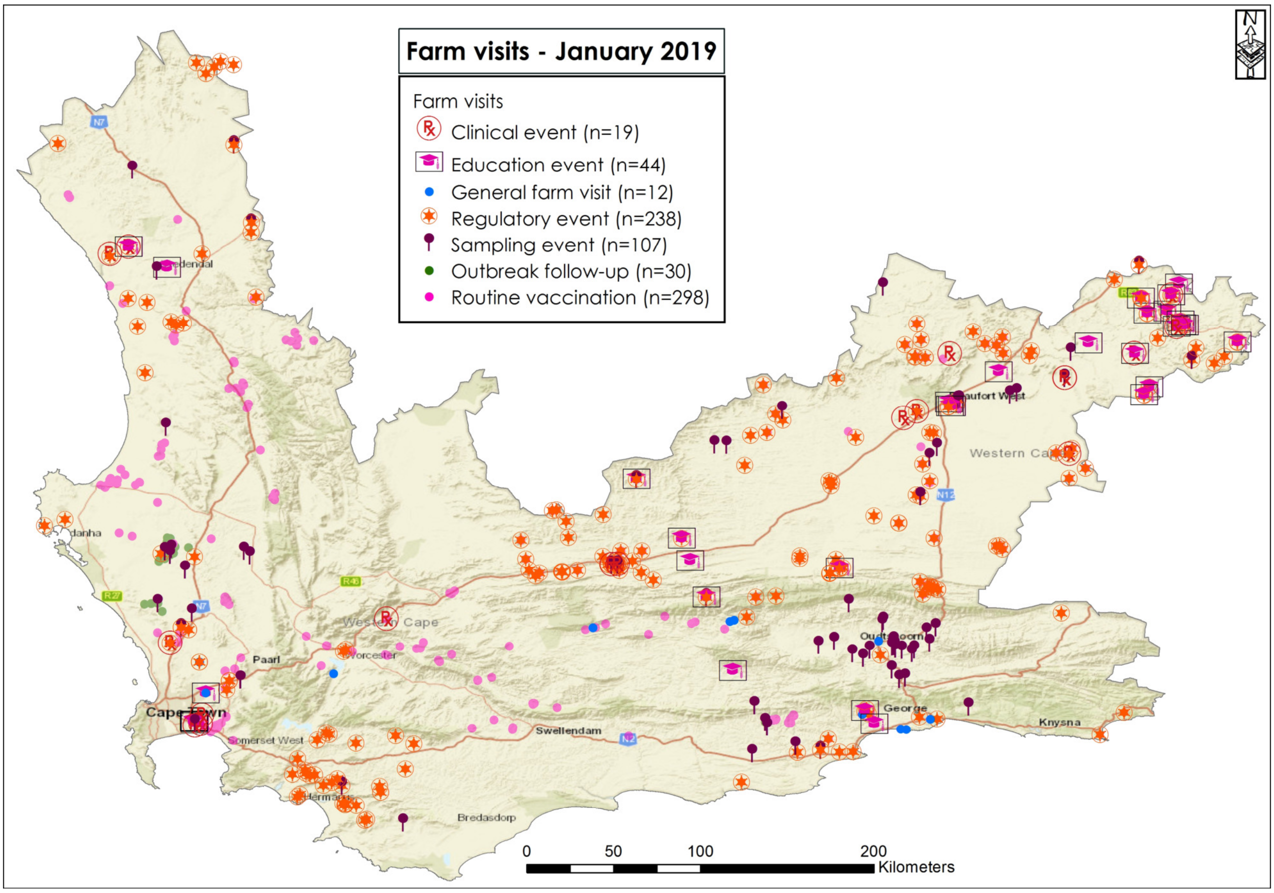
Beyond our borders: HPAI in Namibian penguins

The cause of a mass mortality event of African penguins (fig 3) near Luderitz in Namibia has been confirmed as H5N8 highly pathogenic avian influenza (HPAI). Penguins in the breeding colony located on Halifax Island showed neurological signs including head-tilting, twitching and loss of co-ordination. Corneal opacity was also seen, similar to penguin H5N8 HPAI cases in South Africa in 2018. Attempts to treat some of the penguins at a local rehabilitation centre were unsuccessful. Of a colony of approximately 7000, over 200 penguins have died. Similar clinical signs were noticed in swift terns in the same area, but mortalities of this species have not been reported.

Figure 3: Dead penguins near Luderitz (Photo: The Namibian)

Disease and surveillance





Outbreak events

Sheep scab outbreaks were reported from eight properties in the **Swartland** and one near **Paarl**. Varying degrees of clinical signs, including damage to wool, pruritis and alopecia were seen (fig 4). The infestations appear to have started with the arrival of new sheep, and to have spread to neighbouring farms.

Outbreaks of **bluetongue** in **sheep** were reported by farmers near **Riviersonderend** and **Botrivier**.

Laughing doves in **Cape Town** were seen dying after showing neurological signs: disorientation, incoordination and splayed legs. Samples taken from dead birds tested positive for pigeon paramyxovirus, a form of virulent **Newcastle disease**.

Five **sheep** farms near **Malmesbury**, **Moorreesburg**, **Caledon** and **Riviersonderend** were diagnosed positive for **Johne's disease** after progressive emaciation of a few sheep was seen over time.

Salmonella enteritidis was isolated from dead-in-shell chicks and chick box liners arriving on a broiler **chicken** farm in the **Paardeberg** region and on boot cover swabs on a farm near **Atlantis**.

Bovine anaplasmosis was reported by farmer near **Caledon**.

A herd of beef **cattle** near **Murraysburg** were tested for **bovine brucellosis** with one positive reactor. As the tag numbers were not well recorded, the herd was retested and there was again one positive reactor, with a CFT titre of 688. There is no history of brucellosis on any of the neighbouring farms, there have been no new movements onto this farm and the farmer does not vaccinate his cattle against brucellosis. The positive reactor animal will be slaughtered and bacterial culture attempted, as well as retesting of the herd and further investigation of the status of cattle herds in the area.

Parrot chicks being reared in **Ladismith** showed acute vomiting, diarrhoea, loss of condition and death. On post mortem they were diagnosed positive for **psittacosis**. The staff member feeding the parrots complained of chest pains and respiratory problems and was advised to contact his doctor immediately. All birds on the premises will be quarantined and treated with doxycycline for 45 days.

Sheep in the far **north** of the province experienced various problems associated with **clostridia**.

Chickens near **Vanrhynsdorp** were seen with **fowl pox** and **scaly leg mite**.

Abomasal impactions caused by sand were seen in **sheep** and **cattle** in **Vanrhynsdorp** and **Vredendal**.

Cattle on two farms near **George** died of **malignant catarrhal fever**. On one of the farms this was the second occurrence of wildebeest-associated disease in six months, as there are wildebeest on neighbouring game farms. On the other farm, the virus was sheep-associated, probably originating from sheep that are kept on other farms in the area.

Figure 4: Sheep showing clinical signs of sheep scab (Photo: M Chapman)

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

VETERINARY SERVICES
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Vector season is coming

Lesley van Helden

Sporadic outbreaks of bluetongue that have been reported in sheep in January and February this year are a reminder that, with the combination of rain and the relatively warm temperatures of late summer and autumn, vector-borne diseases are about to reach their peak (fig 1). It is therefore the time of year to be vigilant for both endemic vector-borne diseases, as well as those that are not common in the Western Cape, such as African horse sickness and Rift Valley fever.

Bluetongue is seasonal, occurring in late summer and autumn in countries where it is present. In the Western Cape it peaks in April as numbers of the *Culicoides* vectors are highest at this time. This corresponds with observations of vector surveillance at the Kenilworth quarantine station (see the Epi Report of October 2018).

A similar pattern is observed with African horse sickness (AHS), which stands to reason as it is also spread by *Culicoides* midges. However, the majority of reported AHS cases have been clinical and subclinical cases detected during active surveillance in the AHS surveillance and protection zones during outbreaks in 2011 and 2014. Low numbers of cases are usually reported from the infected zone of the province.

All reported cases of Rift Valley fever occurred during the epizootic of 2010 and 2011 but, again, cases peaked in late summer and autumn, probably due to the high numbers of mosquito vectors during this season.

Lumpy skin disease is also vector-borne and, according to conventional wisdom, cases should follow the same seasonal pattern as the aforementioned three diseases. However, it does not seem to do so in the Western Cape. The variation in numbers of outbreaks between years is large with, for instance, no cases being reported in 2018, while 49 outbreaks were reported in 2014. Interestingly, this is a similar pattern to what was observed by Ochwo et al (2018) in Uganda, a country with a completely different climate from the Western Cape.

Fortunately, bluetongue, AHS, Rift Valley fever and lumpy skin disease are all preventable with vaccination. Knowing that the risk of infection increases when vector numbers are high, we can plan to vaccinate in the low-risk seasons so that animals will be protected when they are most likely to be infected. For African horse sickness, this low-risk period is defined by law, with horse owners in the free, surveillance and protection zones only being allowed to vaccinate their horses between June and October.

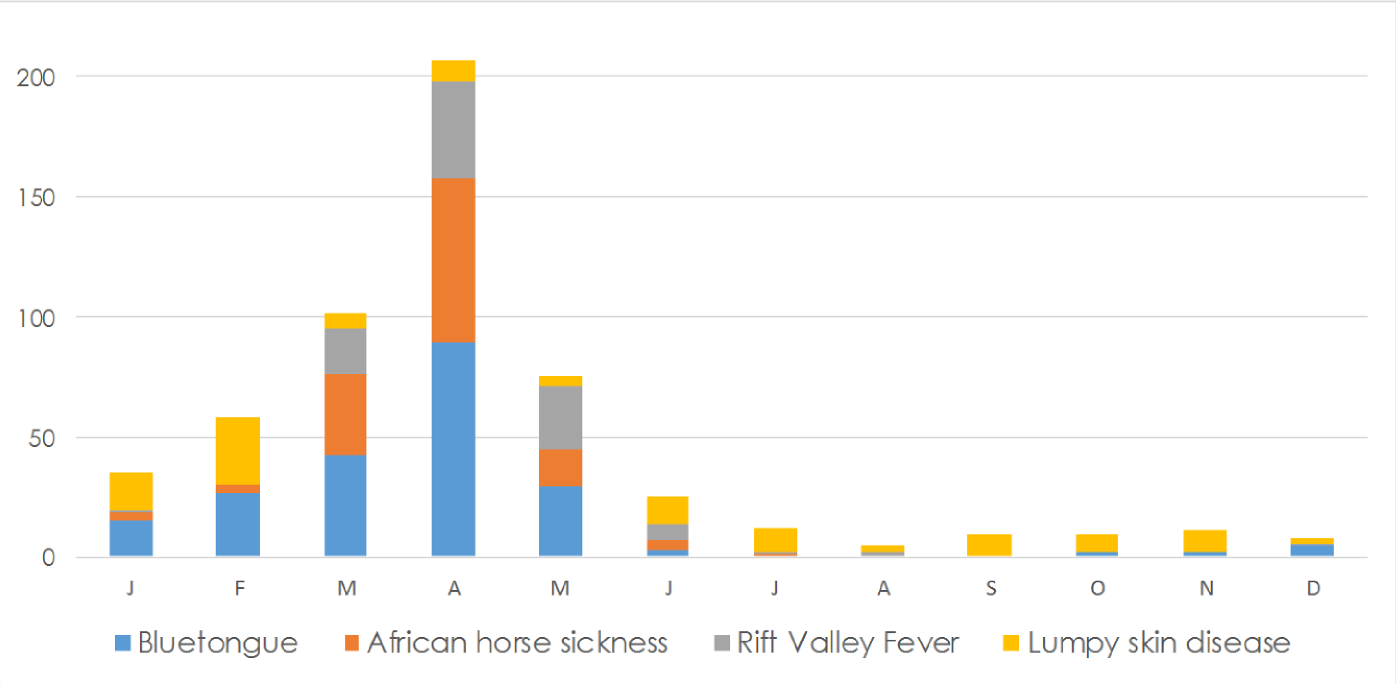
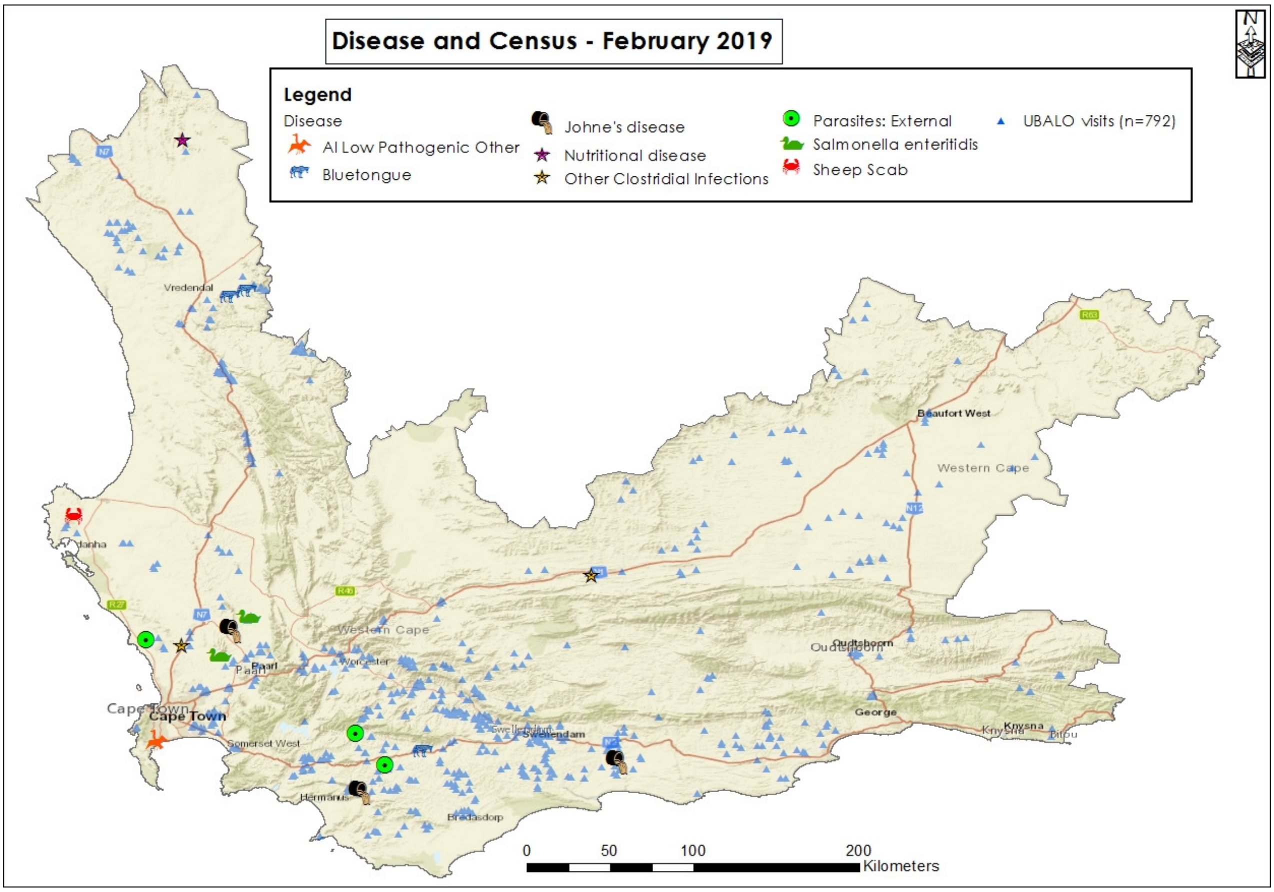
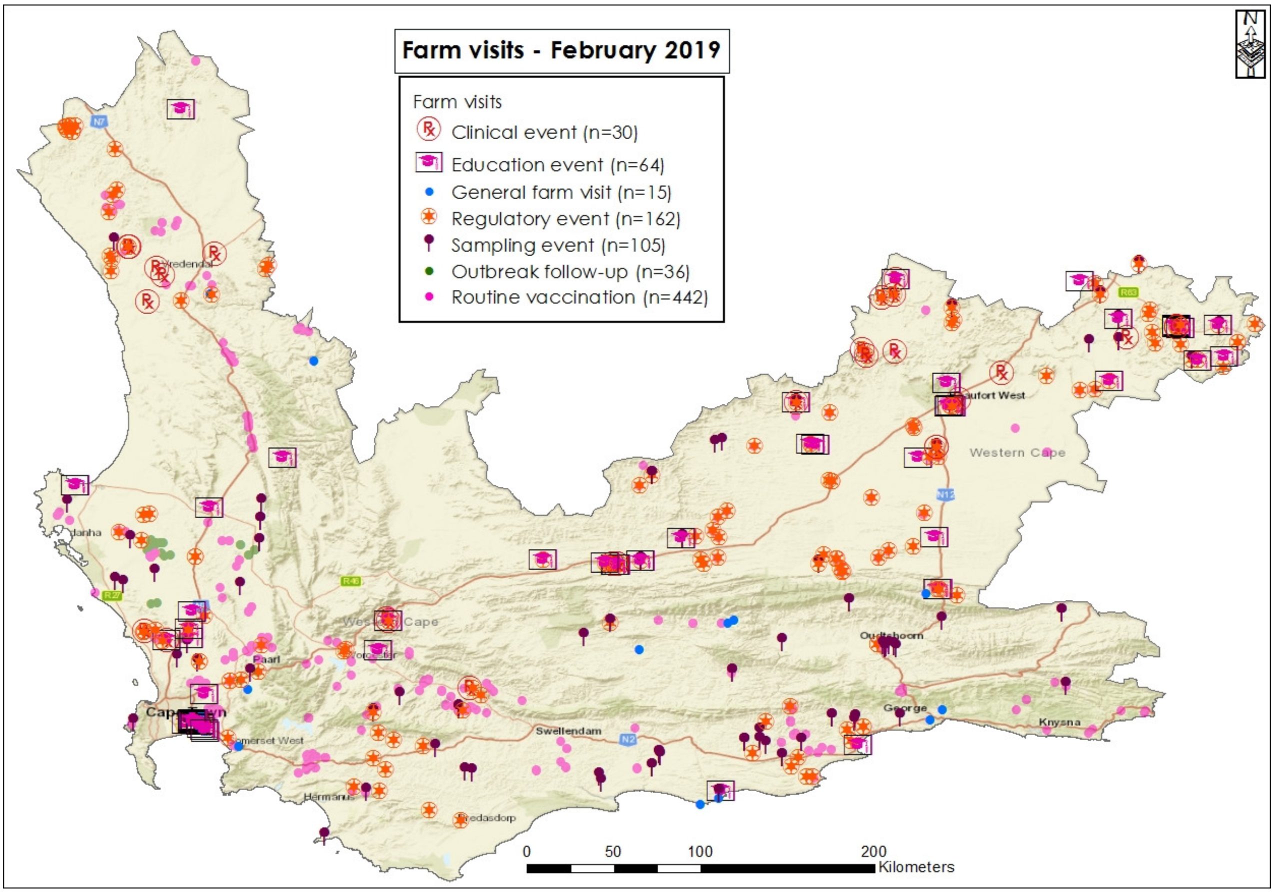


Figure 1: Outbreaks of vector-borne diseases reported in the Western Cape by month (2007-2018)

Disease and surveillance





Outbreak events

Wild **mallard ducks** are an introduced species that threaten indigenous duck populations by hybridising with them. The City of **Cape Town** therefore culls mallard ducks inhabiting public spaces. Several of these culled ducks from Zandvlei Nature Reserve were sampled for avian influenza surveillance and a **low pathogenic H11N9 avian influenza** virus was found in one of the samples.

An outbreak of **sheep scab** was detected in its early stages on a farm near **Vredenburg**. The farm experienced an outbreak of sheep scab last year, which was apparently successfully treated. This new outbreak was detected shortly after sheep were brought in from another property belonging to the farmer in the Northern Cape. The farm was placed under quarantine and the sheep will be treated under official supervision.

Farmers near **Malmesbury**, **Caledon** and **Heidelberg** noticed their **sheep** becoming emaciated and showing signs of diarrhoea. **Johne's disease** was diagnosed on these farms by private veterinarians.

Two broiler **chicken** hatcheries in the **Malmesbury** area received positive cultures for ***Salmonella enteritidis*** from dead-in-shell chicks and chick box liners. Increased monitoring and treatment of parent flocks was instituted.

Outbreaks of **bluetongue** were reported in:

⇒ Four out of 60 **sheep** in a flock near **Vanrhynsdorp**,

⇒ Two out of 140 **sheep** that died in a flock in **Caledon**. It is likely that these two sheep were accidentally omitted during vaccination.

⇒ Fifteen **springbok** of all ages near **Vanrhynsdorp** that died over two weeks showing clinical signs typical of bluetongue. When AHT Vanrhynsdorp was notified, only the springbok ram was showing clinical sings, but could not be caught to take samples. The ram has since recovered (and can still not be caught).

Two cases of **tetanus** in **sheep** were reported: one in a lamb near **Laingsburg** that died after castration using an elastrator, the other in a ewe near **Malmesbury** that presented with generalised muscle spasms and a penetrating wound of unknown origin in her cheek (fig 2).

Chickens with **infectious coryza** were successfully treated with sulfonamides near **Beaufort West**.

Red lice were seen on **sheep** inspected near **Riviersonderend**.

Mange was reported in **pigs** near **Caledon** (unconfirmed) and in two newly bought pigs out of 24 near **Atlantis** (fig 3).

Figure 2: Ewe with tetanus showing stiffness as a result of generalised muscle spasms (Photo: M Vrey)

Figure 3: Pigs showing clinical signs of mange (Photo: M Vrey)

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EPIDEMIOLOGY REPORT

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March 2019
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DDs for Foot and Mouth Disease: please recognise & report

Laura Roberts

As you will be aware, a foot and mouth disease (FMD) outbreak in Limpopo province in January 2019 caused South Africa to lose its FMD free zone without vaccination status. To regain FMD-free status, South Africa must again actively prove freedom from FMD.

In February, the national Director: Animal Health at the national Department of Agriculture Forestry and Fisheries (DAFF) issued letters requesting private and state veterinarians to report suspect FMD cases; either cases where FMD was at some point suspected or cases where FMD is a differential diagnosis. The aim is to show that effective passive surveillance is ongoing all over the country. If we can show that we know what FMD looks like, and that we are looking and have not found it, it will assist with convincing our trade partners that most of the country is free from FMD.

The letter included a request for this information :

- Location
- GPS coordinates
- Species
- Number susceptible and affected
- Reason for call
- Clinical signs
- Conclusion

Figure 1: Excessive salivation is a sign of pain in the mouth[12]

Figure 2: Erosion on the dental pad due to FMD[9]

Please send the information to FMD@daff.gov.za and to your local state vet (refer to http://www.elsenburg.com/services-and-programmes/veterinary-services-0#s=Animal-Health-and-Disease-Control in the Western Cape).

First of all, a refresher on FMD clinical signs :

FMD affects cloven-hooved animals and the severity of clinical lesions caused by FMD virus depends on the host species, breed and immunity, and the virus strain. The incubation period is usually between two and eight days, after which vesicular lesions form. These then rupture to form erosions or ulcers[1]. In cattle, the lesions occur usually on the dorsum of the tongue, though they can occur elsewhere in the mouth. Lesions on the feet occur in the interdigital space, at the coronary band and on the bulbs of the heel. Teat lesions occur in cows and the pain caused can lead to difficulties in milking and secondary mastitis[2]. In young domestic animals, peracute deaths can occur due to a myocarditis, which causes a white streaked appearance of the myocardium often referred to as "tiger heart disease"[2,3].

Figure 3: Ulceration of the interdigital space due to FMD[9]

Figure 4: Healing FMD lesions (5 days old) in the mouth[12]

Differential diagnoses for FMD	Clinical signs similar to FMD
• Vesicular stomatitis • Swine vesicular disease • Vesicular exanthema of swine	These diseases are clinically indistinguishable from FMD[4] but should not, however, occur in South Africa
Bovine viral diarrhoea and mucosal disease	Some strains of BVDV (BVD type 2) can cause ulceration in the mouth and lesions on the coronary band and on the skin between the claws. Mucosal disease: erosive lesions on the mucosa of the nose and mouth.
Infectious bovine rhinotracheitis (BHV-I)	Inflammation of the muzzle and nostrils[6]
Bluetongue	Hyperaemia and congestion followed by oedema of the muzzle and lips, ulceration and necrosis of the mucosae of the mouth. Hyperaemia of coronary band of the hoof and lameness due to coronitis or pododermatitis[7]
Bovine mammillitis (BHV II & IV)	Oedematous plaques on the teats that develop into vesicles. These may rupture, leaving ulcerated areas[5]
Bovine papular stomatitis	Erythema and/or proliferative & erosive lesions on muzzle, lips, nostrils and mouth [13]
Malignant catarrhal fever	Ulceration, crusting and sloughing of the muzzle; multifocal erosions and ulcerations of the oral cavity and nasal passages; exudative dermatitis of udder, teats, interdigital spaces and coronary bands[13]
Orf (contagious pustular dermatitis)	Pustules & scabs on abraded skin including muzzle, gums, coronary bands, teats[8]
Peste des petits ruminants	Crusting scabs on lips, erosive and/or necrotic lesions in oral cavity[4] (Not reported in South Africa yet but has reached as far south as Tanzania and Zambia)
Interdigital dermatitis	Hyperaemic & swollen interdigital skin with greyish exudate
Digital dermatitis	Moist ulcers above the heels

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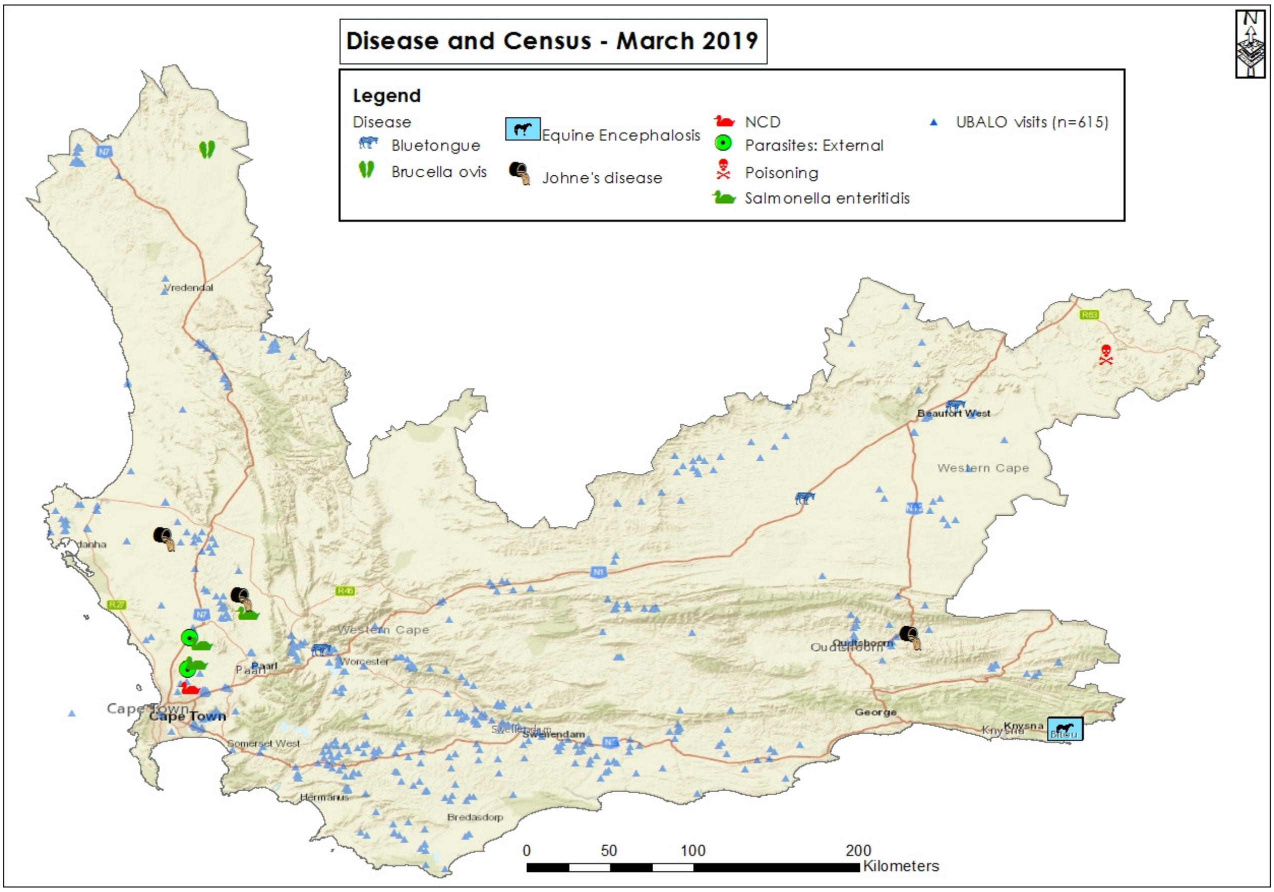
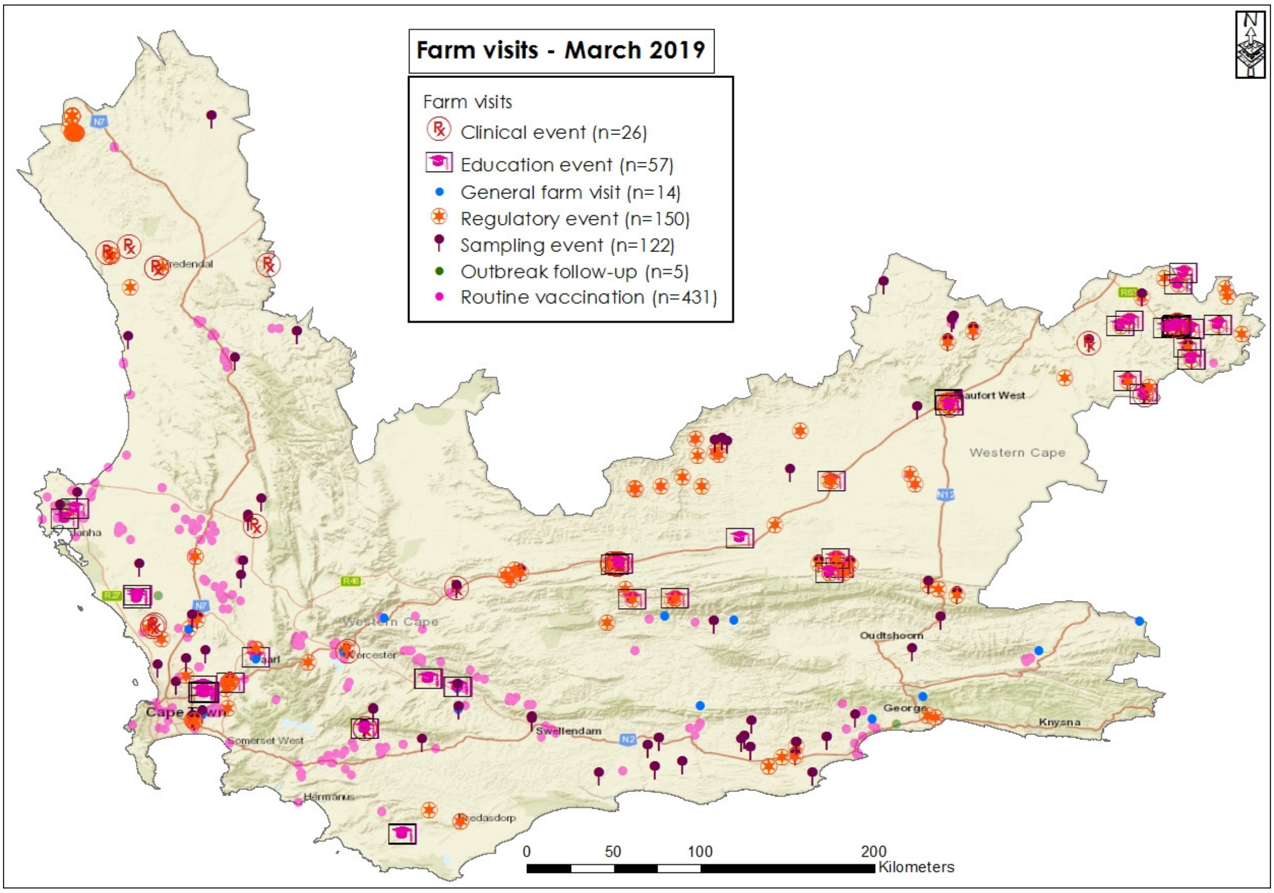
Figure 5: Erosions on a pig's snout due to FMD[10]

Figure 6: Ruptured FMD vesicle on cow's teat [11]

Disease and surveillance





Outbreak events

Bluetongue was reported on several farms, including near **Worcester** where seven **sheep** out of approximately 1000 showed oral ulcerations, swollen tongues, nasal discharge and corontis, with two later dying. The flock was of an unknown vaccination status and had all been purchased from the Caledon area in November 2018. Cases were also reported from **Leeu-Gamka**, where 20 of 1500 sheep were affected, and **Beaufort West**, where 18 clinical cases occurred in a flock of 450.

Two **equine encephalosis** virus cases were reported from **Plettenberg Bay**.

Approximately 15 wild **laughing doves** were found dead in a garden in a northern suburbs of **Cape Town**. The dead birds tested positive for virulent **Newcastle disease** and **pigeon paramyxovirus**.

Ovine Johne's disease was diagnosed on farms near **De Rust**, **Hopefield** and **Riebeek West** after sheep showed emaciation and diarrhoea.

Boot cover swabs on three broiler **chicken** farms in the **Malmesbury** area tested positive for ***Salmonella enteritidis***.

Brucella ovis was detected during **ram** testing near **Kliprand**.

Sheep died of chronic **cardiac glycoside** poisoning (krimpsiekte) near **Murraysburg**

A **secretary bird** was found by a motorist near **Riviersonderend**, showing severe lethargy. It became paralysed overnight. A necropsy showed **haemorrhagic enteritis** and diarrhoea, with cachexia, pale muscles and oedema of the heart and lungs. Testing for avian influenza and Newcastle disease virus was negative.

Sheep showing signs of pruritis near **Klipheuwel** were sampled and diagnosed with **red lice** infestation.

Pigs near **Malmesbury** showed typical clinical signs of **mange**.

Figures 7 and 8: Secretary bird showing lethargy and weakness as a result of severe enteritis (Photos: W Gouws)

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EPIDEMIOLOGY REPORT

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April 2019
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Dourine freedom survey in the AHS surveillance zone

Adapted from the SA Equine Health and Protocols Dourine in Equids Surveillance Report by J.D. Grewar and C.T. Weyer

This is the second surveillance report relating to dourine, a sexually transmitted trypanosomal (Trypanosoma equiperdum) disease of equids, in the African horse sickness surveillance zone of the Western Cape Province. A detailed introduction to the program can be found in the first report, featured in the April 2018 Epi Report. Dourine is a disease that impacts on the trade of horses between South Africa and the European Union. While the only explicit condition is the testing of horses in quarantine prior to export, the preamble in that decision describes a required period of freedom from dourine in the Western Cape during the 6 months prior to export. Since 1997 and the direct exports of horses to the EU, freedom from dourine within the territory of dispatch has relied on primarily clinical passive surveillance by private veterinarians, the active surveillance undertaken within the breed societies and the individual testing of horses in quarantine prior to export. The active dourine surveillance described in this report relates to the additional surveillance undertaken to further address the freedom status of the AHS controlled area for export purposes.

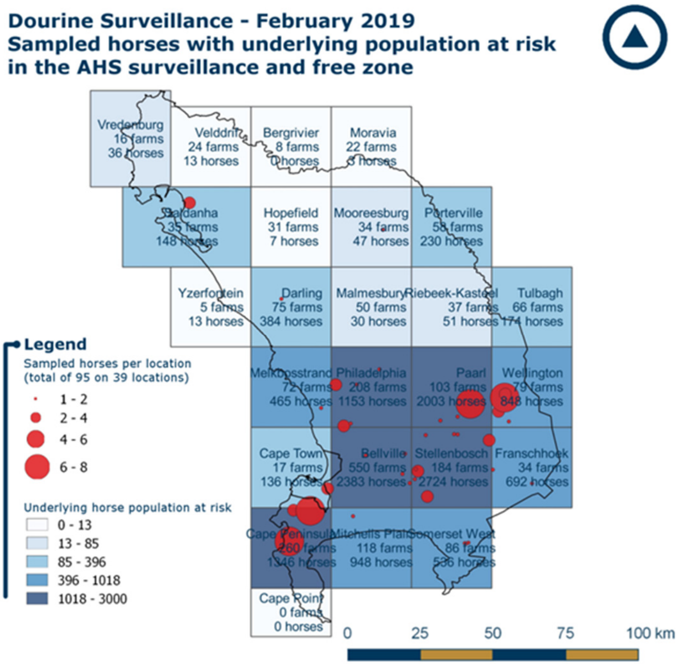


Figure 1: Dourine survey locations showing proportional circles for number of horses tested per location. The underlying population at risk is shown as a light to dark blue gradient.

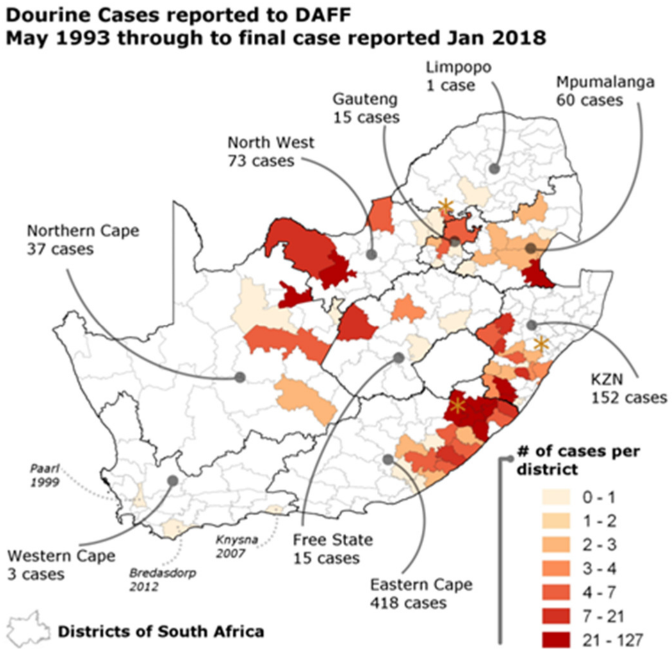


Figure 2: Historical dourine cases reported to DAFF from 1993 through Jan 2018. Cases have been aggregated by district while case totals per province are labelled. Additional cases reported since the 2018 dourine surveillance report are indicated by yellow stars (n=3).

A goal of 60 serological sentinels per month is the requirement for AHS sentinel surveillance testing for direct exports from South Africa to the EU. Over and above this, South Africa generally samples another 90 horses in the AHS surveillance zone to test approximately 150 horses in the zone using PCR testing. Given that serum samples are taken from all 150 horses, the sampled horses for the dourine surveillance were targeted from the remaining horses sampled but not tested serologically for AHS. Samples were taken between 1st and 20th February 2019.

A total of 95 horses were sampled in 39 locations across the AHS surveillance zone. Proportional numbers of horses sampled across the surveillance zone are shown in figure 1. The AHS sentinel surveillance program makes every effort to sample horses in proportion to their relative underlying population at risk using a gridded surveillance system, as depicted in figure 1. The majority of samples were thus taken from an area of approximately 50 km around the Kenilworth Quarantine Station, from which horses are exported.

All 95 samples tested negative for dourine antibody using the CFT (tested at the Agricultural Research Council's Onderstepoort Veterinary Institute

Currently the probability of freedom in the AHS surveillance zone for dourine ranges between 90.8% and 99.6% depending on the effective design prevalence used.

The surveillance evaluation to obtain a probability of freedom estimate is reliant on random and representative sampling. The sample frame for this surveillance is primarily in the commercial sector, horses are repeat sampled across periods and the selection of samples has a degree of convenience. Furthermore, for horses to be included in the sentinel program they should not have been recently vaccinated against AHS and this will bias the selection of horses. Furthermore, the geographical scope is limited to the AHS surveillance zone. Having said this, we believe this program is just a part of the overall dourine surveillance undertaken and should assist in export protocols that require dourine freedom statements where horses are exported from AHS free zone quarantine facilities such as Kenilworth Quarantine Station.

Figure 2 shows all dourine cases reported in South Africa from 1993 through Jan 2018 (data accessed April 2019 from www.daff.gov.za and collated to South African local municipalities). The cases reported in the last year do not influence these results since only an additional three cases, as indicated by stars in figure 2, were added to the disease database in the last year. In figure 3, we've included the equine movements that occurred from the AHS infected zone into the AHS controlled area during the 2017/2018 period. The majority of movements are horses within the commercial sector. In our previous report we suggested that Dourine is likely to be circulating in the non-commercial sector. The movement patterns of horses show that movements from heavily prevalent dourine affected areas occur less compared to those from non-dourine affected areas. Movements from the Eastern Cape, the most heavily affected dourine province, occur primarily from the south-eastern sector, with dourine occurring primarily in the north-eastern sector of this province. Similarly from KwaZulu-Natal, while there are dourine cases reported from areas from which horses move, these are less affected than surrounding districts in the province.

The recommendation initially for this surveillance was that it be repeated every six months in the AHS surveillance zone. Surveillance was not performed as planned in August 2018 due to logistical issues at the time. This lack of surveillance impacts the probability of freedom for both August 2018 and for the February 2019 periods.

Acknowledgments

Funding for this project was obtained from the South African Equine Health and Protocols (SAEHP –sampling, logistic and testing costs), Western Cape Department of Agriculture (sample kits). We are as always very grateful to the owners and managers of the sentinel horses in the AHS controlled area in the Western Cape, they are always willing to assist and their collaboration allows us to make scientifically backed statements regarding disease freedom for a number of equine diseases.

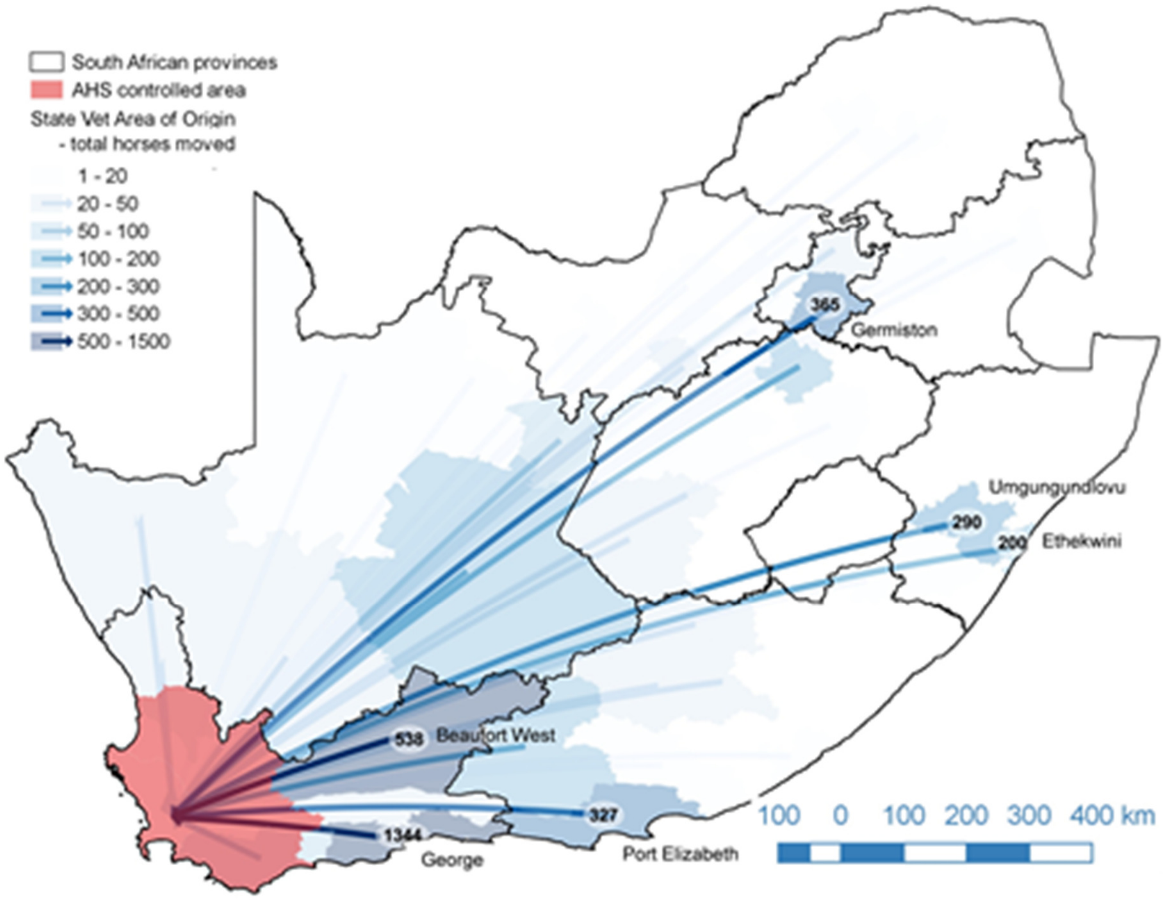
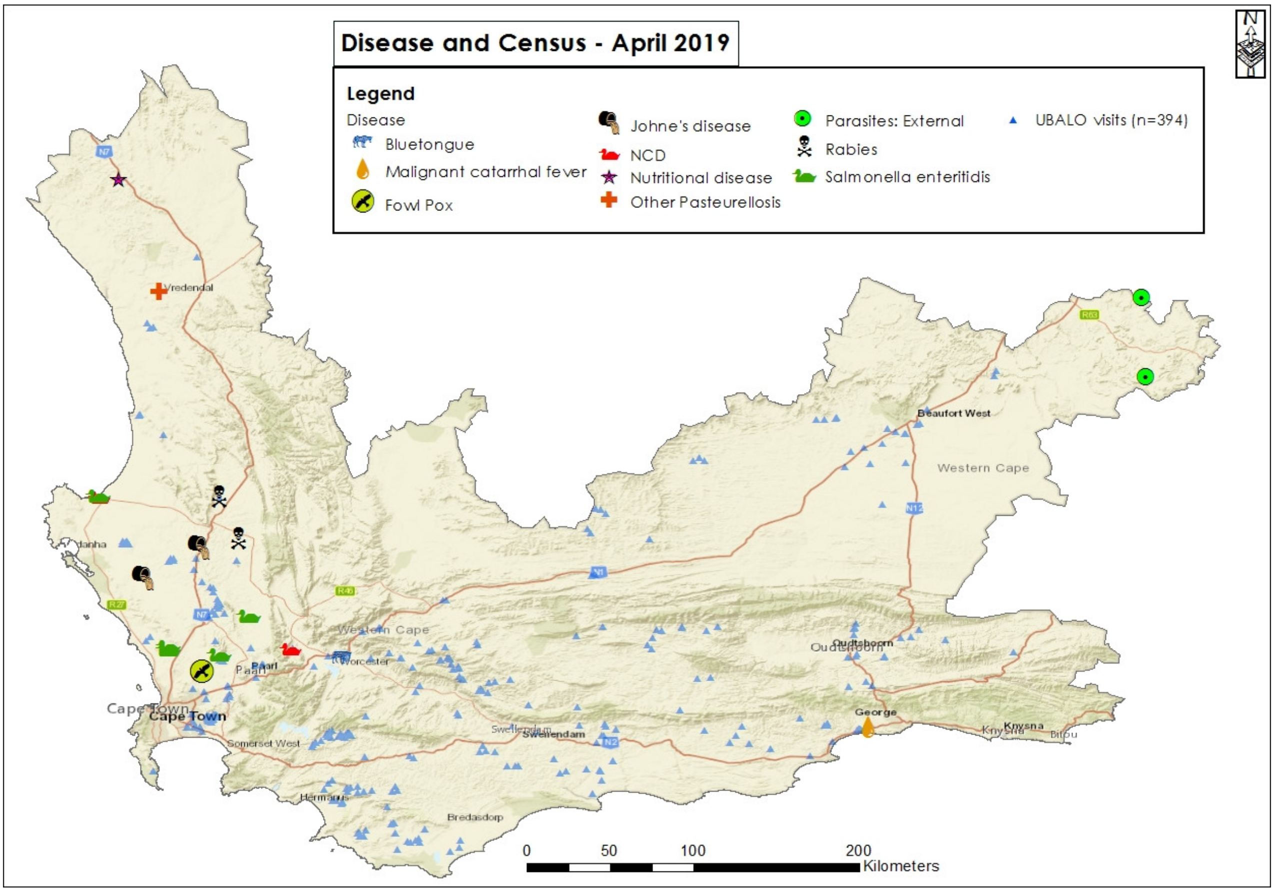
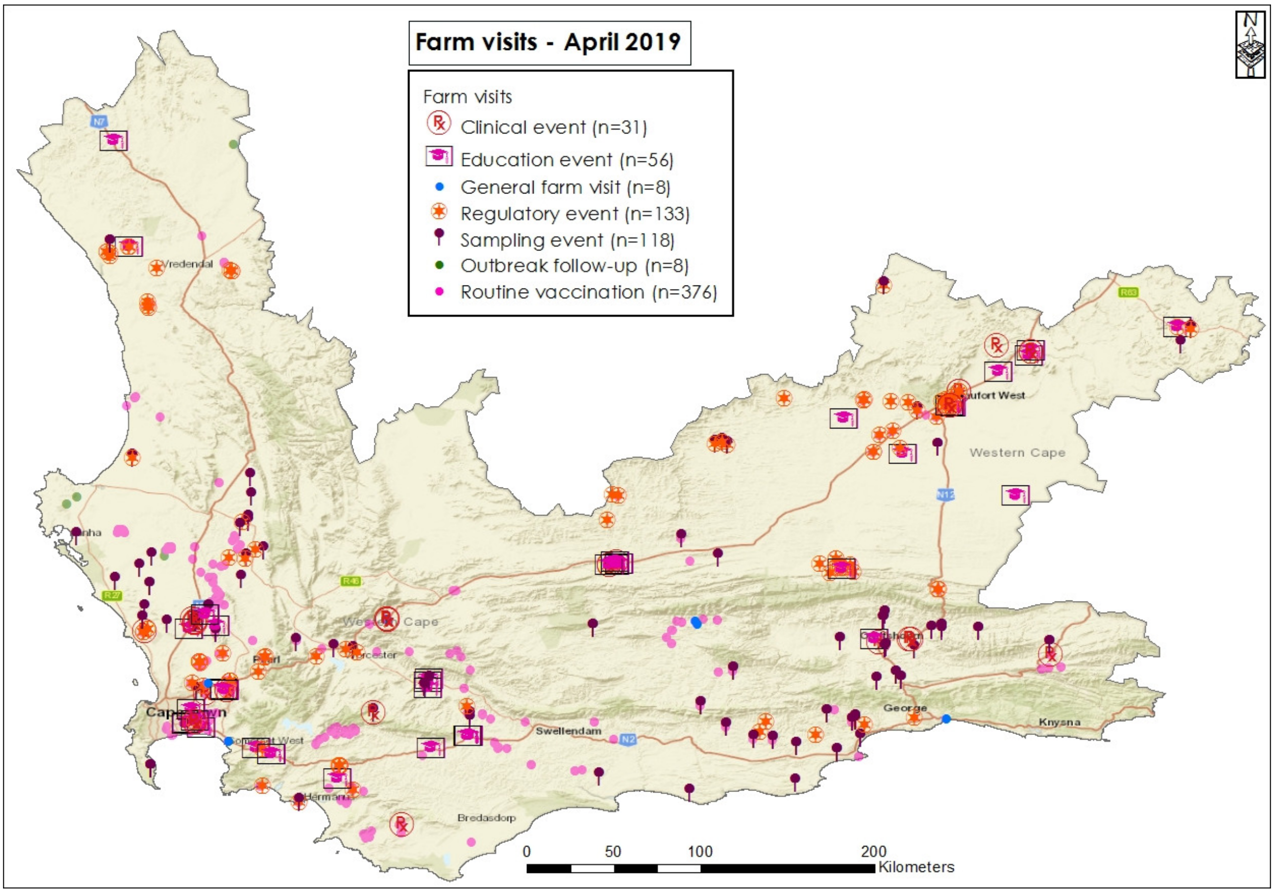


Figure 3: Movements of equids between the AHS infected zone and the AHS surveillance zone between September 2017 and Aug 2018. The six most common origins for these movements are labelled.

Disease and surveillance





Outbreak events

Two different farmers, one near **Porterville** and another near **Piketberg**, shot **bat-eared foxes** that attacked their vehicles as they were driving on their respective farms. Both foxes subsequently tested positive for **rabies** and dogs and cats in the area were vaccinated in response.

A flock of 27 Namaqua Afrikaner **sheep** (fig 4) in **Worcester** were observed showing clinical signs of **bluetongue** by a private veterinarian. The sheep were not previously vaccinated against bluetongue.

Newcastle disease was reported in backyard **chickens** near **Worcester**.

Domestic **pigeons** in **Velddrif** showed nervous signs, including star gazing, and diarrhoea, followed by acute death. The pigeons tested positive for virulent **Newcastle disease** and pigeon paramyxovirus.

Two **sheep** farms near **Mooreesburg** tested positive for ovine **Johne's disease** after the farmers noticed some of their ewes becoming emaciated. Both farms were placed under quarantine and plan to start vaccinating their flocks in the future. One of the farmers additionally uses agricultural lime in the camps where ewes lamb down, to neutralise the acidic soil.

Salmonella enteritidis (SE) was detected on five properties in the Malmesbury state vet area:

⇒ Chick box liners and dead-in-shell chicks in **broiler** hatcheries near **Paarl** and **Hermon** tested positive for SE. Increased monitoring and disinfection is taking place in the hatcheries and in the broiler breeder flocks supplying them.

⇒ Boot cover swabs on two **broiler** farms near **Atlantis** tested positive for SE. Broilers in the positive houses were treated and follow-up testing and increased monitoring will take place once treatment is complete.

⇒ SE was detected on dust swabs taken from the beginning of the production stages of **fish meal** at a plant in **Velddrif**. Swabs taken from later stages of processing, including after fish meal was heat-treated, were negative for SE. A deep clean of the factory with acid treatment was done.

Four **cattle** died of **anaplasmosis** in **Cape Town**.

Cases of wildebeest-associated **bovine malignant catarrhal fever** were reported near **George**.

Backyard **chickens** were observed with cases of **fowl pox** on two different properties in **Klipheuwel**.

Two **sheep** in a flock of twelve were affected by **pasteurellosis** near **Vredendal**.

Young **piglets** near **Mamre** showed signs of oedema disease, caused by infection with ***Escherichia coli***. Older piglets also showed neurological signs, consisting of trembling and falling which were attributed to *E. coli* infection.

Cases of **tick paralysis** were reported in **sheep** in the **Murraysburg** area.

Abomasal impaction was identified as the cause of death of a **sheep** in the far **north** of province.

Figure 4: The Namaqua Afrikaner is an indigenous breed of fat-tailed sheep (Photo: Grootfontein Agricultual Development Institute)

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EPIDEMIOLOGY REPORT

VETERINARY SERVICES
May 2019
Volume 11 Issue 5

African swine fever on the move

Laura Roberts and Lesley van Helden

In April and May this year, several outbreaks of African swine fever (ASF) occurred in South Africa affecting four different provinces in the north of the country (fig 1).

The outbreak in the North-West Province occurred just outside the border of the ASF control area in free-ranging pigs that had contact with warthog.

In Gauteng, Mpumalanga and the Free State, however, the outbreaks were possibly linked to illegal movement of pigs out of the controlled area, which were then sold at auctions and moved to various parts of the country.

In all cases, the outbreaks were detected after increased mortalities were observed in pig herds. In some cases the mortality rate was very high, but in the case of the affected farm in the Free State, the mortality rate was relatively low and continued for an extended period of time.

All pigs on the infected properties were placed under quarantine prior to being culled and disposed of. The properties have also been disinfected.

In response to the detection of outbreaks within the province, Gauteng has suspended the sale of all live pigs at auctions and the keeping of pigs in auction pens.

It is worth noting that these outbreaks do not affect the trade status of South Africa. Exports can occur from officially recognized pig compartments which have biosecurity measures in place that allow them to certify freedom from several pig diseases.

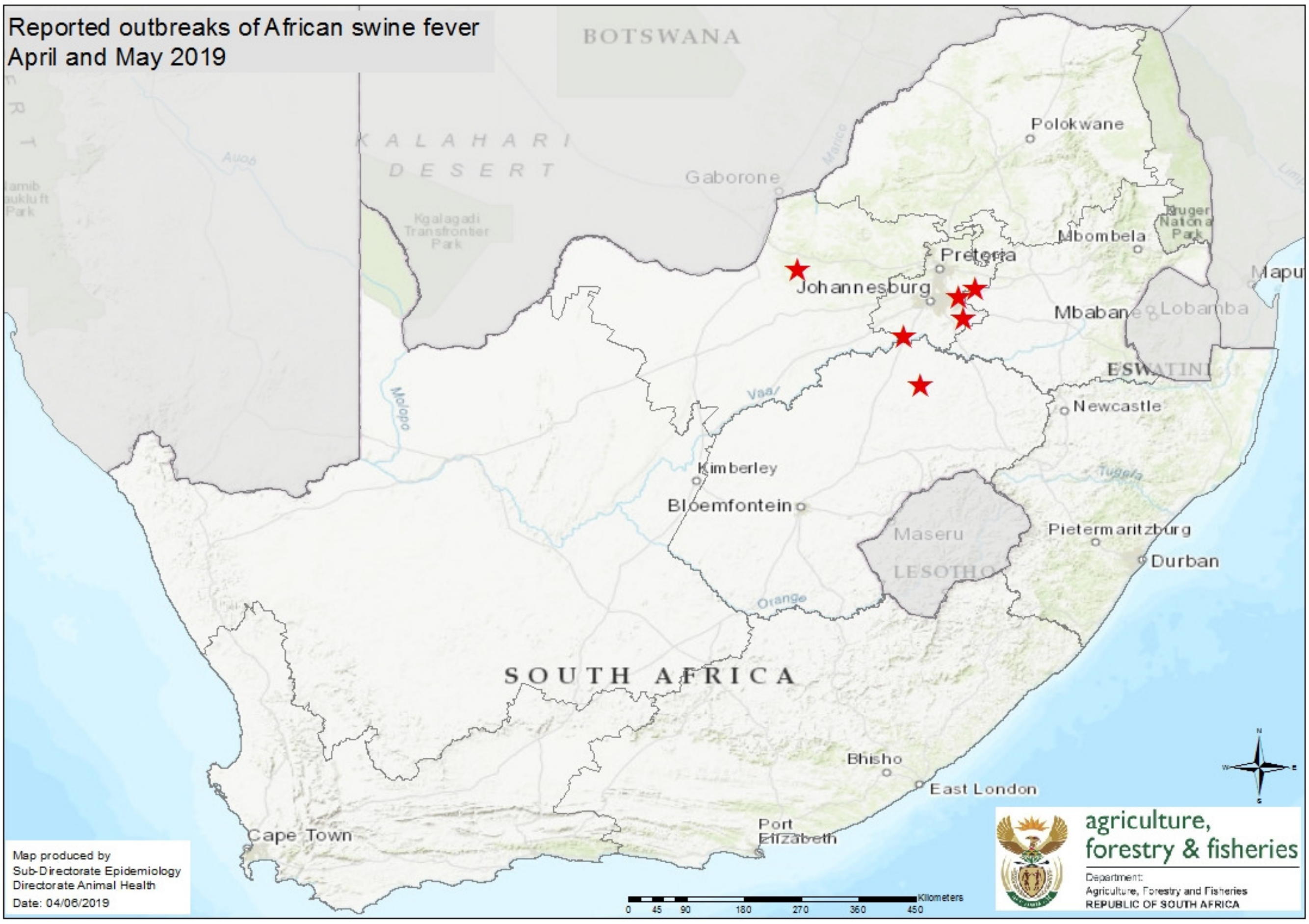


Figure 1: Outbreaks of African swine fever reported in South Africa in April and May 2019 (DAFF)

In South Africa the first outbreaks outside the control zone (which comprises most of Limpopo province and northern parts of North-West and Mpumalanga) were in 2012 (Mpumalanga & Gauteng) and then again from 2016 to 2018 (North-West, Free State and Northern Cape). The latter outbreaks were caused by a genotype not previously associated with South African outbreaks and raised suspicion of introduction from further north in southern Africa. The same genotype is causing outbreaks now and the original source is still unclear.

Clinical signs

The incubation period is 4-19 days (FAO). Pigs can **die peracutely** from ASF without showing any clinical signs, but they may briefly show high fever with reddening of the belly and extremities (fig. 2), recumbency, shade-seeking, huddling and rapid breathing before death.

In acute cases, infected pigs survive approximately two to seven days and show similar signs, but reddened areas may become purplish and small haemorrhages may be visible on the skin. Additional signs may also include ocular and nasal discharges, abdominal pain, constipation or bloody diarrhoea, hind-limb weakness, difficulty breathing due to lung oedema, nervous signs and abortions. Mortality rates can be up to 100%.

On post mortem, there are general signs of haemorrhage and oedema.

ASF is clinically indistinguishable from classical swine fever and can also be confused with septicaemia, so it is important to take samples for laboratory testing

The samples of choice in a dead pig include fresh **lymph nodes, spleen, kidney and tonsils** collected aseptically and kept chilled (at 4°C) but not frozen. These can be tested with PCR and virus isolation can be attempted. In a live pig, up to about five days after the onset of fever, virus may be detectable in blood. EDTA (purple top) and heparin (green top) tubes should both be used as they are suitable for PCR and virus isolation respectively. Samples should be sent to the Transboundary Animal Diseases section of ARC-OVR.

Figure 2: Pig with ASF showing reddening of the skin (EFSA)

Organ samples can also be collected in 10 % formalin for histopathology and immunoperoxidase staining.

Serum samples (red/ yellow-topped tube) will only be useful if an infected pig survives an ASF infection for more than 1-3 weeks and has time to develop antibodies.

ASF status around the world

ASF spread to Europe (Portugal) in the 1950s and was reported first from West Africa (Senegal) in the '70s. The disease was eradicated in Europe by the early '90s, except for Sardinia, where it has become endemic. The virus was re-introduced to Europe to the Caucasus (Georgia) in 2007 and has spread since, across Russia, to the Ukraine in 2012 and eventually to Belgium in 2018. The disease may now be established in the wild boar population. In Asia, the disease was reported for the first time in China in August 2018. There has been an increase in cases worldwide since 2016 and concern is growing (OIE).

Transmission

ASF in domestic pigs in Southern Africa has been linked historically to tampans (soft ticks) infected with the virus by warthogs. However, the virus can also be transmitted directly between pigs and via their products and can be maintained in a population without tampans. Biosecurity, careful sourcing of new stock, and thorough cooking of any swill-containing pig products are therefore all very important, especially as cases in domestic pigs increase.

Survival in the environment & disinfection

ASF virus is very tolerant of cold and of pH extremes and can survive years in frozen meat, months in ham and weeks in pig pens, though it is susceptible to heat and desiccation.

2% sodium hydroxide (caustic soda) or sodium hypochlorite (bleach) with a 30-minute contact time will kill ASF virus, as well as 0.3% formalin. Detergents are effective, as well as commercial virucidal disinfectants. Infected or suspect meat should be cooked for at least 30 minutes at 70°C before being fed to pigs or transported.

Sources:

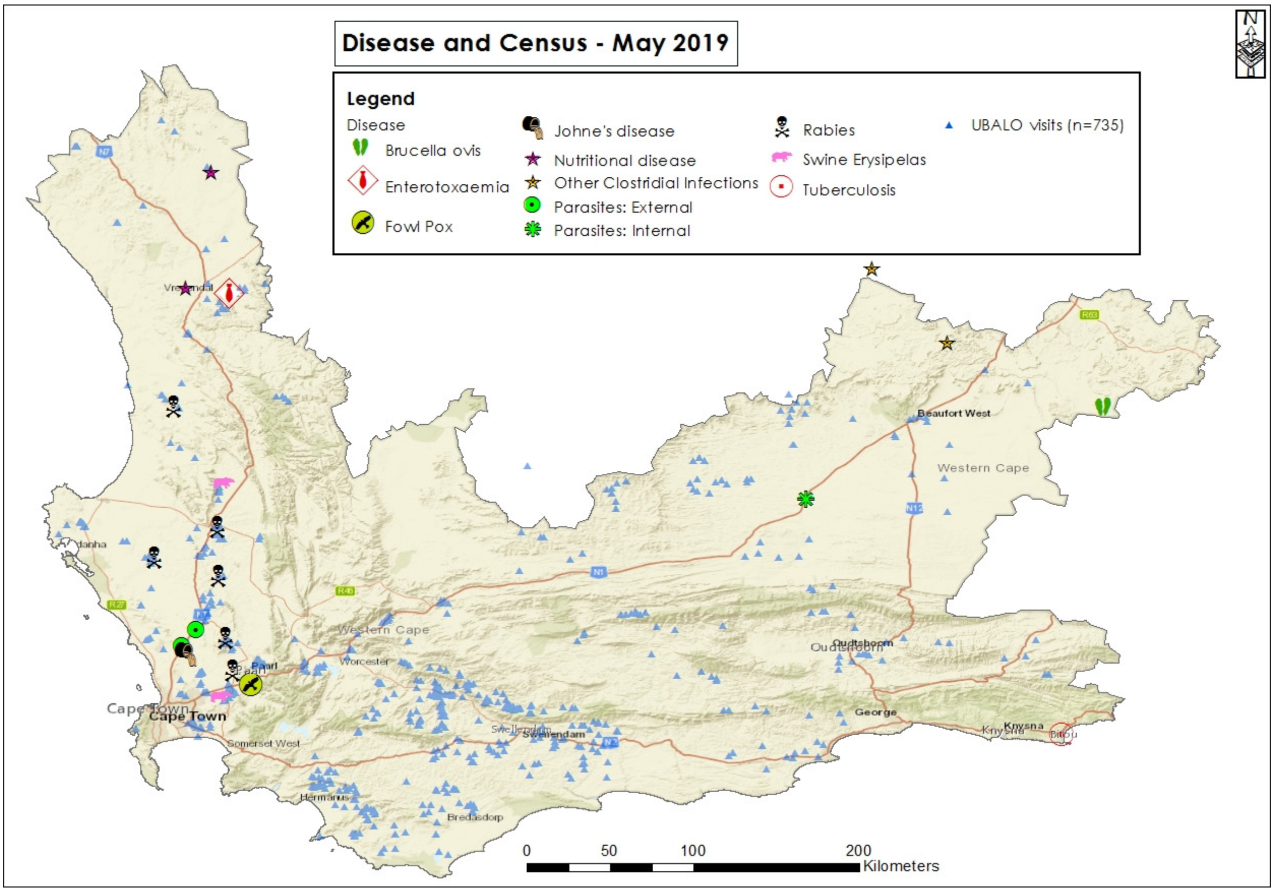
EFSA AHAW Panel (EFSA Panel on Animal Health and Welfare, 2017. Characterisation of African swine fever (ASF) for scientific opinion on vector-borne diseases. https://www.arcgis.com/apps/MapJournal/index.html?appid=db62d00222644945862b40fe6277831a

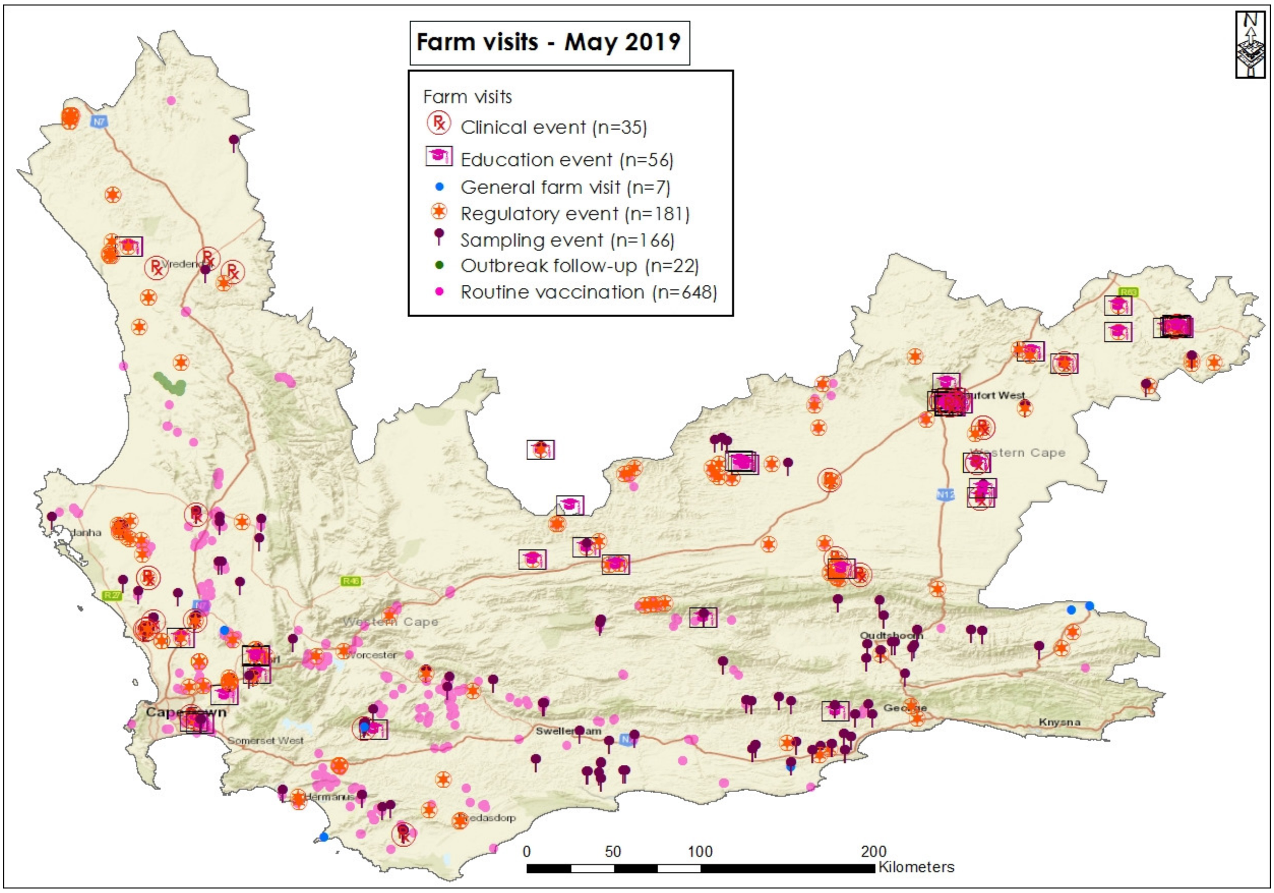
Penrith, ML African Swine Fever (ASF) AfriVIP, summarized from Infectious Diseases of Livestock http://www.afrivip.org/sites/default/files/ASF/index.html

http://www.oie.int/en/animal-health-in-the-world/animal-diseases/african-swine-fever/

Minutes of DAFF ASF workshops, November 2018 & June 2019

FAO (2009) Preparation of ASF Contingency Plans http://www.fao.org/3/a-i1196e.pdf


Disease and Census - May 2019
Legend
Disease
Brucella ovis
Enterotoxaemia
Fowl Pox
Johne's disease
Nutritional disease
Other Clostridial Infections
Parasites: External
Parasites: Internal
Rabies
Swine Erysipelas
Tuberculosis
UBALO visits (n=735)
Cape Town
Paarl
Worcester
Somerset West
Hermanus
Bredasdorp
Swellendam
George
Knysna
Bitou
Oudtshoorn
Beaufort West
Western Cape
Vredendal
0 50 100 200
Kilometers


Farm visits - May 2019
Farm visits
Clinical event (n=35)
Education event (n=56)
General farm visit (n=7)
Regulatory event (n=181)
Sampling event (n=166)
Outbreak follow-up (n=22)
Routine vaccination (n=648)
Cape Town
Worcester
Somerset West
Hermanus
Bredasdorp
Swellendam
George
Knysna
Oudtshoorn
Western Cape
0 50 100 200
Kilometers

Outbreak events

Six cases of **rabies** were reported in **bat-eared foxes** this month. Dogs and cats in the areas surrounding the cases were vaccinated against rabies.

⇒ A bat-eared fox near **Hopefield** attacked a farmer's vehicle as he was driving. The farmer shot the fox.

⇒ A private veterinarian on his way to work near **Wellington** saw a bat-eared fox next to the road showing nervous signs. He picked up the fox and euthanased it.

⇒ Another private vet found a bat-eared fox on his property near **Paarl**, showing nervous signs and appearing disorientated. He euthanased the fox.

⇒ A bat-eared fox showing nervous signs was seen next to the road by a farmer near **Piketberg**. He shot the fox.

⇒ A bat-eared fox found dead in a farmyard near **Graafwater** tested positive for rabies. There was no evidence of any human or animal contact.

⇒ Near **Mooreesburg**, a farmer saw a bat-eared fox walking around his garden with difficulty and lying on the lawn. When he returned from fetching his rifle to shoot it, it had disappeared and was not seen again. Although this case was not confirmed by laboratory testing, it is highly suspect for rabies.

A female **chacma baboon** was found in a garage of a residential area of **Plettenberg Bay**, showing signs of dyspneoa. She was euthanased and a necropsy revealed lesions in her lungs containing acid-fast bacilli. Mycobacterial culture and spoligotyping identified the organisms as ***Mycobacterium tuberculosis***, Beijing strain. This strain is found commonly in humans with tuberculosis in the Western Cape and it is suspected that the baboon became infected through contact with contaminated food or other material. The troop to which she belonged has ben observed foraging for food in residential areas and refuse dumps.

A **sheep** farmer near **Philadelphia** had noticed for the past few years that a small number of his ewes were becoming emaciated and dying. A private vet diagnosed ovine **Johne's disease** after a post mortem and histopathology. The farmer plans to vaccinate his flock to minimise losses.

Two **pigs** from farms near **Klapmuts** and **Eendekuil** were observed to have classic skin lesions of **erysipelas of swine** after slaughter and scalding of the carcasses. Pigs on the farms of origin were examined for signs of disease and a small number that appeared sick were subsequently treated with penicillin.

On a farm near **Paarl**, **fowl pox** lesions were seen on the younger members of a flock of about 80 **chickens** (fig 3).

Brucella ovis was diagnosed in seven young **rams** on a farm near **Murraysburg**.

Clostridium novyi affected **sheep** on two farms between Loxton and **Beaufort West**.

A necropsy of a **lamb** near **Vanrhynsdorp** revealed the cause of death to be **enterotoxaemia**.

Seven **lambs** died of **navel ill** near **Vanryhnsdorp**.

Two out of seven young **pigs** started showing fits and nervous signs near **Atlantis** as a result of meningitis due to ***Escherichia coli*** infection.

Three-week-old **lambs** died of **abomasal impaction** in the **Vanrhynsdorp** area as a result of eating sand.

Nasal bots were seen in **sheep** near **Kalbaskraal** and in **Abbotsdale**.

Infestation with **long-necked bankrupt worm** was seen in **sheep** near **Leeu-Gamka**.

Figure 3: A young chicken with fowl pox lesions on the skin of its face (M Fourie)

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EPIDEMIOLOGY REPORT

VETERINARY SERVICES
June 2019
Volume 11 Issue 6

Swine erysipelas: why is it important?

Lesley van Helden

Erysipelothrix rhusiopathiae is a ubiquitous organism that has been recorded causing disease in many species of animals, including birds and mammals. However, the disease is notifiable to veterinary services when it occurs in pigs.

Up to 50% of pigs around the world carry the organism, usually in their tonsils. It is excreted in oronasal secretions and faeces, from which it can infect other pigs or contaminate the environment. It survives for a long time in the environment and can also survive in infected meat, though it is destroyed by most commonly used disinfectants.

Owing to the ubiquitous nature of the organism, most piglets are protected by maternal antibodies up until about 12 weeks of age. After this, growing pigs, gilts and younger sows are the most susceptible to disease (if they have not been vaccinated). An infected animal that has recovered from clinical disease develops immunity thereafter.

Outbreaks of erysipelas in the Western Cape are infrequent, with three or four reported per year. Usually, clinical signs are detected in pigs when they are sent to the abattoir, either during pre-slaughter inspection or meat inspection after slaughter, as previously undetectable skin lesions sometimes become apparent after scalding of the carcass.

There are numerous different strains of the bacterium, some of which are pathogenic and others which are non-pathogenic. **Clinical signs** can therefore range from being inapparent to severe.

Acute outbreaks are usually seen in pigs approaching slaughter weight. The disease begins with fever, listlessness and loss of appetite, with reddening or cyanosis of the skin following soon after, especially on the ears, snout, throat and belly. Sometimes the skin lesions in acute cases take on the classic appearance of being raised, red and diamond-shaped (figures 1 and 2). These turn black as they necrose and normally heal within ten days. The bacterium infects the joints, causing pain and lameness, sometimes with visible swelling of the joints. Acute cases may also present as sudden deaths due to septicaemia or heart failure.

Acute infection may also cause infertility as fever and septicaemia damage spermatozoa in boars and cause abortions and small litter sizes in sows.

Outbreaks may be difficult to detect, as usually just a small number of animals become ill with non-specific clinical signs. However, in unvaccinated herds, up to 10% of animals could be affected. The higher the number of infected animals, the higher the likelihood that skin lesions and/or lameness will be seen.

Untreated acute cases may die or recover, but some can become chronically infected. Chronic infection usually manifests as chronic arthritis due to joint infection or vegetative valvular endocarditis. Chronically infected animals are often poor doers.

It is suspected that stress plays a role in whether clinical disease manifests in an infected animal or not. Outbreaks are often seen after mixing of pigs into new groups e.g. at weaning or after sudden changes in temperature and weather conditions.

Other factors that increase the challenge on the immune system, including concurrent infection with viruses such as porcine reproductive and respiratory syndrome virus or influenza, poor hygiene, mycotoxins in feed or heavy parasite burdens can result in clinical erysipelas.

Diagnosis of erysipelas is usually based on clinical signs and a good response to treatment with penicillin.

Figure 1: Pig showing classic diamond-shaped skin lesions (H. Lubbinge)

However, diagnosis can be confirmed by bacterial culture of kidney, spleen, lymph nodes or blood. Serology is of little use in diagnosing disease, but can be used to demonstrate immune response to vaccination or whether previous exposure has occurred.

Diagnosis of chronic infections is difficult and requires bacterial culture from joint lesions.

Treatment is fairly simple as *E. rhusiopathiae* is susceptible to penicillin and usually also tetracyclines, but it is resistant to many other antibiotics. Treatment of individual animals can be done during small outbreaks, but if a large percentage of the herd is infected, medication can be delivered through drinking water .

Chronic cases often don't respond to treatment and should rather be culled from the herd.

Prevention in the form of vaccination should be practiced on properties that are experiencing an outbreak or have previously had outbreaks. Piglets can be vaccinated before or at weaning, but it is usually recommended to vaccinate twice from ten weeks of age, two to four weeks apart, depending on the product used. This should provide protection to pigs growing to slaughter weight, but in some herds a booster vaccination during the finishing stages may be necessary, especially if infection pressure is high.

Breeding stock should be vaccinated at least two weeks prior to breeding and booster vaccinations given every six months. Animals should not be vaccinated while on antibiotic treatment, as this will interfere with the immune response to the vaccine.

Good hygiene and biosecurity should be practiced in all herds and chronically infected animals identified and removed.

Given the ubiquitous nature of the organism and usually mild effects of outbreaks, one may wonder why erysipelas is a notifiable disease.

Erysipelas causes a general septicaemia, and for that reason, shares clinical signs with several controlled pig diseases of importance, including classical swine fever, African swine fever and porcine reproductive and respiratory syndrome. The occurrence of these clinical signs must therefore be investigated as part of surveillance for controlled pig diseases. Outbreaks of erysipelas going undetected are an indication of insufficient passive surveillance in pig herds.

Erysipelas is also a food safety issue, in that acutely infected carcasses are condemned as a result of septicaemia. In chronically infected animals with arthritis, limbs with affected joints will be condemned.

Figure 2: Carcasses like this one showing signs of generalised erysipelas are condemned at the abattoir (H. Lubbinge)

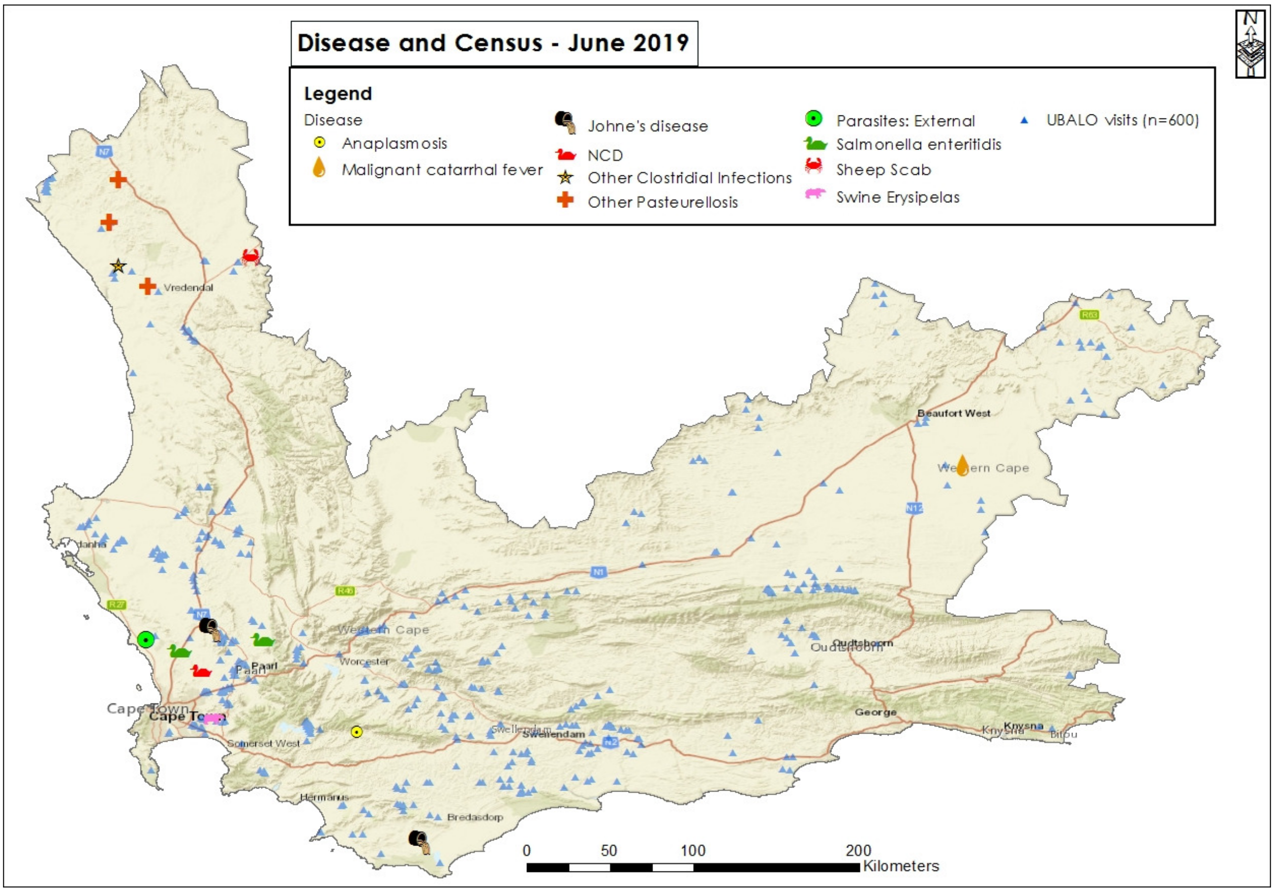
Humans who work with infected animals or products may get erysipeloid, which occurs when *E. rhusiopathiae* enters the skin through small wounds and causes a localized infection with inflammation. However, erysipeloid should not be confused with the human disease, also called erysipelas, which is a streptococcal infection of the skin.

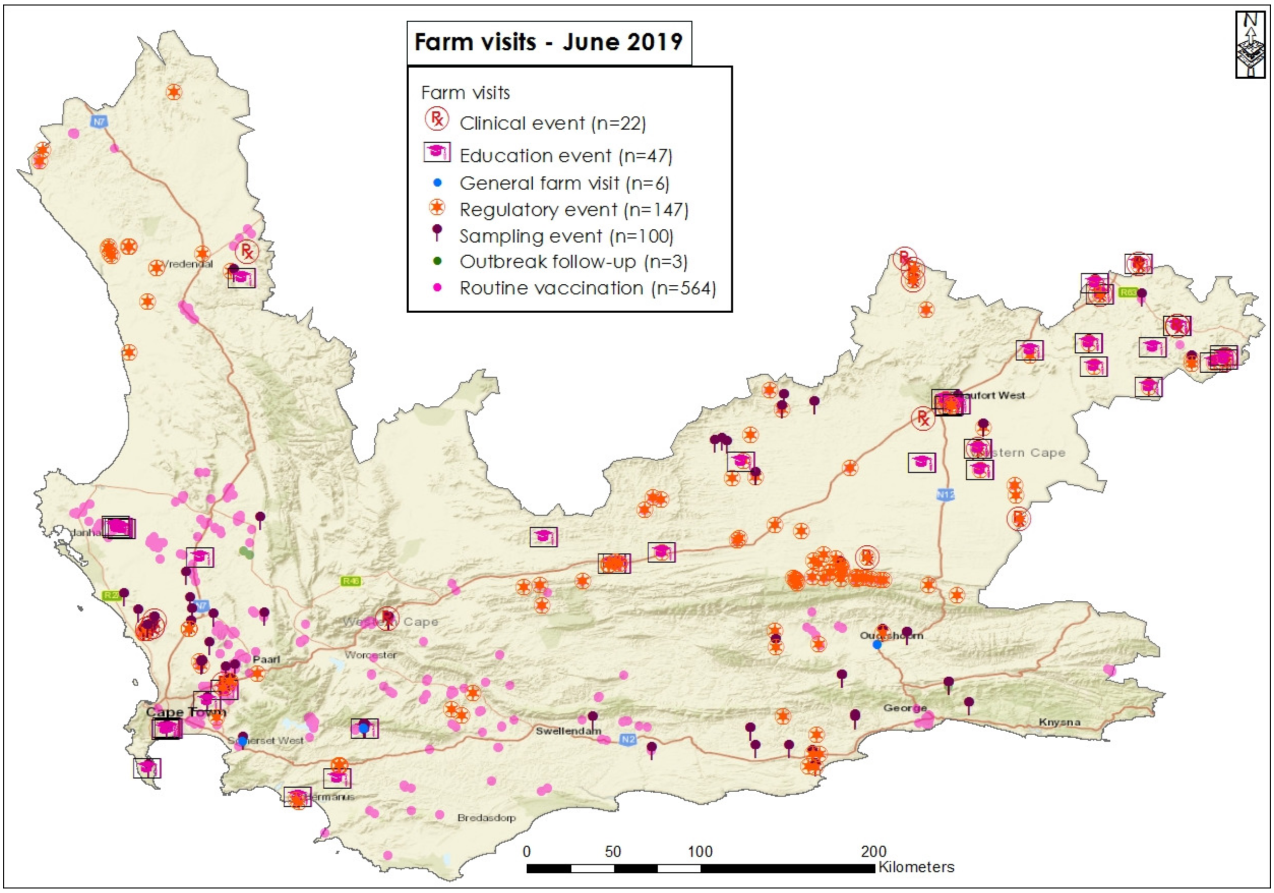
New publications

Grewar, J.D., Sergeant, E.S., Weyer, C.T., van Helden L.S., Parker, B.J., Anthony, T. and Thompson, P.N. 2019, Establishing post-outbreak freedom from African horse sickness virus in South Africa's surveillance zone, *Transboundary and Emerging Diseases.*

https://doi.org/10.1111/tbed.13279

Disease and surveillance





Outbreak events

Itching and loss of wool (fig. 3) was seen in a sheep flock near **Vanrhynsdorp**. Wool samples analysed under the microscope revealed the presence of *Psoroptes ovis* mites, the causative organism of **sheep scab**. The property and all contact properties were quarantined and treatment instituted under official supervision.

Wild **laughing doves** were found dead at several locations in the town of **Klipheuwel** after showing clinical signs of respiratory distress, depression and diarrhoea. Brain and tracheal swabs taken from the dead birds tested positive for virulent **Newcastle disease** and pigeon paramyxovirus.

Sheep farms near **Malmesbury** and **Bredasdorp** were diagnosed positive for **Johne's disease** after observations of emaciation in ewes over a long period of time.

Chick box liners arriving on a broiler **chicken** farm near **Wellington** tested positive for ***Salmonella enteritidis***. Cloacal swabs taken from the same group of chickens at day 14 also tested positive. The chicks are being treated with enrofloxacin and their carcasses will be frozen at slaughter.

Boot swabs from another broiler **chicken** farm near **Philadelphia** also tested positive for ***Salmonella enteritidis***. Chickens in the affected house were treated with enrofloxacin and follow-up monitoring will be done before slaughter.

Skin lesions were seen on **pigs** originating from a farm near **Stellenbosch** on arrival at the abattoir. A clinical diagnosis of **erysipelas** was made. Outbreaks have not been seen previously on this farm and no clinical signs were observed in the herd.

A heifer near **Beaufort West** was euthanased after appearing ill and with signs of conjunctivitis for a few days. Sheep-associated **bovine malignant catarrhal fever** (MCF) was diagnosed. This farm has experienced cases of MCF more than once in the past.

Two **cattle** near **Genadendal** were treated for **anaplasmosis**.

Fifteen **lambs** died of **enterotoxaemia** (rooiderm) near **Koekenaap**.

Sheep on three different properties near **Vredendal**, **Nuwerus** and **Bitterfontein** experienced outbreaks of **pasteurellosis**.

An outbreak of **sarcoptic mange** was seen in **pigs** in **Mamre**.

Figure 3: Sheep showing alopecia and crusting as a result of sheep scab (J. Kotze)

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EPIDEMIOLOGY REPORT

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July 2019
Volume 11 Issue 7

Epidemiology in our personal lives: The case of human flu

Lesley van Helden

Concepts such as epidemiology and one health are often viewed as large and abstract, not applying to the individual but rather dealing with populations and therefore not having much of an effect on specific animals or people.

However, the opposite is true. Every big picture is influenced by the behaviour of each individual within it.

As animal health professionals, we apply epidemiological principles in our lives at work daily. We do this by enforcing quarantine and biosecurity measures on properties infected with animal diseases to prevent the spread of outbreaks. We also take biosecurity precautions ourselves to prevent acting as fomites and spreading pathogens between properties.

We often forget that we also play a role in the spread of human disease. This month, we wanted to turn the focus from the animal populations we deal with every day to the human population of which we are part. To illustrate this, we will use the example of influenza in South African people.

It is estimated that 34% of South Africans are infected with seasonal influenza each year and 20% experience symptomatic illness. This represents approximately 10 million people who are affected by influenza each year. The influenza season occurs each year in winter between May and August, lasting for 12 to 25 weeks. According to the Viral Watch respiratory disease surveillance programme, this year's season started at the end of April, peaked in June and has now started to decline (fig 1).

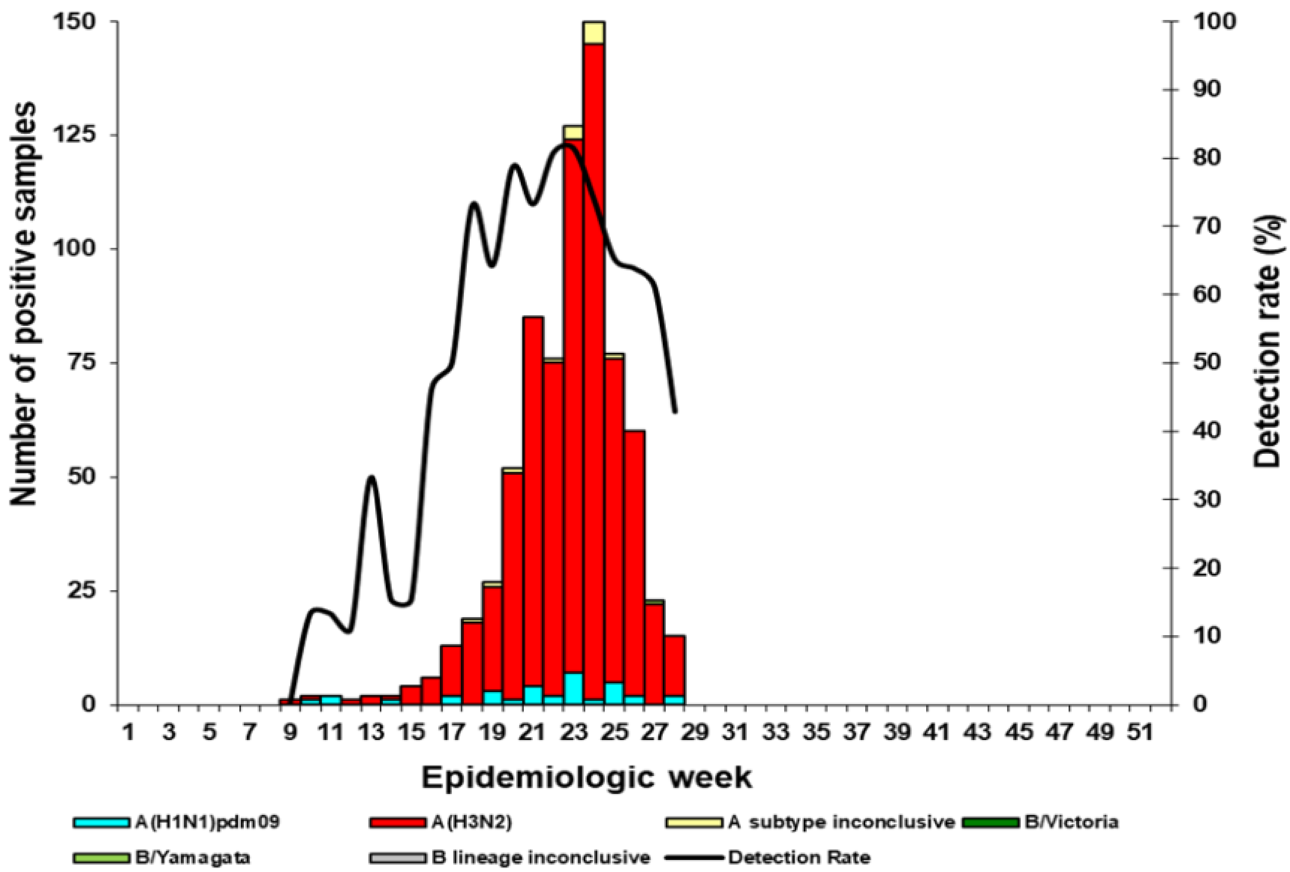


Figure 1: Influenza season in South Africa in 2019 represented by the number of positive samples by influenza type, subtype and detection rate from Viral Watch
(Figure from the NICD Communicable Diseases Communiqué, July 2019, Vol 18(7))

Currently available information indicates that 7-15% of the global human population is infected with influenza each year. In comparison with the rest of the world, the South African rate of infection is therefore very high. This is likely a result of a high rate of transmission of the virus between infected people in South Africa, influenced by human behaviour. It is important, as individuals, to realise that we are not exempt from the rules of disease transmission. It is also important to consider that an illness that is mild for you, may not be for other people to whom you are exposing it.

Of all of the influenza cases in South Africa per year, 128000 people are hospitalised as a result of their illness and approximately 12000 deaths occur. Those at high risk of complications include pregnant women, children, the elderly, the immunosuppressed and those with chronic conditions such as diabetes, heart disease or obesity. Vaccine effectiveness is lowest in these groups of people, so it is important to prevent transmission of the virus in order to avoid severe illness and deaths caused by influenza. Many people who seem otherwise healthy may be suffering from a condition that is not obvious, may be in the early stages of pregnancy or may have high-risk family members at home for whom they are caring.

The control of human disease follows many of the same principles we apply to control animal diseases:

Isolation:

Stay at home and rest when you are sick (fig 2). Do not go to work or out in public until at least a day after your fever has subsided. Encourage colleagues to stay home when sick. Going to work when sick not only slows down recovery time, but makes one more likely to make mistakes at work as well as infect one's colleagues, causing significant losses in productivity. A study published by researchers from the University of Pittsburgh showed that, by sick employees staying at home for just two days, the number of influenza cases in a workplace could be reduced by almost 40%,

Keep sick children away from school. Children are important transmitters of influenza. Early in the influenza season this year, clusters of disease were reported in several schools. A second peak in the number of influenza cases is also usually seen once children return to school after the school holidays in July.

Early detection and intervention:

Make sure to rest as soon as you start feeling sick. If you are in one of the groups at high risk of complications, be sure to visit a doctor or clinic as soon as possible to receive treatment if necessary.

Biosecurity:

If you have no choice but to be in an environment with other people, stay as far away from others as possible (at least two metres). Wash your hands often and clean and disinfect all surfaces you have touched that will be touched by others. Wear a mask over your nose and mouth to minimise the amount of virus you spread into your surroundings.

Figure 2: Humans and animals alike should stay home when sick to speed up recovery time and prevent transmission of disease to others.

Don't try this at home: Use of oral thermometers is not recommended in animals.

Vaccination:

Get an annual influenza vaccination, especially if you are in one of the high risk categories. It is best to do so before the start of the season i.e. in March or April, but it is still beneficial to vaccinate later during the season if this is not possible.

General health:

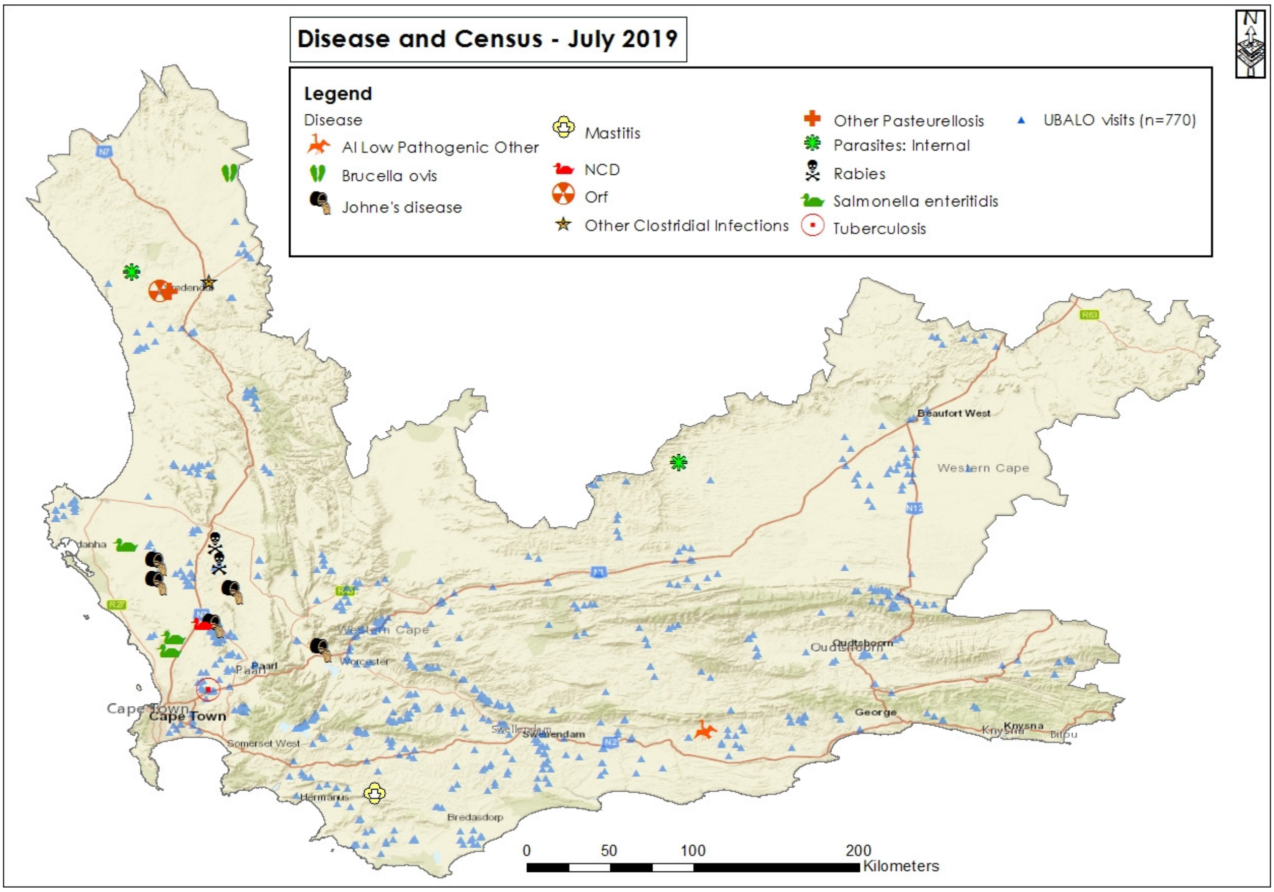
Keep as healthy as possible by eating a balanced diet, exercising several times a week, getting eight hours of sleep a night and practising stress-management techniques.

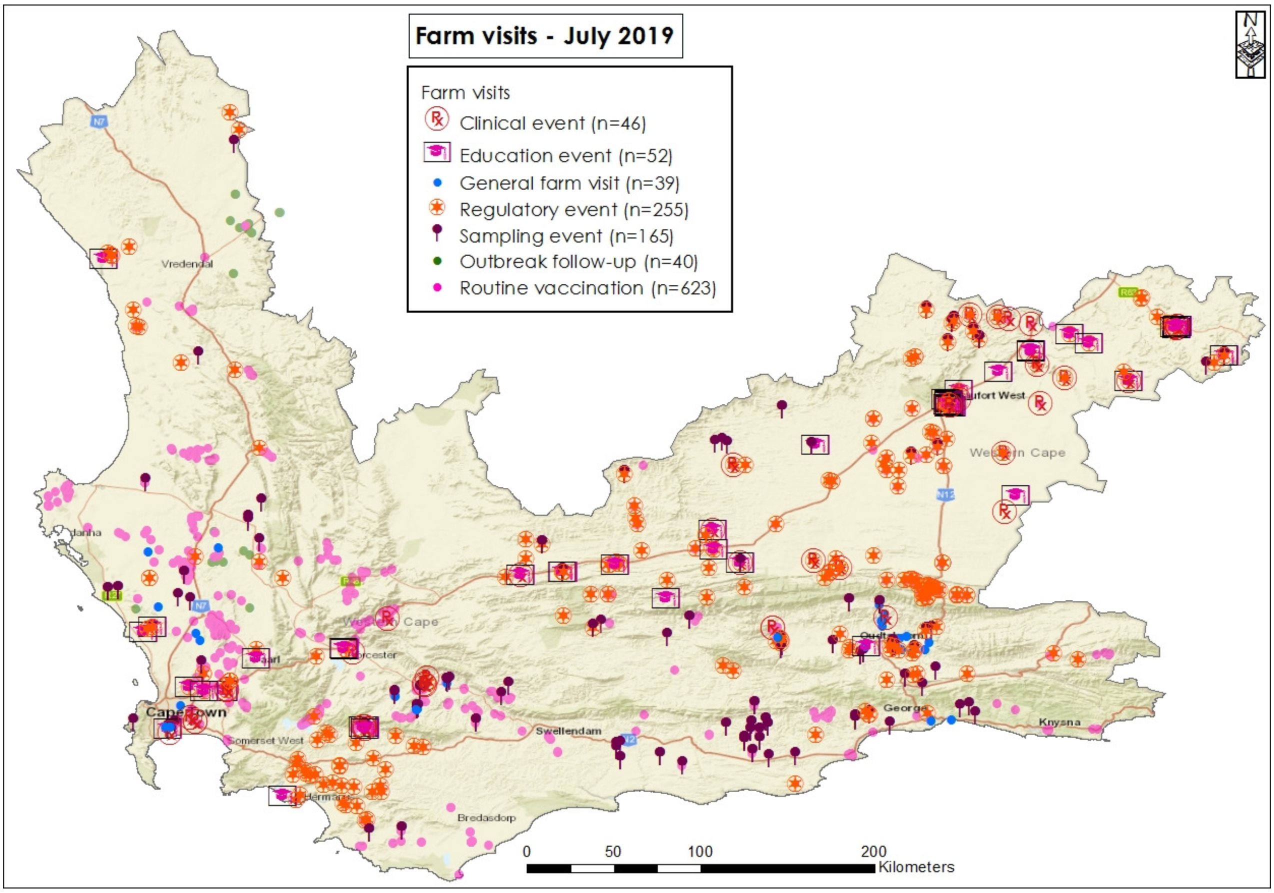
<u>References and useful resources</u>:

The monthly Communicable Diseases Communiqué is produced by the National Institute for Communicable Diseases and provides current information on communicable human diseases in South Africa as well as international disease of importance. The Communiqué can be found at http://www.nicd.ac.za/publications/internal-publications/

Kumar et al., 2013, Policies to reduce influenza in the workplace: impact assessments using an agent-based model, *American Journal of Public Health* 103, no. 8, pp. 1406-1411. https://doi.org/10.2105/AJPH.2013.301269

Disease and surveillance





Outbreak events

A female tufted **capuchin monkey** at a primate rescue facility near **Cape Town** suddenly started losing weight and was taken to a private veterinarian. Radiographs showed extensive internal organ lesions and so the animal was euthanased. On post mortem, multinodular pyogranulomas were found in several organs. Histopathology of smears of these lesions revealed slender, acid-fast rods in areas of granulomatous inflammation. The person responsible for feeding the monkeys had died earlier this year and it is suspected that this person was infected with **tuberculosis**, which she transmitted to the monkey. All other staff on the premises tested negative for tuberculosis. Further testing of the samples from the affected monkey and of other monkeys in the facility is underway.

Rabid bat-eared foxes were reported on two farms in the **Moorreesburg** area belonging to the same owner. On one farm a fox approached the farm house in the early hours of the morning and attacked a dog's bed before being shot by the farmer. The dogs, which had run away from the fox when it appeared, were examined by a private veterinarian and no evidence of contact with the fox was found. The dogs were washed with F10 and vaccinated twice three days apart. On the second property, a bat-eared fox was observed in the fields showing no fear of humans. When the farmer went to investigate the next day, it attacked his vehicle and ran away. It was found later that day and killed. All dogs, cats and horses on the affected and surrounding properties were vaccinated.

Ostriches near **Riversdale** tested positive for antibodies to **avian influenza** on haemagglutinin inhibition after being moved from another ostrich farm in the Eastern Cape. Further investigation to identify the responsible virus is underway.

A wild **laughing dove** was found with neurological signs (loss of co-ordination, torticollis and weakness) at the **Malmesbury** state vet office. The dove was euthanased and a brain swab tested positive for presence of **pigeon paramyxovirus**.

Ovine Johne's disease was diagnosed on farms near **Worcester**, **Moorreesburg**, **Hopefield**, **Malmesbury** and **Riebeeck West** after farmers noticed a small number of ewes becoming thin over time and dying.

Salmonella enteritidis (SE) was cultured from chick-box liners and boot swabs on two broiler **chicken** farms in the **Atlantis** area. SE was also cultured from dust on a broiler breeder rearing farm near **Hopefield**. Birds in the affected houses on all three properties were treated with antibiotics and increased follow-up sampling will be done.

Brucella ovis was diagnosed in **rams** in the **Knersvlakte** in the north of the province.

A **sheep** died of **tetanus** near **Vanryhnsdorp** (fig 3).

Staphylococcus aureus was identified as the cause of **mastitis** in **cattle** near **Tesselaarsdal**.

Six-week-old **lambs** died of ***Escherichia coli*** infection on two properties in the **Beaufort West** area.

In **Lutzville**, **lambs** were dosed for infestation with **wireworm**.

Several **sheep** died of **pasteurellosis** in **Vredendal**

A severe infestation of **liver fluke** was seen in **sheep** near **Laingsburg**.

Figure 3: Stiffness and extension of the limbs as a result of tetanus (J. Kotze)

Contagious pustular dermatitis (**orf**) was seen in five **lambs** in **Vredendal**.

Epidemiology Report edited by State Veterinarians Epidemiology:

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

VETERINARY SERVICES
August 2019
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African swine fever update

adapted from DAFF ASF update report, 6 Sep 2019

Several additional outbreaks of African swine fever (ASF) have occurred in Gauteng, North West, Mpumalanga and the Free State provinces since May this year. This brings the total number of outbreaks in 2019 in South Africa outside the ASF control zones to 17 (fig 1).

A variety of properties have been affected, from semi-commercial farms to backyard holdings. In all cases, the disease was detected due to observation of clinical signs, most notably increased mortalities. Outbreaks were either reported to veterinarians who then investigated further, or were detected via forward-tracing from other outbreaks.

The virus appears to be spreading in several ways, including through the movement of infected pigs as well as through fomites and infected swill.

The majority of the outbreaks have been shown to be caused by the same genotype 1 virus. However, the two outbreaks in the North West were caused by unrelated viruses.

The sale of pigs at auctions has been suspended in Gauteng, North West, Mpumalanga and the Free State in an attempt to stop the spread of the virus. Affected herds have been quarantined and culled with the assistance of the South African Pork Producers' Organisation. The infected carcasses were disposed of by burial or burning, followed by cleaning and disinfection of the facilities in which they were kept.

The scope to continue controlling the disease in this way is limited if the outbreaks continue. All pig keepers and veterinarians are encouraged to apply strict biosecurity measures to prevent the spread of the virus.

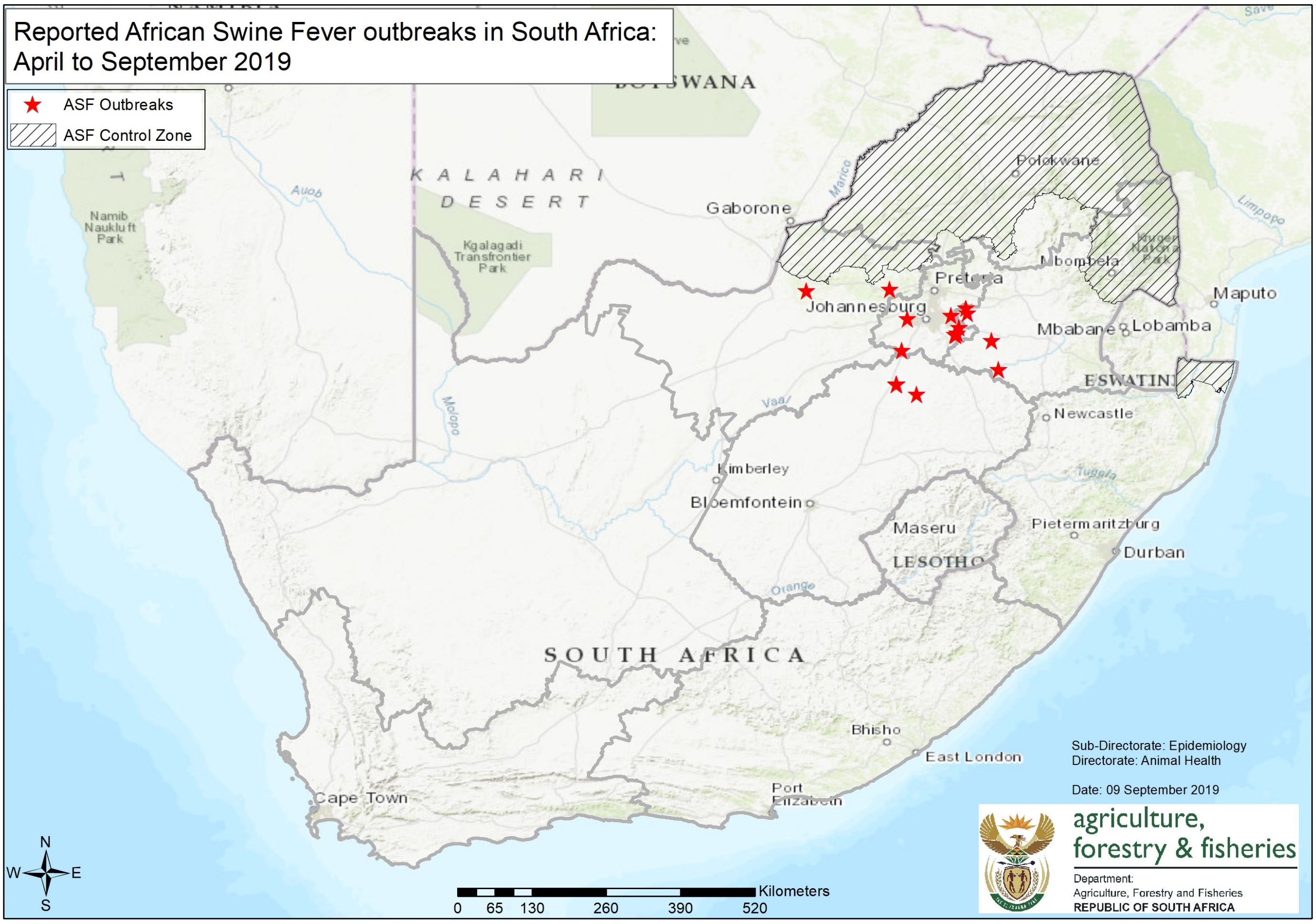

Figure 1: Locations of reported African swine fever outbreaks in South Africa outside the control zones: April-September 2019 (DAFF)

Western Cape presentations at SASVEPM 2019

Several officials from Western Cape Veterinary Services attended the annual conference of the Southern African Society for Veterinary Epidemiology and Preventive Medicine (SASVEPM) in August 2019.

There was no shortage of representation of the Western Cape in the conference presentations either.

Belinda Peyrot, veterinary technologist in the virology section of the Stellenbosch Provincial Veterinary Laboratory, presented an investigation of the molecular epidemiology of the avian influenza viruses isolated from coastal wild birds in the Western and Eastern Cape during the outbreak of H5N8 AI in 2017 and 2018. She found that the viruses affecting these birds clustered together with viruses isolated from terrestrial birds in these same areas, but had undergone some changes.

Lesley van Helden, state veterinarian in the epidemiology section at Western Cape Veterinary Services, presented her work on serosurveillance for hepatitis E virus in commercial pig herds supplying the City of Cape Town. She found a high seroprevalence for hepatitis E in pigs at slaughter age, as well as several risk factors associated with seroprevalence in pig herds.

Shira Amar, compulsory community service veterinarian at Wingfield Military Base, presented a study of working dogs with lumbosacral disease, analysing the length of time between diagnosis and boarding of the dogs when they were no longer able to work. She found that the median time to boarding was 230 days, but that female dogs were more likely to be boarded sooner than male dogs.

John Grewar, research and innovation manager at South African Equine Health and Protocols, presented an analysis of whether the zebra in the Western Cape were capable of maintaining a reservoir of African horse sickness virus. The risk of this was found to be extremely low. He also gave a presentation detailing the new protocols for control of African horse sickness in the control zones of the Western Cape.

Outbreak events

Salmonella enteritidis was detected on several **chicken** farms surrounding **Cape Town**. In all cases the affected houses were treated with antibiotics and follow-up samples were taken to ensure effectivity of treatment.

Three **pigs** from two large, commercial farms in the **Malmesbury** state vet area showed classic diamond-shaped lesions of **swine erysipelas** after slaughter and scalding at the abattoir. No clinical signs were observed prior to slaughter. Both farms routinely vaccinate their breeding stock against erysipelas.

Brucella ovis was detected in **rams** near **Vanrhynsdorp**.

In **Lutzville**, three **ewes** were treated for **pasteurellosis**.

Sarcoptic mange was seen in **dogs** in **Mamre**.

Clinical signs of **nasal bots** were seen in **sheep** near **Darling** and **Malmesbury**.

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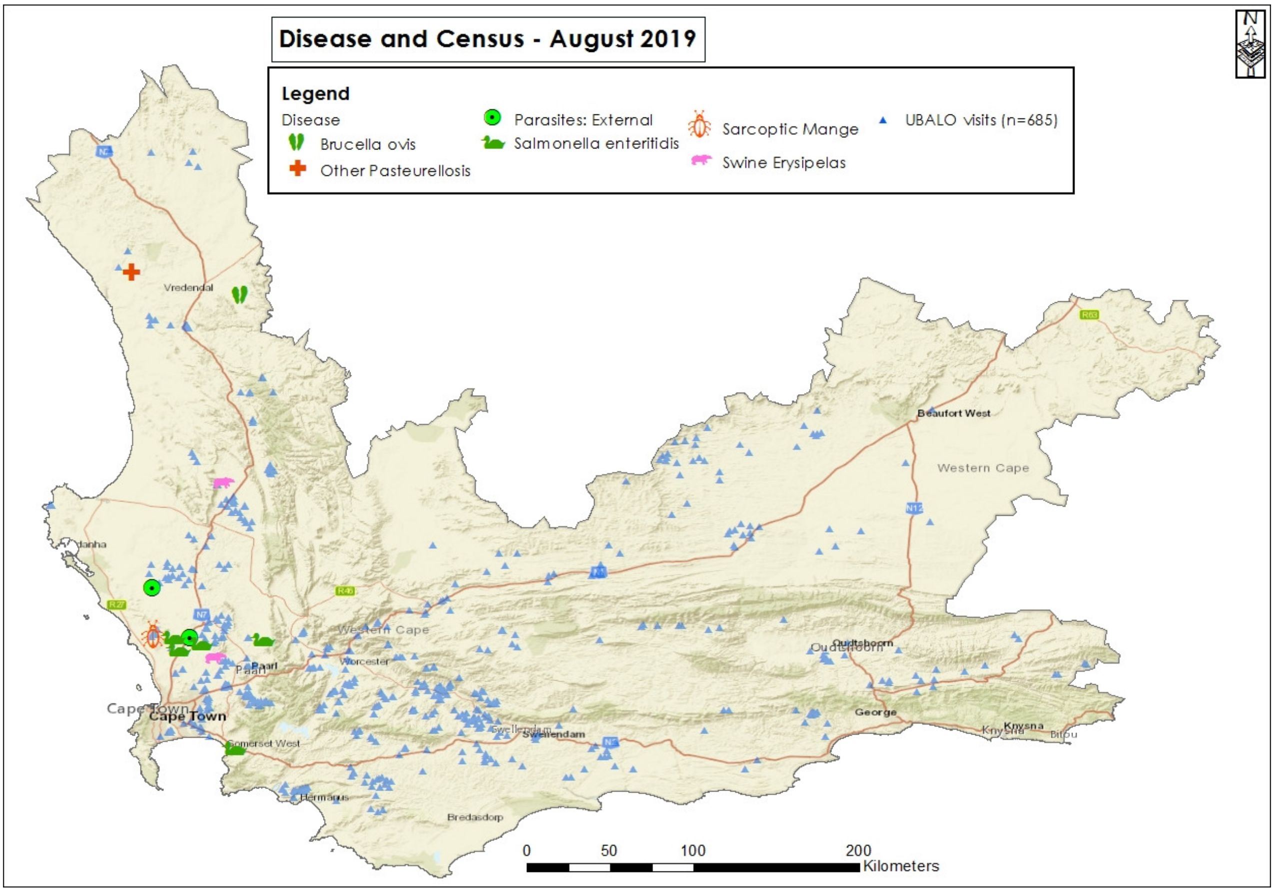
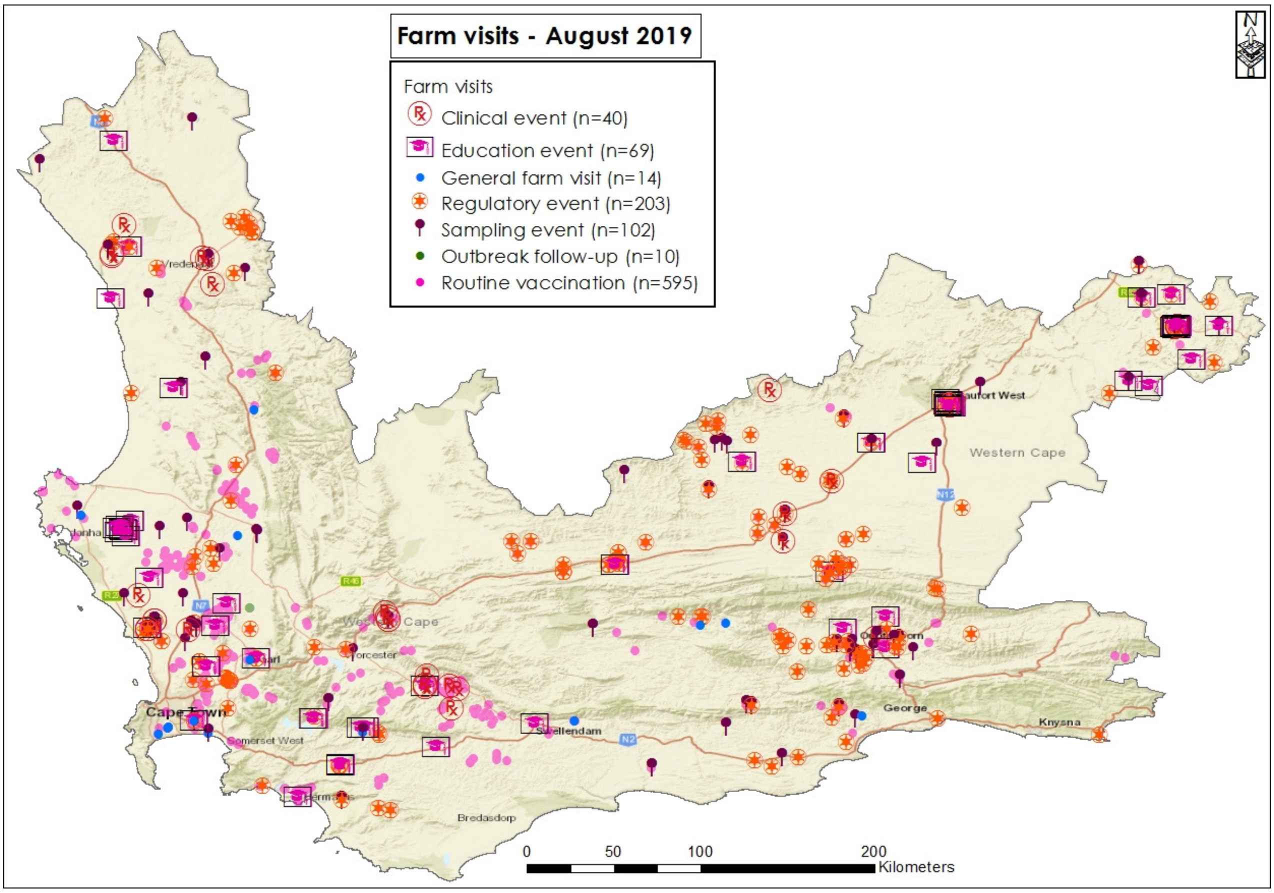

Disease and Census - August 2019
Legend
Disease
Brucella ovis
Other Pasteurellosis
Parasites: External
Salmonella enteritidis
Sarcoptic Mange
Swine Erysipelas
UBALO visits (n=685)
Vredendal
Beaufort West
Western Cape
Worcester
Paarl
Cape Town
Somerset West
Swellendam
Oudtshoorn
George
Knysna
Bredasdorp
0 50 100 200 Kilometers


Farm visits - August 2019
Farm visits
Clinical event (n=40)
Education event (n=69)
General farm visit (n=14)
Regulatory event (n=203)
Sampling event (n=102)
Outbreak follow-up (n=10)
Routine vaccination (n=595)
Western Cape
Worcester
Cape Town
Somerset West
Swellendam
George
Knysna
Bredasdorp
0 50 100 200 Kilometers

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Agriculture

EPIDEMIOLOGY REPORT

VETERINARY SERVICES
September 2019
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African horse sickness sentinel surveillance 2018/19

Adapted from The AHS sentinel surveillance program 2018-2019 season report by J.D. Grewar[1] and C.T. Weyer[1]
[1] South African Equine Health and Protocols NPC

The African horse sickness (AHS) sentinel surveillance program is aimed at providing additional confidence of AHS freedom in the AHS Free and Surveillance Zones of South Africa. The program incorporates the monthly sampling of recruited horses proportionately selected within the zones based on the estimated underlying population. The program has two components: a sero-sentinel program that evaluates the changing serological status of horses on a month to month basis; and a PCR-based program that is used to detect circulating AHS viral genetic material (RNA) within recruits. The sero-sentinel sampling frame is drawn up to detect AHS at approximately a 5% minimum expected prevalence (with a 95% confidence level) whilst the PCR surveillance aims for a 2% minimum expected prevalence. Monthly sampling targets are therefore approximately 60 and 150 recruits respectively. Individual recruits can be part of both programs. Sero-sentinels are required to be unvaccinated for at least the previous two years and are screened using serology prior to recruitment. The vaccination status of PCR sentinels is captured but does not influence their

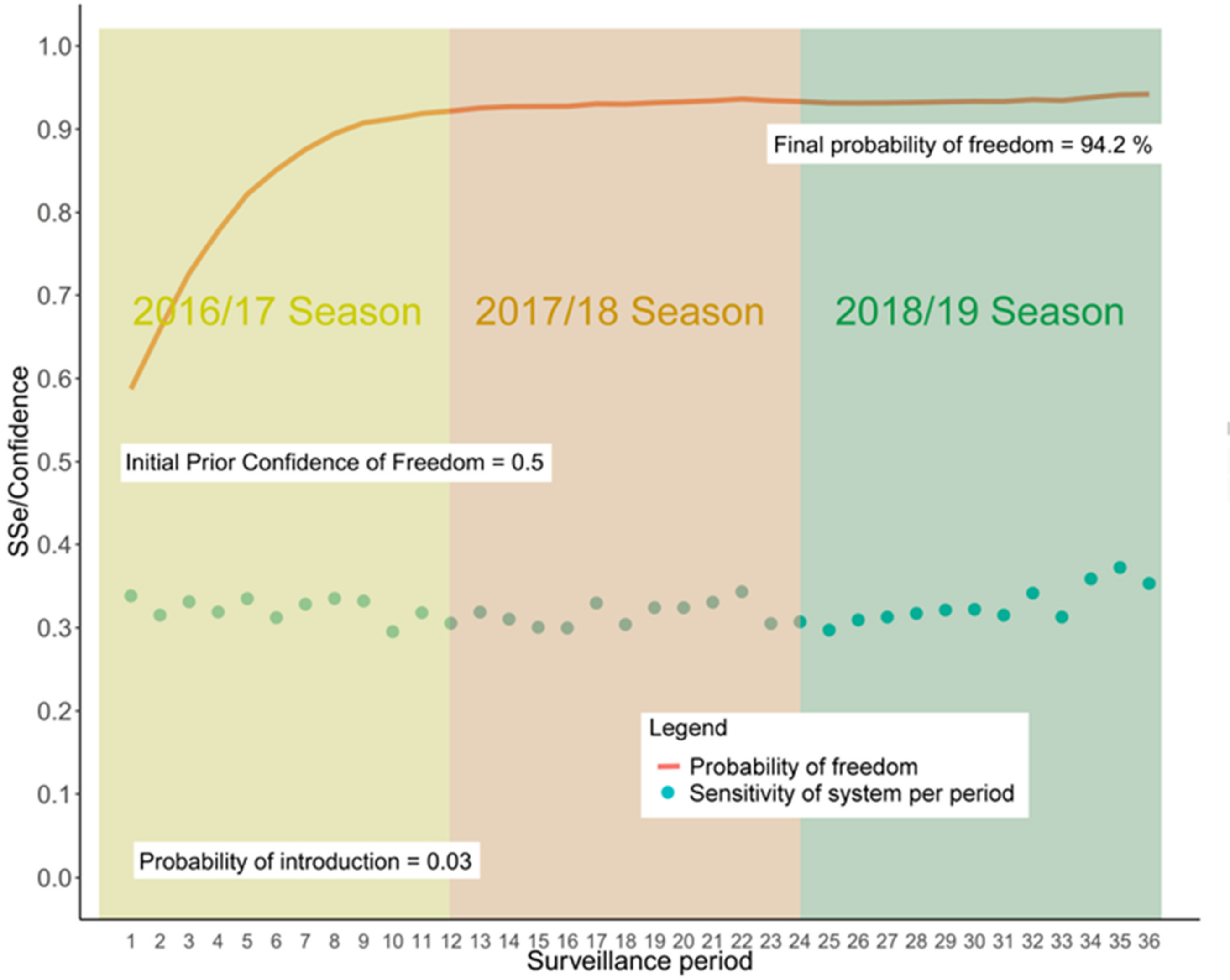

Figure 1: The sentinel surveillance sensitivity of individual surveillance periods (dots) with probability of freedom curve (red line) based on an uninformed 50% prior probability of freedom and a probability of AHS introduction of 3% for the past three surveillance seasons. The right pane represents the period of Sept 2018 to Aug 2019.

recruitment unless vaccination against AHS took place sufficiently recently to result in positive PCR results on their initial testing.

The serological tests performed rely on the indirect ELISA (i-ELISA) as the base serological test (Maree & Paweska 2005). It is a non-quantitative assay and changes between positive, suspect and negative results across paired sample events are used for evaluation. Follow-up serological tests include the serum neutralisation assay (SNT), which is AHS serotype specific. All serology is performed at the Agricultural Research Council - Onderstepoort Veterinary Institute (ARC-OVI). Viral RNA testing was performed at the regional Stellenbosch Provincial Veterinary Laboratory (SPVL). The test method used is a University of Pretoria (Equine Research Center) developed and OIE validated real-time RT-PCR (Guthrie et al. 2013).

General overview of results

A total of 701 sero-sentinel samples were analysed from 40 different farms at an average of 59 samples from 27 different farms per month. This was a sampling increase of 1.4% from the 2017/2018 surveillance period. Of the tested serological samples 684 (average of 57 per month) could be evaluated as they had relevant paired results. This is a 0.7% increase compared to the 2017/2018 season.

A total of 1902 PCR sentinel samples were analysed from 74 different farms at an average of 158 samples from, on average, 56 different farms per month. This was an increase of 8.3% from the previous season.

Positive results

The total serology samples that could not be evaluated for lack of a paired sample amounted to 27 samples (3.8% of the total). This compared to 2017/2018 where 23 samples could not be evaluated (3.3% of the total). All paired serological samples that could be evaluated showed stable serological results. However, over the course of the season there were three investigations where positive ELISA-results were found to have been a result of sampling and/or labelling errors. Corrective action was taken to ensure that positive identification of sentinels is made by samplers, particularly if they are unfamiliar with a property.

There was one investigation of importance during the 2018/2019 season. This was as a result of a screening positive PCR in horse 1791 on property 5356 in October 2018.

Horse 1791 had a positive screening PCR result in October 2018. It was a PCR-sentinel only; however, serum samples that had routinely been taken from this animal were also subsequently tested during the investigation. The ELISA results confirmed the prior vaccination history of the animal and returned positive results from both September and October.

The horse was the only sentinel on the farm (in the Bottlery region of the AHS surveillance zone) on which another eight horses were resident at that time. The owner confirmed that neither Horse 1791 nor the other horses on the property had been vaccinated against AHS during 2018.

Trace-back analysis of movements into the surrounding 10 km showed that a total of five horses moved in two separate movements from the AHS infected zone in September 2018. These horses originated in Midrand, Gauteng (n=1) and Parys, Free State (n=4). At that point there had been no confirmed cases of AHS yet in the AHS infected zone for the 2018/19 season. Two suspect cases were reported in November from Midrand, but the Midrand farm of origin with regard to the movement was outside a 30 km zone around both suspect cases.

Laboratory follow-up testing included re-testing at the SPVL, testing using the same PCR at the Equine Research Center at the University of Pretoria and both hemi-nested PCR and an attempt to type and sequence at the ARC-OVR. Repeat testing at SPVL returned similar results (Ct-value 32.5). ERC results were negative for both AHS and EEV while the OVR hemi-nested PCR was positive. Sequencing and typing at OVR was unfortunately not possible due to low levels of RNA in the sample. SNT results from the suspect horse returned a polyvalent response as was expected from a previously vaccinated horse.

Follow-up sampling on the farm included full farm population sampling in November and December. All samples were negative for AHS.

Results from surrounding sentinel farms were evaluated: there were eight farms with 24 sentinels present on them within 10 km of farm 5356. All sentinel results from these farms were consistently negative going back from July 2018 and throughout the rest of the 2018/19 season.

The final conclusion reached was that the positive result was a false positive PCR reaction. This conclusion was based primarily on:

• The high Ct value and inability to type or sequence the PCR product

• The lack of clinical signs in the horse and horses on the same property

• The negative follow-up testing in both the affected horse and horses on the same property

• The negative status of 24 sentinels surrounding the affected farm

• The negative results from the entire sentinel cohort in November through February 2018

• The negative outcome of the trace back for the month preceding the suspect case.

Spatial considerations

The sentinel surveillance program is based on a proportional sampling system with most sentinels in areas of the surveillance area that have the highest population

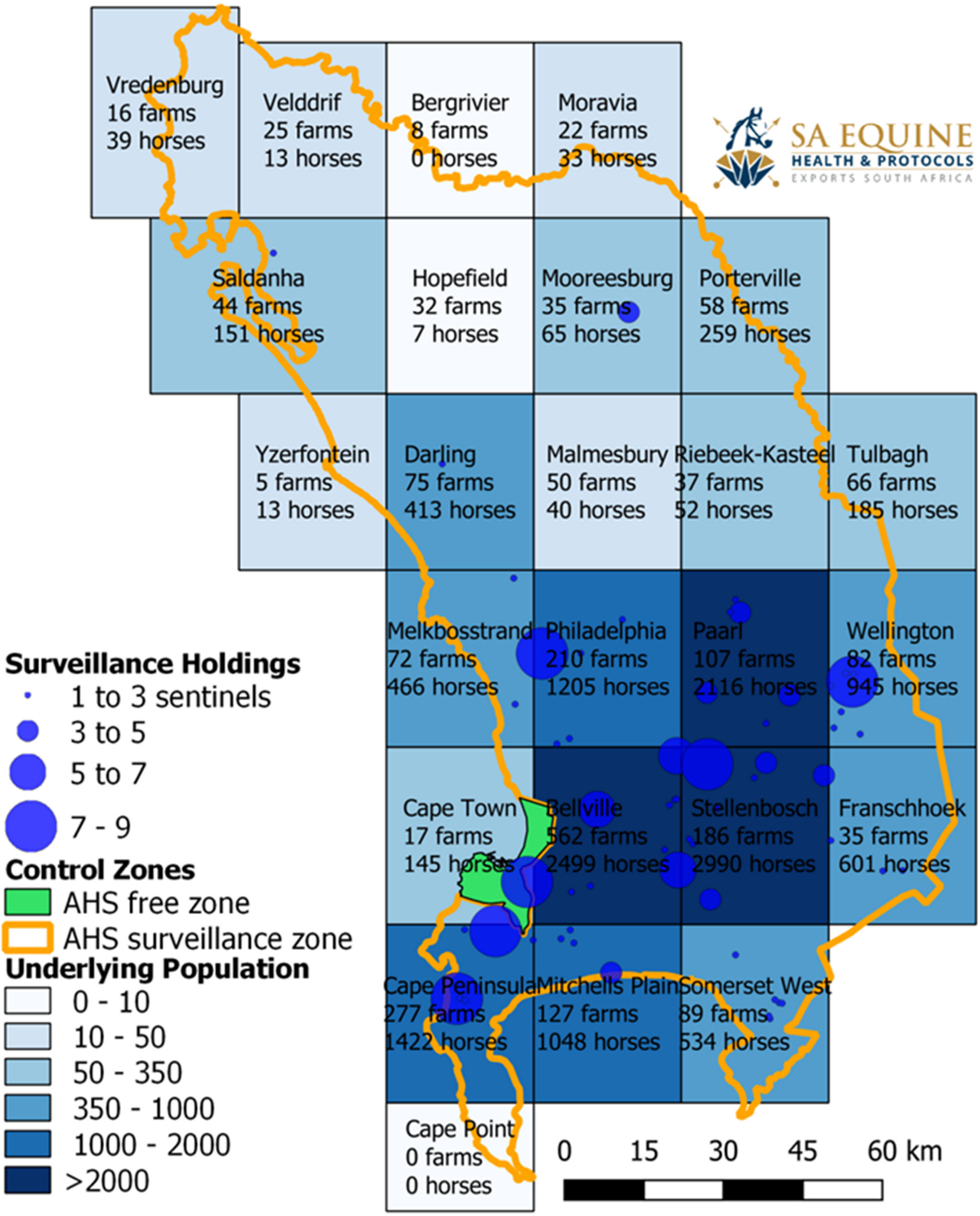

Figure 2: The underlying population of horses in the Surveillance and Free Zones of South Africa. These populations have been revised based on new population data collected between 1 April 2016 and 1 September 2019. The proportional circles represent the current sentinel populations.

of horses. Figure 2 shows the underlying population and current sentinel farms.

There are improvements with spatial representativeness compared to previous years. At worst the sero-surveillance target was, on average, four sentinels per month short in the Philadelphia area and the Paarl area was seven PCR sentinels short per month.

Over the past few years where formal analysis of this program has taken place this result is the best representativeness that has been present over an AHS season.

Sensitivity of surveillance system

The surveillance program is designed to detect AHS in the AHS Surveillance Zone at a minimum expected prevalence of 5% (serology) or 2% (PCR). The monthly sensitivity of the surveillance program where any sentinel tested negative in the month was established (on paired serology or negative PCR).

Analysis is based on evaluating sensitivity of surveillance programs (Martin et al. 2007). The previous surveillance program is taken into account as it provides historical information that aids in determining an accurate final probability of freedom as of August 2019. A single season analysis was performed with a final posterior probability of freedom of 93% assuming an uninformed prior probability of freedom in Sept 2018 of 50%. The final probability of freedom at the end of the three year period was 94.2% (fig 1). The sensitivity of the sentinel surveillance alternates around the 30% mark throughout. This is the third AHS season running where cases of the disease have not been detected in the AHS controlled area. The last time this occurred was in the period between the 2006 and 2011 outbreaks where, for four full seasons running, the area was AHS free.

Economic cost of surveillance

Very similar numbers of horses and farms were tested in 2018/2019 compared to 2017/2018 and thus the estimated cost of the program for the year remains R1.5 million. This cost is made up of testing, personnel, travel/ logistics and equipment costs. Funding primarily comes from the South African Health and Protocols NPC and the Western Cape Department of Agriculture (both Animal Health and Provincial Laboratory).

Discussion and conclusion

The primary goal of demonstrating AHS freedom for the 2017/2018 season was achieved, with a final probability of freedom of ~93%. The PCR testing in conjunction with the serology testing assists greatly in the analysis of the system and for follow up in suspect cases. Furthermore, the use of SNT analysis allows confident categorization of previously seronegative horses into vaccinated or field strain events.

While there are still areas that remain a challenge in terms of representativeness this is the first year where no area had a major lack of sentinels, either serological- or PCR categories.

A three-year review of sentinel results show that the probability of freedom attained for this program, at an animal design prevalence of 5% animals and herd-level design prevalence of 2%, shows a 94% probability of freedom from AHS as a result of sentinel surveillance.

References and acknowledgements

This program would not be possible without the support of the horse owners in the AHS surveillance zone who freely give of their time and resources to allow and facilitate the monthly sampling of horses. We are grateful to the Onderstepoort Veterinary Research Institute and the Stellenbosch Provincial Veterinary Laboratory who performed the testing of samples this season.

In this season we again made use of compulsory community service and Western Cape state vets who assisted in sampling. In this regard we specifically acknowledge Drs Tasneem Anthony, Katie Edmonds, Louie Genis, Gina Anstey, Anouska Rixon and Nellma le Roux. We are very grateful to our SAEHP team who are directly involved with the program – Esthea Russouw and Lizel Germishuys.

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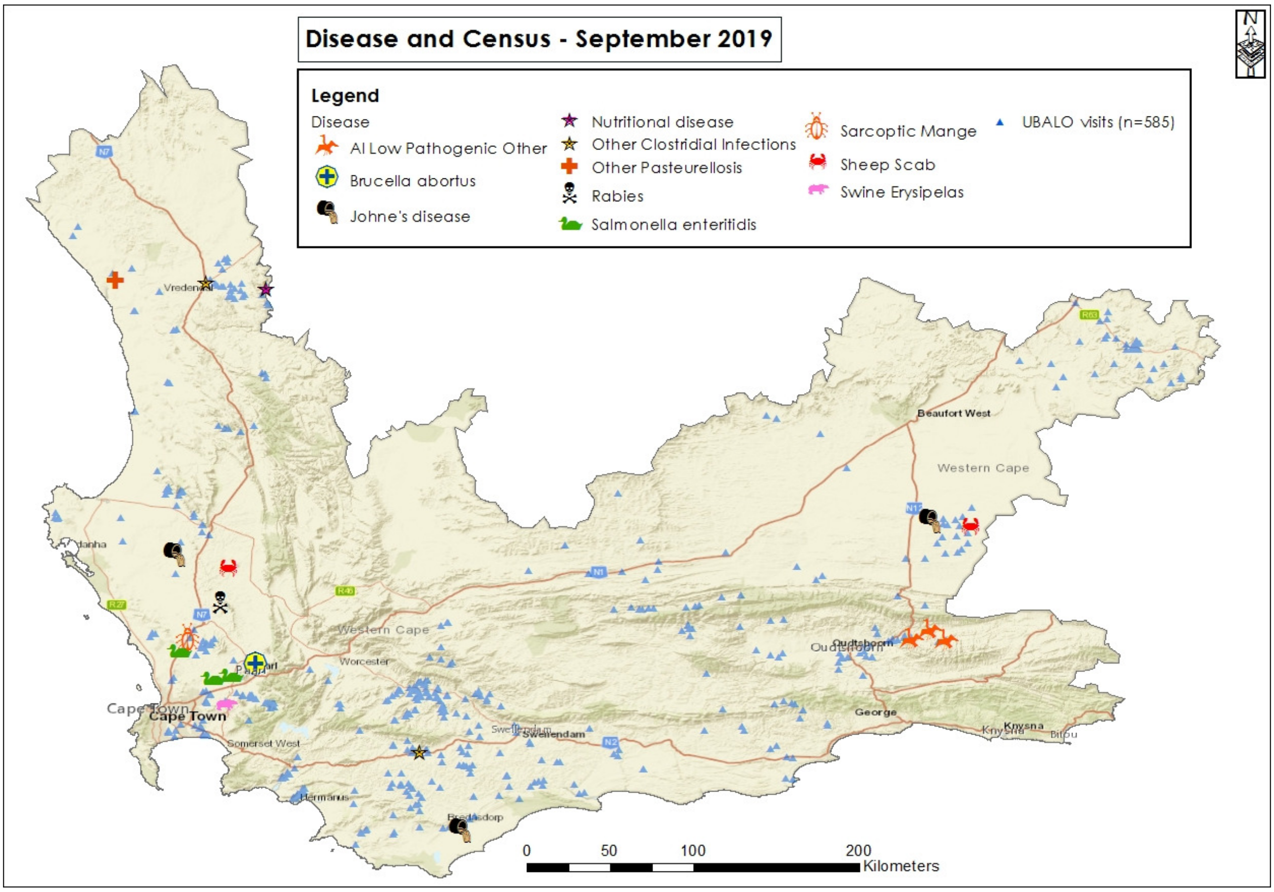
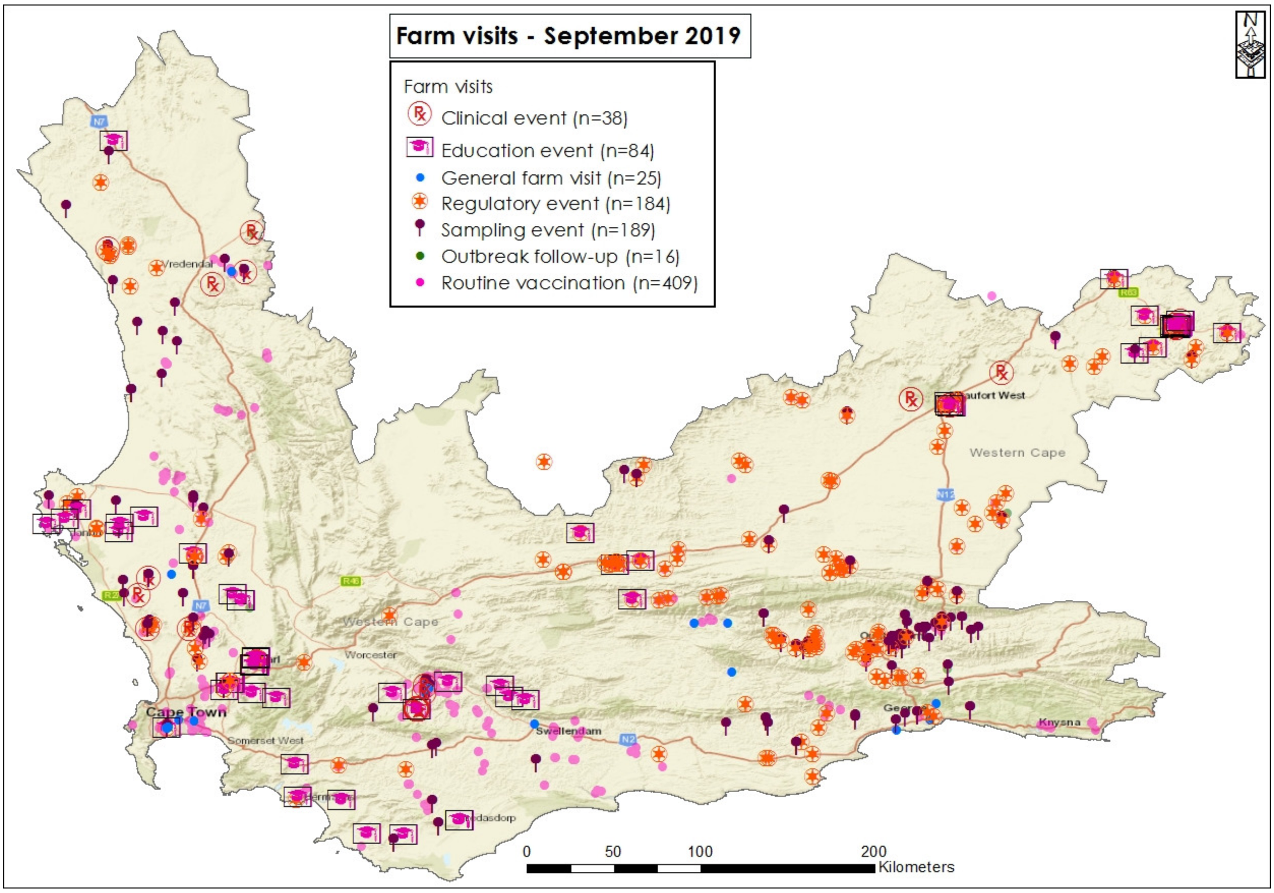
Disease and surveillance





Outbreak events

Cattle belonging to several owners in **Paarl** tested positive for **brucellosis**. The cattle share grazing land that belongs to the municipality and there are frequent movements of livestock in and out of the area. Most heifers in the area were vaccinated by the local animal health technician in 2018 and all test results in that year were negative. Three cows aborted earlier this year, but no investigation took place after this occurrence as it was not reported. All positive reactor cows were slaughtered and all female cattle in the area will be vaccinated with RB51 to control the outbreak.

A farmer near **Riebeek Kasteel** noticed that a car had stopped on the dirt road near his farm. The occupants had seen a **bat-eared fox** rolling and salivating in the road and had wanted to help it. Fortunately the farmer suspected **rabies** and warned them not to touch it. He then drove over the animal to kill it and submitted it for rabies diagnosis. It tested positive. A rabies vaccination day was already organized in the area a few days later for World Rabies Day.

Three **ostrich** farms in the **De Rust** area tested positive for **avian influenza** antibodies in the first two weeks of September. They are within 20km of one another and all showed similar (HxN2) serology patterns when tested at ARC/OVR. One farm tested PCR positive for influenza A but tested negative for H5 and H7 avian influenza. Nine farms within a 10km radius of these positive farms have tested sero-negative on follow-up sampling.

Sheep farmers near **Moorreesburg**, **Bredasdorp** and **Beaufort West** noticed emaciation occurring in their ewes. Necropsies, histopathology and ELISA testing on the affected animals revealed **Johne's disease** (fig 3).

Samples of **chicken** meat taken at an abattoir near **Paarl** tested positive for ***Salmonella enteritidis*** (SE). The products were frozen and investigations done to attempt to trace the source of the infection. All parent flocks that supplied the broilers tested negative. Another broiler farm near **Philadelphia** tested positive for SE on boot cover swabs. *Salmonella* reduction protocols were instituted on the farm in response.

Sheep scab was diagnosed in flocks of pruritic sheep near **Moorreesburg** and **Beaufort West**.

Signs of **erysipelas** were seen in free-range **pigs** from **Stellenbosch** after slaughter at the abattoir.

Figure 3: From left to right: Lesions of Johne's disease in the ileum, mesenteric lymph nodes and jejunum of an affected sheep (Photos: J Pienaar)

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EPIDEMIOLOGY REPORT

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October 2019
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Geovet 2019

Miriam Marimwe and Lesley van Helden

In the first week of October, the Geovet 2019 conference in Davis, California was attended by Lesley van Helden (State Vet: Epidemiology) and Miriam Marimwe (State Vet: Export Control). This is a conference that specialises in spatial epidemiology and the use of geographic information systems (GIS) to answer animal and public health questions.

The conference brought together delegates from 29 countries, including veterinarians, medical practitioners, geographers, ecologists and GIS technology industry representatives, all of whom had the opportunity to demonstrate the use of spatial analytics in their respective fields.

With the progress of spatial analysis and geographic information systems, spatial epidemiology plays an increasingly important role in disease management, control and prevention, because of the amount of information it can provide in describing, identifying and quantifying patterns, as well as making predictions. Network analysis, combined with spatial analytical methods, is also being used for disease transmission modelling to improve active disease surveillance.

The leading topic of the conference was "Novel spatio-temporal approaches in the era of big data**".** The increasing availability of spatial data and GIS software makes disease mapping widely accessible and practiced. At the same time, a large amount of data is produced by all kinds of instruments and sensors, from satellites and drones capturing aerial imagery to RFID tags and GPS collars on individual animals. In acquiring all this data comes the need to manage it and translate it into information. However, the real challenge is to understand if such a great availability of data really leads us to the generation of deeper knowledge.

Despite the fact that the volume of information available is increasing, it is not being used effectively to inform animal health decisions. Policy makers do not need to be presented with more information, but rather with less irrelevant information and a summarized version of the available, relevant information.

Of particular significance at the conference was the advancement in spatial modelling techniques that were directed towards predictive analytics, with most represented countries working towards modelling of disease risk in anticipation of disease incursions. This could also be attributed to the rise of big data, as a statistician indicated during the course of the proceedings that the availability of large amounts of data is conducive to performing predictive analysis.

There was also discussion on "Accelerating the path from the industry big data revolution to policy changes" There was consensus on the need to work together and examples of how some sectors were working together through various research collaborations as well as building data-sharing platforms and systems. However, there was a concern from industry that advances in geospatial technology were outpacing the speed at which government bureaucracy could move, resulting in a limit on government innovation and collaboration with industry. Other challenges raised were those surrounding data sharing and privacy.

Abstracts presented are available online at: https://www.frontiersin.org/events/GeoVet_2019_Novel_spatio-temporal_approaches_in_the_era_of_Big_Data/6796

The delegates attending Geovet 2019

African horse sickness vaccination permissions 2018/19 season

Reproduced with permission from the African horse sickness controls: Vaccinations permissions report (2018/2019 season) by J.D. Grewar[1] and C.T. Weyer[1]
[1] *South African Equine Health and Protocols NPC*

Introduction

Annual vaccination against African horse sickness (AHS) is compulsory in South Africa (Animal Diseases Act, 35 of 1984) except in the AHS free and surveillance zones in the AHS controlled area in the Western Cape Province. Vaccination against AHS in these zones can only be performed following written approval from the Veterinary Services of the Western Cape Department of Agriculture (WCDOA). Permission to vaccinate against AHS is only granted for vaccination to be performed between 1 June and 31 October each year. This vaccination period is based on the potential for vaccine virus reassortment/reversion to virulence and the risk of transmission during periods of increased vector activity. The restricted vaccination period mitigates this risk.

The process for vaccination permissions is summarized and available online at http://jdata.co.za/myhorse/documents/infographics/Vaccination%20Schema/1.%20Vaccinating%20against%20AHS%20in%20the%20Free%20and%20Surveillance%20Zone.pdf. This report briefly summarises the vaccination permission applications that were received and the descriptive statistics of those permissions that were issued. Permissions are given on an individual horse basis, with horses associated with specific holdings, and the information is analysed as such.

Summary of permissions issued

The total permission applications received are shown in Table 1 with their comparisons to the 2018 and 2017 season. There are consistently approximately 1100 applications received each year totaling an associated 7300 horses, and permissions are given for approximately 96%. By far the majority (97.5% - n= 279) of declined applications in 2019 related to invalid or non-existent passports – this is similar to previous years.

Forty veterinarians and veterinary practices were registered as the associated vet likely to perform the vaccination, with the top five practices responsible for vaccinating 73.5% of the permission-granted horses, and the top ten practices responsible for 88.5% of all permission-granted horses.

Table 2 shows the reasons that were provided by applicants (granted horses only) when requesting permission to vaccinate. The majority (92.3%) were to enable horses to comply with AHS movement requirements.

We now have three years of detailed, individual horse information for the vaccination permission process in the AHS controlled area. 4556 horses that were granted permission in 2019 had also been granted permission in 2018, making up 62.1% of the total for the year. 2987 horses were granted permission to be vaccinated in 2017, 2018 and 2019, accounting for 40.7% of permission-granted horses in 2019. There are currently 14725 horses registered in the AHS surveillance and free zone.

The vaccination permission system does require intensive regulatory checking, and particularly since individual passports for applicants are thoroughly checked. In 2019 we did allow for early applications, although permissions only got sent from 1 June since vaccination was only permitted from then. Table 3 therefore includes applications that were received prior to June 2019 but the *Days processed to response* is not applicable for those months. The applications received prior to the actual season do impact the response time in processing applications to vaccinate – this is clear from the improving processing time from June through to October.

Conclusion

Vaccination coverage within the AHS controlled area, including the AHS surveillance and free zone continues to be fairly comprehensive with approximately 50% of the known population being vaccinated based on permissions requested. A high number of those horses though are associated with repeat requests from year to year, and also since vaccination is a prerequisite for movement into the controlled area, any new adult horses entering the controlled area will be vaccinated already.

References and Acknowledgements

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We are grateful to both horse owners and veterinarians for their patience during the vaccination permission season. We are grateful for the continued support of the Western Cape Veterinary Services who assist in this program and in particular Dr Gary Buhrmann from State Vet Boland who reviewed this report. We acknowledge team members from the SAEHP: Danielle Pienaar; Esthea Russouw; Gillese de Villiers; Marie van der Westhuizen; Johanne Jacobs and Lizel Germishuys who performed much of the data processing for the vaccination permission system.

Table 1: Number of applications received for vaccination permissions with associated horses. Granted applications are shown with a percentage of the total in brackets.

Year	Applications received/Associated holdings	Total horses applied for	Total horses granted
2017	1078/647	7183	6893 (96%)
2018	1117/606	7277	7058 (97%)
2019	1108/610	7330	7044 (96%)

Table 2: Reasons provided for the vaccination of horses.

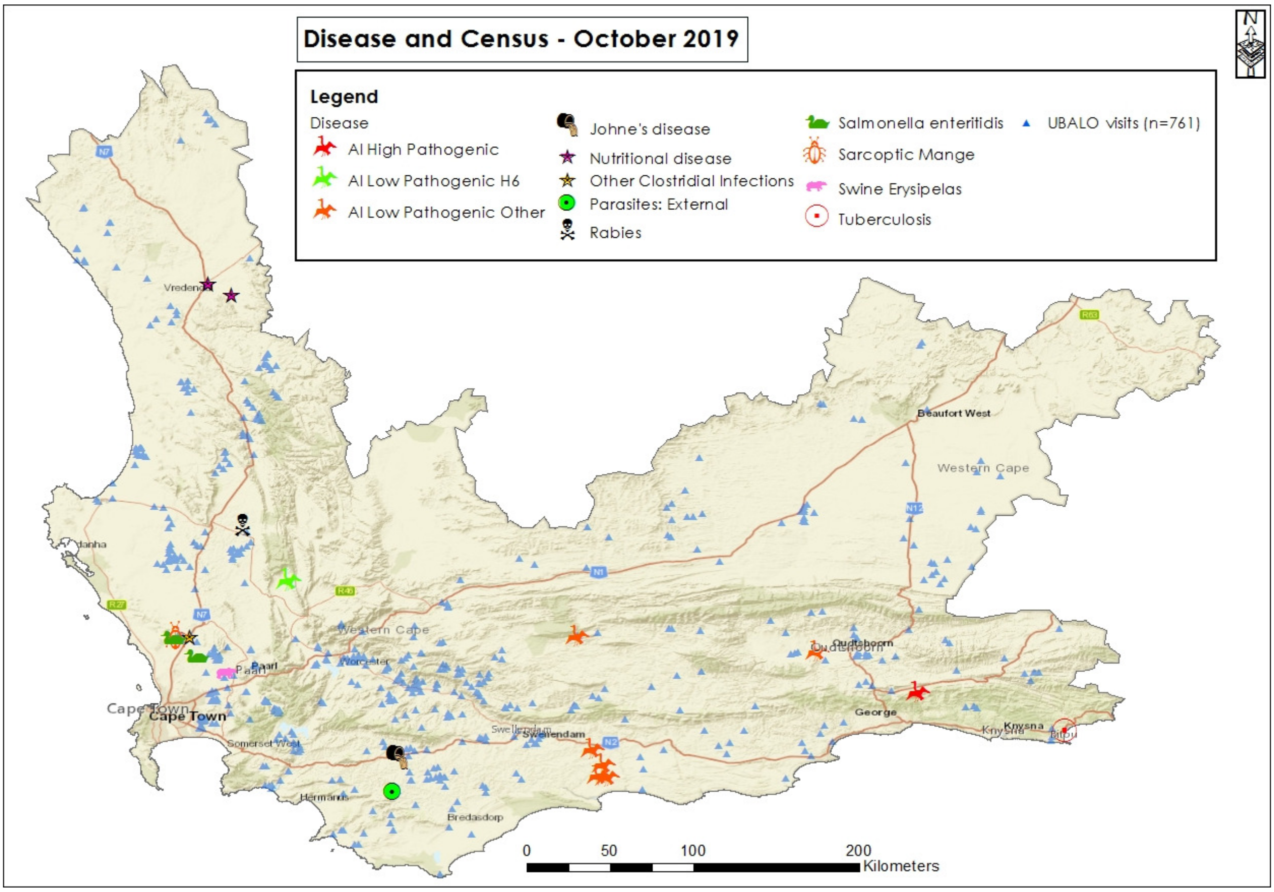
Overarching reason	Count
Movement requirements – current and for future events	6503 (92.3%)
Individual protection (owner and yard)*	518 (7.5%)
Insurance	23 (3.2%)
Total	7044

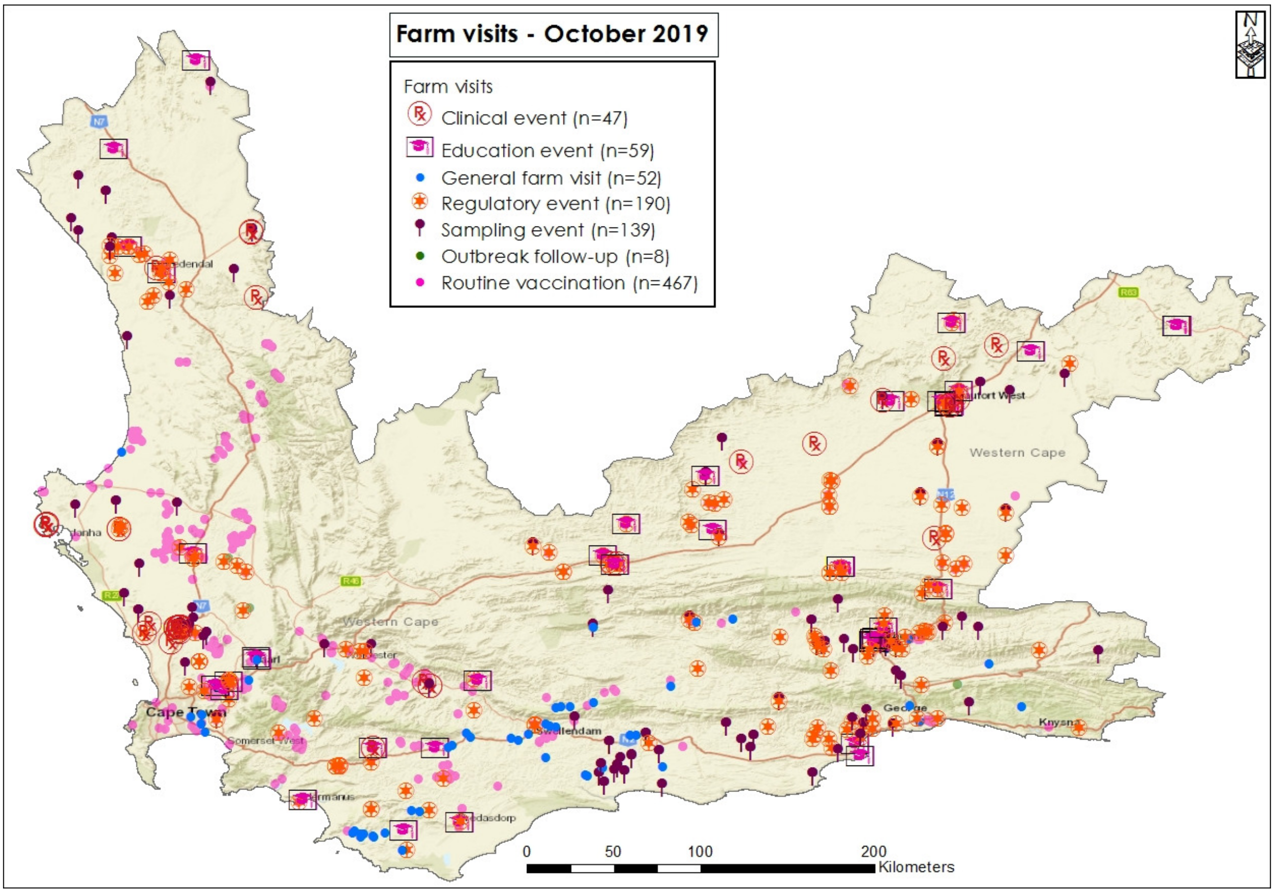
*Individual protection is cited when owners/yard managers believe that the risk to their horse (based on movement risk or prior involvement in outbreaks) justifies vaccination.

Table 3: Administrative time taken for 2019 vaccination permissions applications

<table>
<tr><th>Month (of 2019)</th><th colspan="2">Total applications received</th><th>Median days – application to response</th></tr>
<tr><td>March</td><td>169</td><td rowspan="3">478 prior to season</td><td rowspan="3">Not applicable, however 50% of all applications received prior to 1 June were responded to by 7 June.</td></tr>
<tr><td>April</td><td>113</td></tr>
<tr><td>May</td><td>196</td></tr>
<tr><td>June</td><td>170</td><td rowspan="5">630 during season</td><td>39</td></tr>
<tr><td>July</td><td>188</td><td>24</td></tr>
<tr><td>August</td><td>146</td><td>13</td></tr>
<tr><td>September</td><td>95</td><td>11</td></tr>
<tr><td>October</td><td>31</td><td>2</td></tr>
</table>

Disease and surveillance





Outbreak events

A **bat-eared fox** approached a homestead near **Porterville** and tried to fight with dogs through the fence. It was shot by the farmer and submitted for **rabies** testing with a positive result. The dogs had been previously vaccinated against rabies in January 2019, and were revaccinated after the incident by the local animal health technician. The dogs and cats on neighbouring properties were also vaccinated.

A farmer near **Riviersonderend** noticed progressive emaciation in some of his **sheep**. A post mortem and histopathology was done on one animal and a diagnosis of **Johne's disease** was made. The farm was placed under quarantine.

Salmonella enteritidis was cultured from chick box liners from a hatchery and from neck skins of slaughtered broiler **chickens**, both from farms in the Malmesbury area. Increased surveillance and disinfection is in place on the affected farms.

An adult female **vervet** monkey (fig 1) was found at a shopping village on the N2 near **Plettenberg Bay** showing signs of respiratory distress. She was euthanased and granulomatous lesions with acid-fast staining bacilli were found in her lungs, indicating infection with **tuberculosis**. Earlier this year a case of tuberculosis caused by *Mycobacterium tuberculosis* was diagnosed in a baboon from the same area.

An **ostrich** farm in the **Langkloof** area was reported to the OIE as infected with H5N8 **highly pathogenic avian influenza** (HPAI) due to a positive PCR test result from samples taken on 3 October. Follow-up testing on the farm did not support this result and further investigation is underway.

Four **ostrich** farms in the **Heidelberg** area, one farm west of **Oudtshoorn** and a sixth farm south west of **Laingsburg** tested **avian influenza** seropositive. HPAI was ruled out based on serology.

An **ostrich** farm near **Tulbagh**, reported to the OIE as part of the HPAI H5N8 outbreak was re-infected with **avian influenza**. The virus was sequenced as **H6N2**.

Clinical signs of **erysipelas** were seen after slaughter on a **pig** carcass from a farm near **Paarl**. There were no clinical cases on the farm of origin, but the night before the pigs were slaughtered there was sudden cold, wet weather.

Severe **sarcoptic mange** was seen in one of seven **dogs** on a property in **Chatsworth**.

Three bull **calves** near **Malmesbury** showed clinical signs of **tetanus** after castration with rubber rings.

Newly bought **cows** showed signs of rumen **acidosis** on two properties near **Vanrhynsdorp**.

Myiasis (fly strike) was reported in **sheep** near **Napier**.

Figure 1: A vervet monkey (Photo: L van Helden)

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

VETERINARY SERVICES
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Foot and mouth disease shuts down livestock sales

Lesley van Helden

Cases of foot and mouth disease (FMD) were detected on 1 November 2019 in the Molemole local municipality of the Capricorn district of Limpopo Province. The affected farm consisted of a cattle feedlot, breeding cattle herd and a flock of sheep, and lies within the FMD free zone. The disease-free status of this zone is currently suspended since the outbreak of FMD that occurred further east in Limpopo between May 2018 and January 2019.

Animals in the feedlot had been sourced from auctions in four different provinces, and the stage of the observed lesions indicated that the disease had been present for more than a week. Trace-back operations therefore began and, as of 11 December 2019, twelve additional infected properties had been detected in Limpopo Province (fig 1), including commercial and communal farms as well as associated abattoirs. All properties are linked by movement of animals from other infected properties. Clinical signs observed vary from almost none at all, to foot lesions and severe oral lesions.

The associated virus has been identified as SAT 2, and appears to be a close relative of the virus that caused the latest outbreaks of FMD, also in Limpopo Province. The exact origin of the outbreaks remains unknown.

A notice published in the Government Gazette on 4 December 2019 prohibited the congregation of cloven-hoofed animals from multiple locations for the purposes of distribution to more than one other property. This means that all livestock auctions, shows and similar events are prohibited in the whole of South Africa until further notice. Exemption from this prohibition applies to those who keep animals on their property for 28 days after arrival with no new introductions in this time period, and that keep auditable records to prove this. The prohibition could be lifted once the extent of the outbreak is determined and no further cases have been reported for at least 28 days.

The national Department of Land Reform and Rural Development (DALRRD) and the National Animal Health Forum (NAHF) urge all producers of cloven-hoofed animals to develop and implement a biosecurity plan for their properties in order to minimise the risk of transmission of diseases, including FMD, onto and from their properties. Vigilance and active surveillance by all producers and those in the animal industry for clinical signs of FMD is also encouraged. Please see the March 2019 Epidemiology Report (http://www.elsenburg.com/vetepi/epireport pdf/March2019.pdf) for a list of clinical signs and differential diagnoses for FMD.

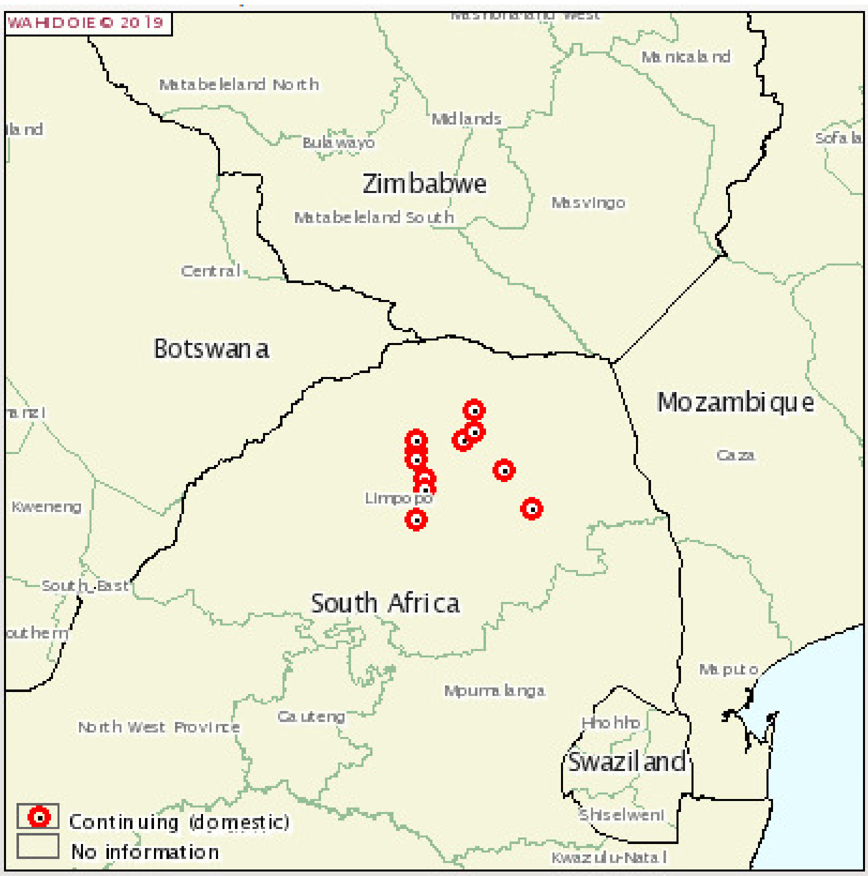
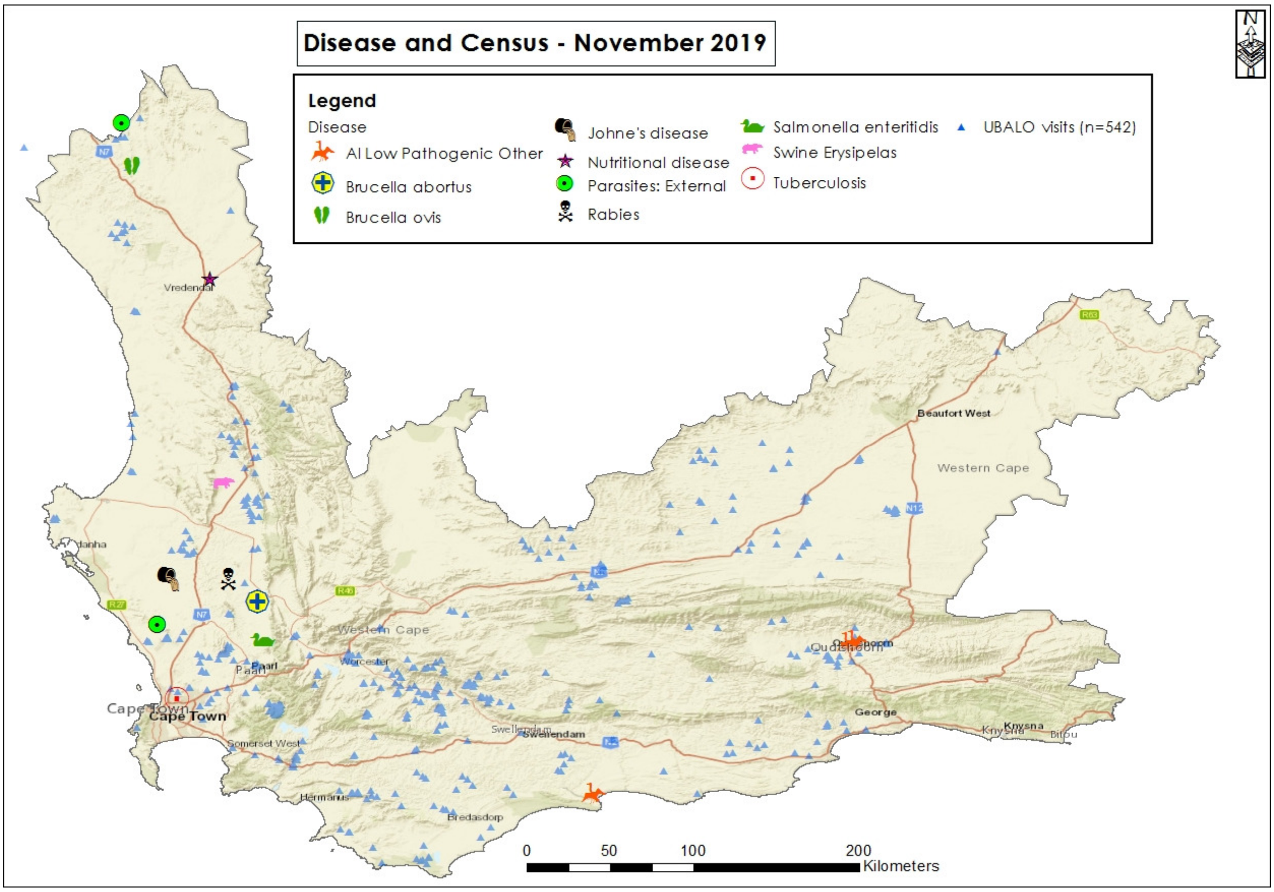
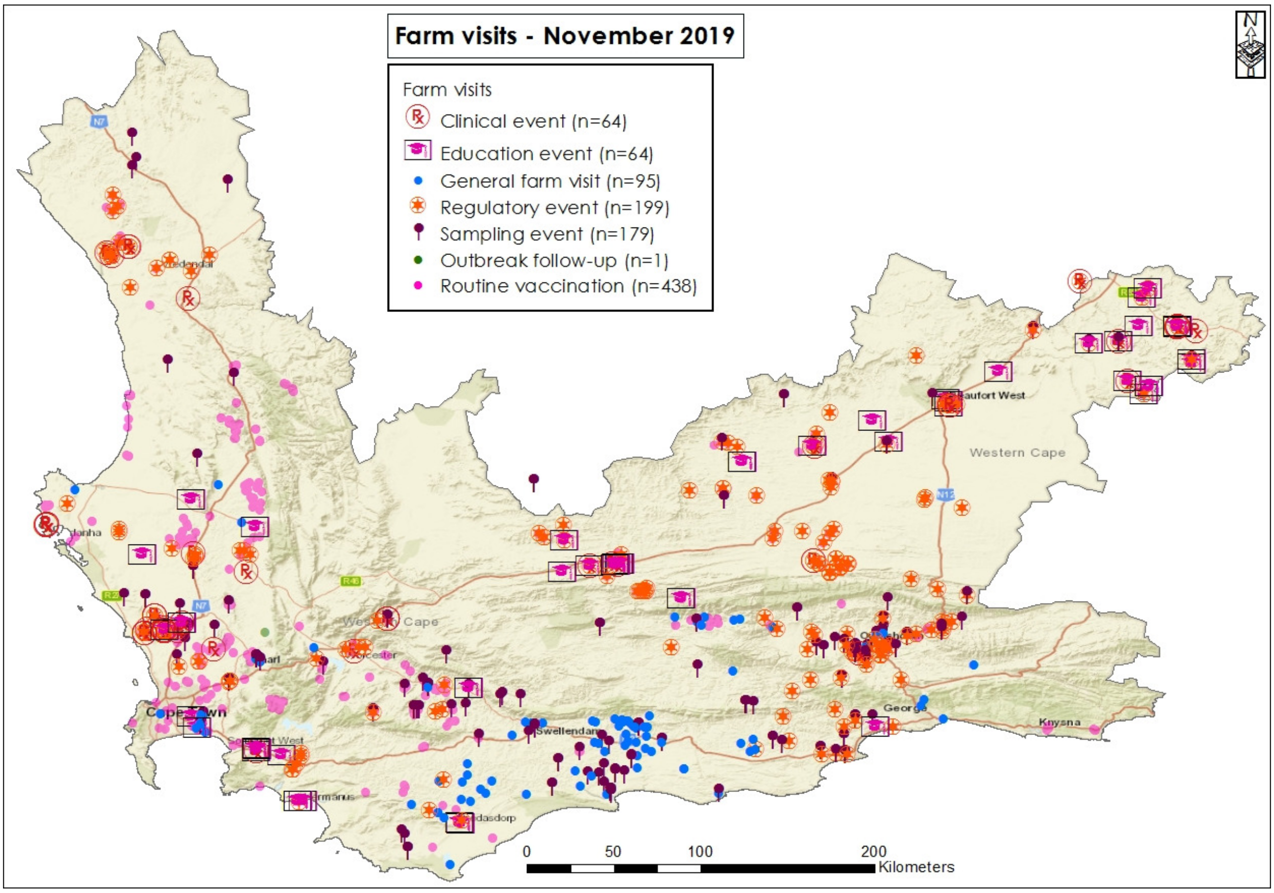


Figure 1: The locations of properties in Limpopo Province reported to the OIE as infected with foot and mouth disease since 1 November 2019, indicated by red circles (OIE, 2019)

Disease and surveillance





Outbreak events

A **bat-eared fox** near **Moorreesburg** approached a tractor on a farm and attacked the tyres. The tractor driver drove over the fox to kill it and the local animal health technician was contacted to collect the carcass, which subsequently tested positive for **rabies**. There were no dogs on the farm, but 13 cats were vaccinated against rabies.

A group of **cattle** grazing communally on land near **Gouda** was tested for **brucellosis**, as a result of forward tracing from the outbreak of brucellosis near Paarl in September. Two cattle tested positive. The cattle belong to five different owners who lease the grazing land from the local municipality, and have been doing so for the past ten years. The herd was placed under quarantine.

A chronically ill **dog** in **Cape Town** had biopsies taken from nodules detected it its liver. Histopathology revealed these nodules to be granulomatous, containing acid-fast bacilli. Mycobacterial culture is currently underway to identify the organism, but **tuberculosis** is suspected. The dog had recently been adopted from a welfare organisation as an adult and its history is unknown.

Two **ostrich** farms northeast of **Oudtshoorn**, close together and with the same owner and manager, were found to be **avian influenza** seropositive on post-movement tests at the end of October. Back-tracing found no evidence of infection on the farms of origin and follow-up testing provided evidence against infection with highly pathogenic AI. Virus material was detected on one of the farms, in live ostriches, from mortalities among poor-doers and from faecal swabs of wild geese, but was found to be H5 and H7 negative on PCR and serology was also H5 and H7 negative. Both farms are near a canal and other water bodies and hundreds of Egyptian geese (fig 2) frequent the ostrich camps. Given detection of virus in the faecal swabs from geese, infection is likely to have originated in these wild birds.

Avian influenza antibodies were detected on a fifth **ostrich** farm in the **Heidelberg** area. No evidence of virus or of antibodies to H5 or H7 AI were detected.

Next generation sequencing of RNA obtained from swab samples taken in September on an **ostrich** farm in the **De Rust** area indicated infection with **H9N2 avian influenza**.

A **sheep** farmer near **Moorreesburg** noticed ewes losing condition and not responding to treatment for internal parasites. A private veterinarian came to do an investigation and diagnosed **Johne's disease** in the flock.

A broiler **chicken** farm near **Wellington** cultured ***Salmonella enteritidis*** from chick box liners supplying two different houses on the site. All chicks are routinely treated with enrofloxacin on days 1-3, and the pH of the drinking water was reduced to 3. Follow-up cloacal swabs taken from the chicks on day 11 were negative for *Salmonella*. Parent flocks of origin also all tested *Salmonella* negative.

Skin lesions indicating **erysipelas** of swine were seen on a **pig** carcass originating from the **Eendekuil** area after slaughter at an abattoir.

Brucella ovis was detected in **rams** near **Bitterfontein**.

Unspecified **nutritional disease** was reported in small farmers' sheep near **Vanrhynsdorp**.

Sarcoptic mange of **pigs** was seen near **Mamre**.

Goats were dipped for **external parasites** in the **far north of the province**.

Figure 2: Egyptian geese (Photo: L Roberts)

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EPIDEMIOLOGY REPORT

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On-farm biosecurity: the responsibility of all

Laura Roberts

We in the veterinary profession all know about biosecurity and hear the word often, but do we actually enforce it ourselves and make sure our farmers understand it and live it? Do they really know what the word means? We need to first make sure that we are not the cause of a breach in biosecurity and then help our farmers understand how important it is and convince them to take responsibility for the disease status on their own properties and in their communities.

Gethmann et al. (2015) reported on a case study of **bovine viral diarrhoea (BVD) in Germany.** Due to the uncommon BVDV-2c strain that caused atypically severe clinical signs, but a low morbidity rate, it took three months from first clinical signs to a conclusive diagnosis and the disease spread to at least 20 cattle farms in the meantime. Detailed epidemiological investigations were performed and the census and movement information from the national cattle registration database was used. The most common, most likely route of spread was person contact in 13/20 cases, 12 of which were probably a vet. In the 13th case, the two farmers were friends. Of the seven remaining cases, six were linked to animal trade and the last to a shared slurry vehicle.

Vets who wore overalls and then changed them when leaving each farm, and cleaned and disinfected their boots, hands and equipment could have halved the number of cases in this outbreak. More difficult, but also important to think about is where the vet's vehicle drove? Did he or she (implied from here on) quickly move the vehicle half way through a visit to an infected farm and contaminate his foot mats? Did he wash his hands properly or did he contaminate his steering wheel, door handle, etc.? Were his calving ropes, nose tongs, dosing gun and stomach tube properly cleaned and disinfected?

Can we really say that we know all the subclinical, chronic diseases on our farms and are doing all we can to make sure they don't spread? Do you make a definitive diagnosis in every case and are you always sure whether or not it is contagious? Do you do enough to clean up if it is contagious?

The OIE defines biosecurity as "a set of management and physical measures designed to reduce the risk of introduction, establishment and spread of animal diseases, infections or infestations to, from and within an animal population" (OIE, 2019). Biosecurity therefore covers everything from vaccination to disinfection, to fences.

Farmers should be taking responsibility and managing the risk of disease entering and spreading within their herds by controlling access of people and animals and contaminated objects. Infected **animals** could be introduced or gain access through poor boundary control. Different species can also pose a risk to livestock health, such as dogs, rats, cats and other wild species. Isolation of new stock, buying stock of known health status and from a reputable source and maintenance of a suitable fence are vital. Indirect contact with other animals via products and waste is the next consideration. Swill and food waste feeding to pigs is very risky, as is allowing access of animals to any manure or slurry.

Any **person or vehicle** that has access to another farm or to livestock is a risk. Grobbelaar (2014) included poor biosecurity as an important reason why poultry farmers fail. Specifically, he mentioned buyers of birds being allowed access to poultry houses. And what about farm workers with their own stock at home? And feed trucks? On intensive poultry and pig farms with proper biosecurity, these trucks are not even allowed onto the property. The trucks pose a lower risk to less intensive

Figure 1: Minimum equipment to allow veterinary professionals to maintain biosecurity: rubber boots and overalls, gloves, disinfectant soap, disinfectant spray, sharps bin and boot washing kit (Photo: L Roberts)

operations but the risk still exists. Lastly, remember that any borrowed or second-hand farm **equipment** could be carrying a pathogen that a farm doesn't yet have (Robertson 2020).

Please also educate your farmers about the use of **vaccines and disinfectants**. A vaccine that is not properly handled and applied may fail. The package insert should be obeyed, including storage temperature and dose schedule. Furthermore, a disinfectant that is applied at the wrong concentration, without sufficient contact time and without consideration of target organisms, may achieve nothing, Very hard water can interfere with disinfectant activity, as can organic matter. A dirty disinfectant solution can either inactivate the disinfectant (especially chlorine and iodine) or can allow micro-organisms to hide. Disinfectant foot baths and wheel baths should be kept clean and accompanied by a bath containing only water to clean off any dirt. Remember though, that wheel arches and vehicle undercarriages can also be contaminated and a wheel bath will not mitigate that risk.

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Outbreak events

Two **ostrich** compartments southwest and west of **Oudtshoorn** tested **avian influenza** (AI) sero-positive in October and November respectively. No virus and no H5, H6 or H7 antibodies were detected. The sero-positive group on one of the compartments moved from another compartment in September, which tested positive in late October.

An **ostrich** compartment south of **Beaufort West** tested **AI** sero-positive in late November. No virus was detected on follow-up and after single-antigen H5 antibody reactions on the initial positive test and first follow-up, with no cross-reactions to indicate H5 virus infection, the second round of follow-up sampling was sero-negative.

Another **ostrich** compartment in the **Heidelberg** area tested **AI** sero-positive in late November. No virus was detected and though initial H5 antibody reactions were concerning, the titres on the two antigens were too dissimilar to constitute a cross-reaction and follow-up testing showed no HI reactions at all on one occasion and only single-antigen H5 HI reactions on the second follow-up test.

An **ostrich** compartment east of **Oudtshoorn** tested sero-positive for **AI** in early December. One bird was sero-positive, but no tests for H5, H6 or H7 antibodies were positive. The only positive result on the first round of follow-up testing was the same bird again and the second round of follow-up was completely negative, including the previously-positive bird.

Figure 2: Ostriches (Photo: L van Helden)

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Disease and surveillance