

VETERINARY EPIDEMIOLOGY REPORT – 2009

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EPIDEMIOLOGY REPORT

Volume 1, Issue 1

October 2009

WESTERN CAPE DEPARTMENT OF AGRICULTURE VETERINARY SERVICES

Bovine Malignant Catarrhal Fever

The George State Veterinary office reported a case of Bovine Malignant Catarrhal fever on a farm near De Rust in the Oudtshoorn Municipal District. This case occurred in a herd of 100 cows which were susceptible to the disease. The confirmed case was in a 5 year old cow. The case was confirmed as sheep associated (vs. wildebeest associated) virus from samples taken by a private veterinarian.

MCF is a caused by a herpes virus which has either wildebeest or sheep as a natural host, depending on the strain of virus. No clinical disease is caused in these natural hosts. Clinical signs in infected hosts are severe and are characterized by inflammation of the mucosa of the respiratory, alimentary and conjunctival surfaces. This often results in mucoid to muco-purulent discharge from the nose and eye.

There is no vaccine available to protect susceptible animals but transmission is erratic and eradication of the disease and control is difficult. Infectious virus is only excreted by the natural hosts (wildebeest and sheep respectively) and no transmission occurs from susceptible species.

Laboratory confirmation is important in suspect cases of MCF due to the wide spectrum of clinical signs and the various differential diagnoses for these clinical signs. A polymerase chain reaction test is available and used routinely in South Africa. Whole blood (EDTA) samples from live animals should be submitted, and in cases which have died the best results are obtained from spleen and brain tissue (Romito M, OVI, Personal Communication). The epidemiology of MCF is complex.

Source: Reid, HW; Van Vuuren, M 2004 Malignant catarrhal fever In: *Infectious diseases of Livestock* edited by: Coetzer, JAW & Tustin, RC. pp 895—908. Oxford University Press Southern Africa

Disease reporting—Outbreaks vs. Cases

The National Department has a protocol which acts as a guideline when assigning outbreaks and cases within the List A and B disease reports. The pertinent points are these:

- 1. All cases occurring in one month in the same Geographic location generally constitute an outbreak
- 2. The **source of infection** plays a role, and it seems that irrespective of geographical distance, if **cases** have different sources of infection, these are regarded as different **outbreaks**, even if in the same month/on the same farm.
- 3. Ongoing diseases (their examples were Johne's, Brucellosis and TB) are not seen as a new outbreak in the following month (Outbreak = 0) but **cases** can occur and are entered as such.

It has been suggested though that outbreaks as in point 3 above which spread from December through to January must be indicated as an outbreak in the January Disease Report.

Some more Definitions:

Cases constitute any animal infected with the pathogen, irrespective of clinical signs, as well as those that have died as a result of the disease.

Number dead constitute NATURAL death.

Number killed constitute all destroyed animals, irrespective of end point of carcass (buried/consumed).

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Rabies Vaccinations being performed-

Beaufort-West

Vaccinations

Rabies awareness week fell towards the end of September and most State Vet offices had awareness campaigns within their areas.

A total of 8795 dogs and cats were immunized during the various campaigns in the Western Cape Province, while an additional 500 doses of vaccine were distributed amongst welfare and private veterinarians in the Swellendam area, for use in needy communities.

Educational talks were also held in the Beaufort West area (Nelspoort).

Other vaccination efforts in the various species for October 2009 are indicated in the table below.

sv	Species	Disease	Total Vaccinations
SV Beaufort Wes	CANINE	RABIES	122
	EQUINE	AFRICAN HORSE SICKNESS	86
SV Boland	CANINE	RABIES	3022
	FELINE	RABIES	246
SV George	BOVINE	ANTHRAX	68
	CANINE	RABIES	527
	FELINE	RABIES	181
SV Malmesbury	AVIAN	NEWCASTLE DISEASE	3800
	BOVINE	ANTHRAX	188
	CANINE	RABIES	752
	FELINE	RABIES	198
	OSTRICH	NEWCASTLE DISEASE	20
SV Swellendam	CANINE	RABIES	417
	FELINE	RABIES	55
SV Vredendal	CANINE	RABIES	82
	EQUINE	AFRICAN HORSE SICKNESS	9
	FELINE	RABIES	41
	OSTRICH	NEWCASTLE DISEASE	222





New Outbreaks and cases: October 2009



Outbreak Investigations

- The Newcastle outbreak in the Malmesbury area which influenced Ostrich Exports from this area during September and October has been concluded, with exports to resume after the perfunctory waiting period is completed.
- There was a false positive PRRS sample from a compartmentalised piggery in the Klapmuts area, sampled during July 2009. An epidemiological investigation was performed with the focus being on Biosecurity. This report was required from the National Department to add to the credibility of the surveillance effort of CSF and PRRS as a whole.
- A false positive Avian Influenza (AI) serological test on a registered ostrich farm near Oudtshoorn was reported, with the farm reverting back to a negative status after all required follow-up sampling was performed and shown to be negative.

The 6 Hermits Epidemic—Scenario Tree Modeling

Six (unusually sociable) hermits live on an otherwise deserted island. An infectious disease strikes the island. The disease has a **1-day infectious period** and after that the person is immune (cannot get the disease again). Assume that initially one of the hermits gets the disease. He randomly visits one of the other hermits during his infectious period. If the visited hermit has not had the disease, he gets it and is infectious the following day. The visited hermit then visits another hermit. The disease is transmitted until an infectious hermit visits an immune hermit, and the disease dies out. There is one hermit visit per day. Assuming this pattern of behaviour the questions posed are:

(from Using Statistics by Travers, Stout, Swift, and Sextro -- p67)

What is the least number of hermits that could get infected?

What is the greatest number of hermits that could get infected?

What is the probabilities of 1, 2, 3, 4, 5 and 6 hermits getting the infection during this epidemic?

How many hermits can be expected to become infected during this epidemic on average (using analytical methods)?



Please feel free to submit any questions as well as answers regarding the *THE BACK PAGE* scenario, we'd like to hear from you.

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EPIDEMIOLOGY REPORT

Volume 1, Issue 2

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WESTERN CAPE DEPARTMENT OF AGRICULTURE VETERINARY SERVICES

Buffer Zones

Buffer zones are calculated around any disease outbreak which, according to legislation, has an impact on the surrounding farming areas. An example of this is when virulent Newcastle disease is diagnosed on a farm and there are registered Ostrich farms within 10 km of this outbreak. This occurred during November on Ostrich farms in the Albertinia area where Newcastle disease was lab diagnosed on a broiler farm in the region. A total of 5 registered ostrich farms fell within the 10 km buffer zone.

An interesting situation was however evident during the mapping of the outbreak. There were 2 registered ostrich farms (colored yellow on adjoining map) whose quarantine camps fell outside the 10 km zone, but which had small tracts of land extending into the buffer zone. The respective owners were contacted and it was determined that slaughtering of ostriches on these farms was not planned until 2010 at the earliest, as well as that ostriches on these farms were not on the land which extended into the buffer zone.

The allowed the State authorities to exclude the 2 bordering farms from the quarantine procedures, limiting the total quarantined ostrich farms to 5.



Disease reporting—Outbreaks vs. Cases



The sheep scab outbreak, which is continuing in the Malmesbury district, shows very nicely an outbreak of a disease which has spread to multiple farms via either people (possibly shearers in this case) or points of contact (like shared dipping procedures). The map on the left shows the single outbreak with the dates of when the diagnosis/ suspected diagnosis was made. Although this is not necessarily the case, for this illustration we assume that the light blue coloured farm was the first (index farm) according to these dates.

In terms of the reporting of this, the outbreak column will be '1' under the index farm (light blue) and '0' for the green, orange and red farms to show that they are part of the same outbreak. An explanation of which farm is the index farm should also then be noted in the comments field.

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Vaccinations



High numbers of Rabies vaccine continued to be administered throughout the Province this month, relative to the Rabies awareness campaigns during October. 1415 doses of vaccine against Newcastle disease virus were administered in the Albertinia area in reaction to the positive (later false positive) NCD result from a broiler farm.

Orf virus vaccinations (Contagious Pustular Dermatitis) have been reported from the Beaufort West office (as well as an indication of numbers of cases seen from this area). This disease is an OIE listed disease and if there are other cases/vaccinations within the Province it would be good if they can be added to the List AB databases every month.

sv	Species	Disease	Total Vaccinations
SV Beaufort Wes	CANINE	RABIES	204
	EQUINE	AFRICAN HORSE SICKNESS	38
	OVINE	CONTAGIOUS PUSTULAR DERMATITIS	50
SV Boland	BOVINE	ANTHRAX	280
	CANINE	RABIES	5092
	FELINE	RABIES	1124
SV George	AVIAN	NEWCASTLE DISEASE	1415
	CANINE	RABIES	81
	FELINE	RABIES	35
SV Malmesbury	BOVINE	ANTHRAX	51
	BOVINE	LUMPY SKIN DISEASE	1651
	CANINE	RABIES	1670
	FELINE	RABIES	245
SV Swellendam	CANINE	RABIES	603
	FELINE	RABIES	97
SV Vredendal	CANINE	RABIES	194
	EQUINE	AFRICAN HORSE SICKNESS	7





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■ Sum of Total Outbreaks ■ Sum of Total Cases



Outbreak Investigations

• The only outbreak investigation done by our office during November was the Newcastle outbreak on the broiler farm near Albertinia. A retest of the samples was performed and the results showed that there were no virulent NDV positive results. The PCR testing which is performed is highly controlled and monitored, with both negative and positive controls which are used to verify results. It was not clear in this case what caused the initial virulent virus positive result, however the broiler farmer was vaccinating for NCD and this may have played a role.

This case did show the advantages of taking current situations and history into account when making diagnoses, and when the history and clinical/pathological signs don't fit the disease isolated, a thorough investigation must be undertaken. The state officials as well as the broiler farmer and ostrich farmers affected can be very grateful to Dr. Gers from the PVL for the effort she and her team put into this case to ensure that the NCD was ruled out in this case. This kind of effort is instrumental in maintaining the good relationship the State has with commercial and rural farmers. The George State vet office were also very efficient in beginning the required vaccination program surrounding the outbreak, with most properties being vaccinated prior to the negative result from the OVI.

THE BACK PAGE ANSWER



THE BACK PAGE QUESTION

The question this month is more for fun than any practical use, but it does, like last month, show what can be worked out using probabilities. The Monty Hall game show question has created quite some controversy, particularly in the USA. It would be really interesting to hear your feedback on this question with reasons why you would choose to switch or not. My first experience with this question resulted in quite heated discussion over lunch at varsity! Here is a nice version of the question:

'Suppose you're on a game show and you're given the choice of three doors. Behind one door is a car; behind the others, goats. The car and the goats were placed randomly behind the doors before the show. The rules of the game show are as follows: After you have chosen a door, the door remains closed for the time being. The game show host, Monty Hall, who knows what is behind the doors, now has to open one of the two remaining doors, and the door he opens must have a goat behind it. If both remaining doors have goats behind them, he chooses one randomly. After Monty Hall opens a door with a goat, he will ask you to decide whether you want to stay with your first choice or to switch to the last remaining door.

Imagine that you chose Door 1 and the host opens Door 3, which has a goat. He then asks you "Do you want to switch to Door Number 2?" Is it to your advantage to change your choice?'



Krauss, Stefan and Wang, X. T. (2003). "The Psychology of the Monty Hall Problem: Discovering Psychological Mechanisms for Solving a Tenacious Brain Teaser," Journal of Experimental Psychology: General **132**(1).

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EPIDEMIOLOGY REPORT

Volume 1, Issue 3

December 2009

WESTERN CAPE DEPARTMENT OF AGRICULTURE VETERINARY SERVICES

What is tested for in the National Residue Program?

During the next few issues of the Epidemiology report we will be investigating what residues are tested for in the National Export Residue Control Program (NERCP) and what impact these residues have with regard to human and animal health.

OVERVIEW

The NERCP monitors residues in a number of export products originating in South Africa. The major component for the Veterinary Services, particularly here in the Western Cape, is the testing for residue in ostrich products, this to ensure compliance with EU legislation. The sampling regimen includes a series of serum samples be taken and tested from all export registered ostrich farms once per year.



STILBENES

The first group we will focus on are the Stilbenes. Three components of this group are tested for viz. **Diethylstilbestrol**, **Hexestrol** and **Dienestrol**. Stilbenes form the chemical basis for non-steroidal (synthetic) estrogenic compounds, which is where their danger sometimes lie with regards to human health.

DIETHYLSTILBESTROL

Diethystilbestrol (DES) was first synthesized in 1938, and is considered the first synthetic estrogen¹. Its initial uses in humans, prior to its side effects being discovered, included treatment of metastatic prostate cancer². After being used for various hormone dependant conditions throughout the 1940's through to the 1990's DES was commercially discontinued (1997) after its side effects outweighed its uses after the introduction of newer, more appropriate drugs³. The major health associated problems of DES in women is the fact that it has been shown to be a teratogen (causing malformation of embryo/foetal tissue), as well as being associated with various reproductive tract cancers in women who were exposed to DES in the womb (*DES daughters*)⁴.

ANIMAL CONSIDERATIONS

DES was one of the first synthetic estrogens used in the USA to commercially fatten chickens (1950's)⁴, but this had already been phased out by 1970 after DES' cancer associations in humans. Various papers have been published on the effects of DES in cattle. A good article by Raun and Preston (2002) is available regarding the history of DES use in cattle⁵. Current legislation in the EU now prohibits the use of growth promotants in meat producing animals.

The only current uses for DES in animals are limited to the treatment of incontinent bitches post-spay (ovariohysterectomy). It does however seem as if it is only available from compounding pharmacies on prescription. Natural estrogens are now available for veterinary use for the treatment of post-spay incontinence, which decreases the need for synthetic DES for this condition.

References

1. Anon, Diethylstilbestrol CAS No. 56-53-1 Report on Carcinogens, 11th Edition

2. Huggins C and Hodges C V. 1941 Studies on prostate cancer. The effects of castration, of estrogen and of androgen injection on serum phosphatases in metastatic carcinoma of the prostate. Cancer Research 1: pp 293-297.

3. Various authors 2009 Diethylstilbestrol accessed from www.wikipedia.org on 06/01/2010

4. Ghandi R and Snedeker S M 2000 Consumer concerns about hormones in food Program on breast cancer and environmental risk factors Cornell University, College of Veterinary Medicine, New York

veterinary medicine, new fork

5. Raun A P and Preston R L. 2002 History of diethylstilbestrol in cattle American Society of Animal Science

Vaccinations

Vaccinations for the month generally decreased as a result of the festive season, with



Reg. No. G 0112 (Act 36/1947) Namibia: NSR 0568



many officials going on leave over this time period. An exception to this was in the Swellendam area where a large number of doses of Newcastle disease and Anthrax vaccines were administered. In the case of the Anthrax vaccinations this was partly due to an effort to decrease stock which was nearing its expiry date, while the Newcastle vaccination increase was due to a routine campaign of vaccinations. There were no outbreaks of NCD or Anthrax in this area during December.

SV	Species	Disease	Total Vaccinations
SV Beaufort Wes	CANINE	RABIES	81
	EQUINE	AFRICAN HORSE SICKNESS	18
SV Boland	CANINE	RABIES	1909
	FELINE	RABIES	167
SV George	AVIAN	NEWCASTLE DISEASE	59
	CANINE	RABIES	388
	FELINE	RABIES	70
	BOVINE	ANTHRAX	21
SV Malmesbury	BOVINE	ANTHRAX	29
	CANINE	RABIES	718
	FELINE	RABIES	191
SV Swellendam	CANINE	RABIES	379
	FELINE	RABIES	109
	AVIAN	NEWCASTLE DISEASE	6250
	BOVINE	ANTHRAX	1944
SV Vredendal	CANINE	RABIES	29
	EQUINE	AFRICAN HORSE SICKNESS	6
	OSTRICH	NEWCASTLE DISEASE	26





VOLUME 1, ISSUE 3



New/Current Outbreaks and Cases: December 2009

Sum of Total Outbreaks Sum of Total Cases



Outbreak Investigations

- The sheep scab outbreak seen in the Malmesbury district has been ongoing with regard to treatment of infected and suspect flocks. No new cases have been reported from the affected area.
- The 5 cases of canine babesiosis reported by SV George are almost certainly not the only cases the Western Province would have had over this time period. We would like to encourage all State Vet offices to report on any cases which they do see, and although this will still be the tip of the iceberg it will improve our knowledge on Babesia spread through the Province.
- We would like to extend an invitation to any reader of this report who has an interesting veterinary investigation which they would like to submit for these monthly reports. We hope that this will stimulate more interest in the report itself as well as provide a platform for Animal Health Technicians and any other interested parties to discuss and evaluate techniques used in the veterinary field, with a special focus on epidemiology. The authors of the report will be willing to assist in editing and referencing of documents.

THE BACK PAGE ANSWER

'Suppose you're on a game show and you're given the choice of three doors. Behind one door is a car; behind the others, goats. The car and the goats were placed randomly behind the doors before the show. The rules of the game show are as follows: After you have chosen a door, the door remains closed for the time being. The game show host, Monty Hall, who knows what is behind the doors, now has to open one of the two remaining doors, and the door he opens must have a goat behind it. If both remaining doors have goats behind them, he chooses one randomly. After Monty Hall opens a door with a goat, he will ask you to decide whether you want to stay with your first choice or to switch to the last remaining door.

Imagine that you choose Door 1 and the host opens Door 3, which has a goat. He then asks you "Do you want to switch to Door Number 2?" Is it to your advantage to change your choice?'

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Change your door unless you want to win GOATS and not CARS!!!

I did say last issue I got into an argument with a good friend, and, being stubborn as I am I said that to change or not change made no difference at all, the chances you have a goat or a car are 50-50, my reckoning being that irrespective of the history of decisions, the choice in front of you is simply 50-50. I was wrong, but I haven't been the only one. This question in the States caused an uproar, with PhD mathematicians commenting that the magazine that published the questions and answers were wrong and only after a nationwide series of experiments were done in schools and other interested institutions it was shown that in fact it is better to change your choice to improve your chances of driving away in the car.

Suppose the doors are labelled **1**, **2**, and **3**. Let's assume the contestant initially picks door **1**. The probability that the prize is behind door **1** is 1/3 (33%). That means that the probability it is behind one of the other two doors (**2** or **3**) is 2/3 (67%). Monty now opens one of the doors **2** and **3** to reveal that there is no prize there (i.e. a goat). Let's suppose he opens door **3**. Notice that he can always do this because he knows where the prize is located. (This piece of information is crucial, and is the key to the entire puzzle.) The contestant now has two relevant pieces of information:

1. The probability that the prize is behind door **2** or **3** (i.e., not behind door **1**) is 2/3 (67%). 2. The prize is not behind door **3**.

Combining these two pieces of information yields the conclusion that the probability that the prize is behind door 2 is 2/3 (67%).

Hence the contestant would be wise to switch from the original choice of door **1** (probability of winning 1/3 (33%)) to door **2** (probability 2/3 (67%)).

For those that are not convinced imagine there are 100 doors to start with, and only one of them has a car behind it, the rest have goats. You can choose 1 door. Monty then, from the remaining 99 doors, opens 98 that have goats behind them. This leaves 2 closed doors, the one you originally chose and one that Monty did not open. Would you change doors now?



THE BACK PAGE QUESTION

Since it is January we've all had a bit of time off, the question this month is simple, but none the less has more application to practical epidemiology which we do in the field than the previous couple of back page questions. Over the next few month the Epidemiology Report will be focusing on some practical epidemiology for use in the field.

Death Measures

If 5 healthy chickens take 5 days to die after being simultaneously infected with Newcastle disease virus, how long will it take 10 healthy chickens to die under the same circumstances?

We trust that you and your family will have a wonderful 2010!!



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