Monthly report on livestock disease trends as informally reported by veterinarians belonging to the Ruminant Veterinary Association of South Africa (RuVASA), a group of the South African Veterinary Association

July 2017

Previous disease reports can be seen on the RuVASA website www.ruvasa.co.za

Click on Disease Reports

The following practices and laboratories (119) submitted reports during July 2017:

Mpumalanga (13)
Balfour – Dr. Louis van Jaarsveld
Bethal – Dr. Hardus Pieters
Delmas –Drs. Du Plessis and Ferreira
Ermelo – Drs. Potgieter and Steinberg
Grootvlei – Dr. Neels van Wyk
Karino – Dr. Silke Pfitzer
Lydenburg – Drs. Trümpelmann and Steyn
Malalane – Drs. Van Sittert and Van Sittert
Middelburg – Malan, Erasmus and Bernitz
Nelspruit – Dr. André Beytell
Piet Retief – Drs. Niebuhr and Weber
Standerton – Dr. Kobie Kroon
Volksrust – Drs. Watson, Solomon and Scheepers

Gauteng (6)
Bronkhorstspruit – Drs. De Bruin, De Bruin, Rudolph and Slabber
Krugersdorp – Dr. Clare Speedy
Magaliesburg – Dr. Ryan Jeffery
Nigel – Dr. Cindy van der Westhuizen
Onderstepoort Veterinary Academic Hospital - Proff. Annandale, Prozesky, Shakespear, Holm and Esposito, Gratwick, Hamman and O'Dell
Pretoria – Dr. Hanneke Pienaar

Limpopo (7)
Bela-Bela – Dr. Nele Sabbe
Lephalale (Ellisras) – Dr. Brigitte Luck
Makhado – Drs. Harris, Klopper and Jacobs
Mokopane (Potgietersrus) - Dr. Henk Visser

Polokwane (Pietersburg) – Drs. Watson, Viljoen, Jansen Van Vuuren, Van Rooyen, Snyman and Cremona
Vaalwater – Dr. Hampie van Staden
Vaalwater – Dr. Annemieke Müller

North West (7)
Brits – Drs. Boshoff and Coertze
Christiana - Dr. Pieter Nel
Klerksdorp – Drs. Theron, Van den Berg, Van den Berg and Geral
Klerksdorp – Drs. Coetzee and Venter
Lichtenburg – Dr. Fritz Ras
Stella - Dr. Magdaleen Vosser
Ventersdorp/ Koster – Drs. Marais and Benadé

Free State (25)
Bothaville – Dr. Johan Blaauw
Bultfontein – Dr. Santjie Pieterse
Clocolan – Drs. Wasserman and Basson
Dewetsdorp – Dr. Marike Badenhorst
Excelsior – Dr. Deidré Nel
Ficksburg – Drs. Kotze and Coetzer
Frankfort - Drs. Lessing, Cilliers and Janse van Rensburg
Gariep Dam – Dr. Marni Strauss
Hertzogville - Dr. Nico Hendrikz
Hoopstad – Dr. Kobus Pretorius
Kroonstad – Drs. Daffue, Eksteen, Van Zyl and Van der Walt
Ladybrand/Exclsior - Dr. De Vos and Nel
Memel – Drs. Nixon and Nixon
Parys – Drs. Wessels and Wessels
Philippolis – Dr. Stephan van Niekerk
Reitz - Dr. Murray Smith
Senekal – Dr. Jan Blignaut
Smithfield – Dr. Nienke van Hasselt
Trompsburg – Dr. Wyn Irwin
Viljoenskroon - Dr. Johan Kahts
Villiers – Drs. Hattingh and Hauptfleisch
Vrede – Drs. Bester - Cloete and Fourie
Wesselsbron – Dr. Johan Jacobs
Winburg – Drs. Albertyn and Albertyn
Zastron – Drs. Troskie and Strauss

KwaZulu-Natal (16)
Bergville - Dr. Ariena Shepherd
Bergville – Dr. Jubie Muller
Camperdown – Dr. Anthony van Tonder

Dundee – Drs. Marais and Fynn
Dundee – Dr. Paul Reynolds
Eshowe - Drs. Pryke and Hoffman
Estcourt – Drs.Turner, Tedder, Taylor, Tratschler, Van Rooyen and Alwar
Howick – Drs. Hughes, Lund, Gordon, Allison and Taylor
Kokstad - Drs. Clowes and Shrives
Mooi River – Drs. Fowler, Hartley, Alexander and Reisinger
Mtubatuba – Dr. Trever Viljoen
Newcastle – Dr. Barry Rafferty
Pietermaritzburg – Dr. Phillip Kretzmann
Pongola – Dr. Heinz Kohrs
Underberg - Drs. Collins, King and Delaney
Vryheid – Drs.Theron and Theron

Eastern Cape (11)
Alexandria - Drs. Olivier and Dreyer
Aliwal North – Drs. Troskie and Strauss
Bathurst – Dr. Jane Pistorius
Cradock – Dr. Frans Erasmus
Graaff- Reinet - Dr. Roland Larson
Humansdorp – Drs. Van Niekerk and Janse Van Vuuren
Jeffreys Bay – Drs. Hoek and Lategan
Kareedouw – Dr. Martin Bootsma
Stutterheim - Dr. Dave Waterman
Uitenhage – Drs. Mulder and Krüger
Witelsbos – Dr. Bernadine van den Berg

Western Cape (17)
Beaufort West - Drs. Pienaar and Grobler
Caledon – Drs. Retief, Coetzer, Jansen and Woudstra
Caledon – Drs. Louw and Viljoen
Ceres – Drs. Pieterse, Wium, De Villiers and Scheepers
Darling – Drs. Van der Merwe, Adam and Senekal
George - Drs. Strydom, Truter and Pettifer
Heidelberg – Dr. Albert van Zyl
Malmesbury – Drs. Bosman and Groenewald
Malmesbury – Dr. Markus Fourie
Maamesbury – Dr. N.J. Heyns
Piketberg – Dr. André van der Merwe
Plettenberg Bay – Dr. André Reitz
Riversdale – Drs. Du Plessis, Taylor and De Bruyn
Stellenbosch – Dr. Alfred Kidd
Swellendam – Dr. Malan
Vredenburg – Dr. Izak Rust
Wellington – Drs. Van Zyl and Louw

Northern Cape (9)
Calvinia – Dr. Bertus Nel
Colesberg – Drs. Rous and Rous
De Aar – Dr. Donald Anderson
Kathu – Dr. Jan Vorster
Kimberley – Drs. Van Heerden and Swart
Kuruman – Dr. Gerhard van der Westhuizen
Kuruman – Dr. Lea Shuda
Postmasburg – Dr. Boeta van der Westhuizen
Upington – Drs. Vorster and Visser

Feedlots (2)
Dr. Andy Hentzen
Drs. Morris and Du Preez

Laboratory reports (6)
Dr. Marijke Henton - Vetdiagnostix, Johannesburg
Dr. Alan Fisher – Queenstown Provincial laboratory
Dr. Rick Last – Vetdiagnostix, Pietermaritzburg
Dr. Liza du Plessis – Idexx, Onderstepoort
Dr. Lucy Lange – Pathcare, Cape Town
George - Deltamune

Key Message

The key message this month is:
Be aware when buying in animals infected with Johne's disease. This debilitating disease is usually brought onto the farm when buying in a positive animal which shows no clinical signs.

Information on the disease is available when clicking on the attached web address.

INTRODUCTION

Johne's disease (also called paratuberculosis) is a disease caused by the bacteria *Mycobacterium avium subsp. paratuberculosis*. This disease affects the intestinal tract and the affected animals show increasingly severe diarrhoea followed by slowly progressive wasting of the animal, with a normal temperature and appetite. Johne's disease primarily affects sheep and cattle, but has been reported in other species as well.

This bacterium is resistant to heat, cold and drying and can survive for long periods (more than a year) in soil and water. The disease is shed by infected animals through manure and milk, thus young animals usually become infected through contamination of the environment or drinking from an infected animal. A foetus can also become infected if the pregnant dam is infected with the disease. Shedding of the bacteria through faeces occurs before the animal shows clinical signs of the disease and thus can spread the disease before it is noticed. A herd free from the disease is usually infected by bringing in animals with the disease.

Animals usually only start showing clinical signs of the disease when they are older. The bacteria causes the intestinal walls to become thickened and inflamed, causing protein loss which leads to muscle wasting, even in the absence of diarrhoea. This may cause the animals to develop a swelling under the jaw (also known as "bottle jaw"). The animals gradually become more malnourished, debilitated and eventually die.

A diagnosis of Johne's disease is usually based on clinical signs, with a positive test required for confirmation. The biggest challenges in the control of this disease is the difficulty of identifying infected animals that are not showing signs of the disease and the currently available diagnostic testing methods which are not very reliable or efficient.

For the full article click on this web address

http://nahf.co.za/wp-content/uploads/Johnes-Disease-Current-status-and-way-forward-2017-08.pdf

OVINE JOHNE'S DISEASE VENDOR DECLARATION

ON THE SALE OF SHEEP

1.	I hereby declare that I am the owner or authorised representative of the sheep on sale and am competent to make this declaration.	**YES**	**NO**
2.	The sheep for sale are clearly identified in the accompanying description.	**YES**	**NO**
3.	The sheep for sale were born on my farm.	**YES**	**NO**
4.	The farm has a closed flock policy. (No live sheep are brought onto the farm from elsewhere)	**YES**	**NO**
5.	I know the signs of the disease and to the best of my knowledge, all of my properties are free of cases of Ovine Johne's Disease.	**YES**	**NO**
6.	I have actively looked for Ovine Johne's Disease and have had tests done for this.	**YES**	**NO**

	YES	NO
7. To the best of my knowledge, my immediate neighbours and farms in my magisterial district of my farm(s) are free of cases of Ovine Johne's Disease.		
8. The sheep on my properties have been vaccinated against Ovine Johne's Disease and are clearly marked with the approved ear tag.		
9. All lambs born are vaccinated		

		years
10. If vaccinated, the number of years that the vaccinations have been done is		

NOTE: Vaccination does not mean freedom from OJD, vaccinated animals can still be carriers.

Statement 8 and 9 apply only to already infected flocks, and such sheep can only be sold to other infected flocks by law.

Buyers should consult their veterinary advisor before any purchases.

Signature

Date

NAME

Farm: _____

OWNER OR AUTHORIZED REPRESENTATIVE

District: _____

Diseases cannot be properly controlled if animals are not identified on a central data base, if they are not traceable and their movement controlled.
The State and private sector are now working together to get a system going addressing these issues

Draft on movement of animals published

The Department of Agriculture, Forestry and Fisheries (DAFF) published a draft document on the registration, approval, traceability and movements recording of animals in South Africa for purposes of disease control.

The purpose of animal identification, recording and traceability (AIRT) is to accurately establish the numbers of the national herd and to allow for the monitoring thereof.

The system is an indispensable tool in safeguarding the national herd through preparedness for disease outbreaks, thus ensuring speedy containment and limiting damages to national and international trade.

The aim is to improve the access of livestock farmers to improved sanitary (animal health and product safety) services; and to provide opportunities for a more stable, predictable income generating market opportunities for the livestock and agricultural products sector.

The ultimate objectives are :-
• To be able to trace meat, animal food products and livestock back to the farm of origin.
• To be able to trace disease outbreaks back to the source and determine the possible spread of the outbreak.
• To manage disease outbreaks.
• To expand market access.
• To assist in the control of stock theft.
• To be able to support local farmers with disaster relieve in case of disease outbreak.

In order to implement a functional and efficient AIRT system, a phased-in approach is highly recommended.

A functional AIRT system aims to identify animals individually and register them on a central database.

Such an AIRT system must be able to link with animal movement information, laboratory results for animal diseases (e.g. brucellosis) and also link with residue and micro-biological testing for anti-microbial resistance and food safety.

Visit the website of the National Animal Health Forum

The website of the National Animal Health Forum (NAHF) is now operational.
www.nahf.co.za

Read what the Forum is all about:
http://nahf.co.za/about/

This website will become the information centre of animal health in Southern Africa.
On the toolbar click on **Stakeholders** and you will find links to producer organizations and other organizations who are participating in the NAHF
http://nahf.co.za/stakeholders/

Provincial Animal Health Forums have their own site – click on **Provinces**
http://nahf.co.za/provinces/

Important is to study the Veterinary Strategy (2016 -2026) as it gives direction to where we are going with Animal Health in South Africa.
http://nahf.co.za/wp-content/uploads/Vet-strategy-final-signed.pdf

Click on **Info centre** for more information on the "war" we have against Bovine Brucellosis. Please be up to date on the role all have to play to control this zoonotic disease.
http://nahf.co.za/category/diseases/brucellosis/

Information on other controlled diseases (Ovine Johne's Disease, Pest of small stock – PPR, and African Horse Sickness) is available.

This link will continuously be updated.

Information on **antibiotic resistance** is also available at this address:
http://nahf.co.za/category/antibiotic-resistance/

Better relationships are being built between the State Veterinary departments and the private sector.

Summary of disease report for July 2017

119 Reports from veterinary practices and laboratories were received (Mpumalanga (MP) 13; Gauteng (G) 6; Limpopo (L)7; Northwest 7; Northern Cape (NC9; Feedlots (FL) 2 and Laboratories (Lab) 6).

Internal parasites

The following reports were received from practices regarding internal parasite infestations:

Internal parasites	MP	G	L	NW	FS	KZN	EC	WC	NC
Roundworms	x	x	x	x	x	x	x	x	x
Resistant roundworms	x	x	x	x	x				
Wireworm	x	x	x	x	x	x	x	x	x
Brown stomach-worm								x	
Long-necked bankruptworm									
Large-mouthed bowelworm									
Nodularworm									
Lungworm									
Eyeworm									
Parafilaria									
Tapeworms	x	x	x		x	x		x	x
Liver fluke	x		x	x	x	x	x		
Conical fluke	x				x	x	x	x	x
Cysticercosis (measles)	x			x					x
Schistosomiasis (bilharzia)									
Coccidiosis	x	x	x	x	x	x	x	x	x
Cryptosporidiosis				x	x	x	x	x	

There is a perception that parasites are dormant in the winter. From the table above it is not the case as wireworm infection was reported from all the provinces. Beware as wireworm resistance reported to some of the active anthelmintic groups is wide spread. Use the five point check to keep on top of what is happening in the flock. For further detail contact your local veterinarian.

External parasites

The following reports were received from practices regarding external parasite infestations:

External parasites	MP	G	L	NW	FS	KZN	EC	WC	NC
Blue ticks	x	x	x	x	x	x	x	x	
Resistant blue ticks	x					x		x	

Heartwater ticks	x	x	x			x	x		
Brown ear-ticks			x		x		x		
Bont-legged ticks	x		x	x	x	x			x
Red-legged ticks	x			x	x				
Paralysis ticks		x					x		
Tampans									
Biting lice	x			x	x	x	x	x	x
Sucking lice				x	x	x	x	x	x
Itch mites	x								
Sheep scab				x	x		x		x
Mange mites	x				x	x			
Nuisance flies	x				x	x			
Midges	x			x		x			
Mosquitoes									
Blowflies			x		x				
Screw-worm			x						
Gedoelstia (uitpeuloogsiekte)									
Nasal bot	x				x	x			x

In the cooler months the larval and nymphal stages of the multi-host ticks are more prevalent. These stages often attach in the ears of animals. In areas where brown ear-ticks are present a winter dipping is advocated to control these stages.

Blue tick resistance to drug groups is on the increase – ask your veterinarian to assist you with information so as to minimize the chances of selecting blue ticks for resistance. Biosecurity is of utmost importance when buying in animals.

Presence of lice infestations were reported from most provinces. Sucking lice causes anaemia and the irritation caused by biting lice leads to weight loss.

Fleece disturbance and scratching in wool sheep are also signs of lice infestation. Red lice is also resistant to many actives. Consult your veterinarian.

Sheep scab is a State controlled infestation. Consult yor veterinarian and beware of this parasite infection when buying in sheep.

Tick borne diseases

The following tick borne diseases were reported by practices in the provinces:

Tick borne diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
African red water	x	x	x	x	x	x	x	x	
Asiatic red water	x	x	x	x	x	x	x	x	
Anaplasmosis	x			x	x	x	x	x	
Heartwater	x	x	x	x		x	x		
Lumpy skin disease	x	x	x	x	x	x			x
Corridor disease									
Theileriosis									

The best time to vaccinate cattle against Asiatic red water is during the winter months. Visit your veterinarian to discuss your vaccination programme and order vaccines in time.

Asiatic red water is spreading and is one of the deadliest diseases in cattle.

The new heartwater vaccine is still a year or two away as registration trials have to be done when the upscaling of vaccine production is accomplished.

The following tick toxicosis was reported by practices in the provinces:

Tick toxicosis	MP	G	L	NW	FS	KZN	EC	WC	NC
Sweating sickness				x					

Insect transmittable diseases

The following insect transmittable diseases were reported by practices in the provinces:

Insect transmittable diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
Lumpy skin disease	x	x	x	x	x	x			x
Ephemeral fever (Three day stiff sickness)						x			
Blue tongue		x							
Rift Valley Fever									
Wesselsbron									
Nagana									

After the first frost insect transmitted diseases usually decline as is seen in the table above. The reason why lumpy skin disease outbreaks are still reported is that this disease is also transmitted by ticks. Now is the time to order vaccines for the next rainy season to control these diseases.

Venerial diseases

The following venereal diseases were reported by practices in the provinces:

Venereal diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
Trichomonosis	x			x	x	x			x
Vibriosis			x	x	x	x			
Pizzle disease									x
Actinobacillus seminis									

New cases of **trichomonosis** are reported every month and this disease is out of control. Make sure to buy bulls from farmers where biosecurity measures are in place and bulls are tested for these diseases at regular intervals.

Make sure that fences are in tact and gates closed so that bulls cannot escape to neighbouring cows that may be infected with *Tritrichomonas* and become infected or infected neighbouring bulls are jumping fences.

Cattle study groups should discuss preventative and control measures with their veterinarians. **Be sure to test bulls regularly for these diseases**.

Beware when buying in or sharing bulls! Remember female animals may also be infected.

Study the Good management SOP's for cattle farmers on the RPO website

http://www.rpo.co.za/wp-content/uploads/2016/04/nuutRPO-NERPO-Code-Addendum.pdf

http://www.rpo.co.za/wp-content/uploads/2016/04/nuutRPO-NERPO-Code-Addendum-4-Good-management-practices-and-SOPs-for-cattle-farmers-1.pdf

Bacterial diseases

The following bacterial diseases were reported by practices in the provinces:

Bacterial diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
Anthrax									
Blackquarter	x				x	x	x	x	
Botulism				x					
Pulpy kidney					x	x	x		x
Lamb dysentery	x				x		x		x
Swelled head	x	x	x		x				
Red gut (cattle)	x				x		x		
Blood gut (sheep)					x	x			
Tetanus							x		
Salmonellosis					x	x			
Bovine brucellosis	x	x	x	x	x				x
Ovine brucellosis (Ram's disease)	x	x			x		x		x
Actinobacillus seminis									
Bovine tuberculosis									
Johne's									
Leptospirosis									
Listeriosis									
Pseudomonas									
Fusibacterium necrophorum									
Septicaemia									
E. coli	x			x	x		x		x
Enzootic abortion	x			x	x		x	x	x
Lumpy wool								x	x
Uterine gangrene							x		x
Bovine dermatophilosis (Senkobo disease)									
Wooden tongue									
Lumpy jaw									

When buying animals this Vendor declaration can help you to minimize risk!

VENDOR DECLARATION BOVINE BRUCELLOSIS

I hereby declare that I am the legal owner or authorised representative of the cattle on sale and am competent to make this declaration

1	The cattle for sale are clearly and permanently identified		Yes	No
2	The cattle for sale/slaughter were born on my farm		Yes	No
3	The farm has a closed herd policy i.e. I do not buy in cattle, rent out grazing or speculate with cattle		Yes	No
4	I practice bio-security on my farm to a level that is **	Poor	Moderate	Good
5	I vaccinate my heifer calves against Bovine Brucellosis once between the ages of 4 – 8 months		Yes	No
6	In addition I vaccinate my cattle older than 8 months with RB51		Yes	No
7	I have all the cattle on my farm tested for Bovine Brucellosis		Yes (date)	No
8	My herd has been tested negative within the past year		Yes	No
9	I did not buy in cattle since my last negative brucellosis test		Yes	No
10	I/my vet investigates any abortions on my farm		Yes	No
11	To the best of my knowledge, my immediate neighbours and farms in my area are free of Bovine Brucellosis		Yes	No
12	I use a veterinarian to advise me on my cattle's herd health		Yes	No
13	The cattle handling facilities on my farm are	Poor	Average	Good

Note: Vaccination does not mean freedom from Bovine Brucellosis as cattle can still be carriers
Please attach the most recent *Brucella* blood test certificate

Owner or authorised representative:…….

Signature:…….

Date:…….

** * Biosecurity

Poor – speculates with cattle, does not vaccinate, poor fences, cattle come into contact with other cattle

Medium – Vaccinates heifers, does not buy in cattle of unknown health status

Good – closed herd/never buys in cattle, vaccinates heifers and no contact with other cattle, follows a herd health plan as advised by his veterinarian, does not allow transport trucks onto property, washes and disinfects truck after returning from the abattoir or auction grounds.

Compiled by: Dr. Sewellyn Davey, Chairman of the Brucellosis Steering committee of the National Animal Health Forum

Viral diseases

The following viral diseases were reported by practices in the provinces:

Viral diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
BMC (snotsiekte)	x		x	x	x		x		x
Rabies (cattle)			x			x			
BVD					x				
IBR	x			x	x	x	x		x
BRSV									
PI3									
Maedi visna virus									
Rotavirus / Coronavirus	x				x				
Enzootic bovine leucosis (EBL)						x			
Sheep leucosis									
Jaagsiekte									
Orf	x		x	x	x	x	x	x	x
Warts	x		x	x	x	x	x	x	x

There is no treatment for viral diseases with the result that animals have to be protected by vaccinations if they are available.

The snotsiekte vaccine is still in the experimental stage and will hopefully be registered in two years tme.

Discuss vaccination programmes and biosecurity measures with your veterinarian.

Fungal diseases

The following fungal disease was reported by practices in the provinces:

Fungal diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
Ringworm	x	x	x	x	x	x	x	x	

Protozoal diseases

Protozoal diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
Besnoitiosis (olifantsvelsiekte)									

Toxicities

The following toxicities were reported by practices in the provinces:

Toxicities	MP	G	L	NW	FS	KZN	EC	WC	NC
Cardiac glycoside		x						x	x
Slangkop									
Crotularia									
Gifblaar									
Gousiekte	x								
Cestrum (ink berry)							x		
Tulip	x	x			x	x		x	
Cynanchum (bobbejaantou)								x	
Facial eczema					x				
Lantana		x				x			
Prussic acid									
Senecio					x				
Cotula nigellifolia (stagger wood)									
Geeldikkop (duwweltjies)								x	
Vermeersiekte									x
Hertia pallens (Nenta, krimpsiekte)								x	
Chrysocoma ciliata (bitterbos)									
Solanum incanum (maldronksiekte)									
Gomphocarpus (Asclepias) fruticosus (milkweed)									
Bracken fern									
January bush (*Gnidia polycephalatus*)									
Chinkerenchee									
Eucalyptus (bloekom) bark									
Kikuyu									
Ryegrass									
Ganskweek									
Paspalum staggers									
Phalaris aquaticum (Phalaris staggers)									
Photosensitivity (Turknael, *Erodium moschatum*)									
Photosensitivity (Stellenbosch)									
Lusern									
Mycotoxicosis									
Diplodiosis									
Lupins									

Harpuisbos									
Syringa berries									
Kraalbos, Geelbos								x	
Crotolaria									
Radish									
Carrot poisoning									
Onion poisoning									
Bracken fern									
Pollen beetle (*Astylus atromaculatus*)									
Water contamination									
Nitrate									
Urea	x			x	x	x			
Snake bite				x					
Moth cocoons (impaction)									
Blue green algae					x				
Copper									
Selenium									
Zinc									
Fluoride									
Lead									
Paraquat									
Phosamine									
Organophosphate									
Zinc phosphide									
Pyrethroid									
Amitraz									
Levamisole									
Ivermectin							x		
Tilmicosin									
Ionophor									
Hypo									

Beware when buying in animals or moving into rested grazing camps as they are the animals which usually eat toxic plants such as tulp and ink berries (*Cestrum*).

For further information on treatment of tulp and other poisonings visit:

www.landbou.com

Klik op Indeks van antwoorde

Klik op Beeste of Skape

Klik op Vergiftigings

Klik op die Opskrifte

Every month there are reports of urea poisoning. Be aware when feeding this product that the correct concentration is used and that the lick does not get wet!

Nutritional deficiencies

The following nutritional deficiencies were reported by practices in the provinces:

Deficiencies	MP	G	L	NW	FS	KZN	EC	WC	NC
Energy	x		x	x	x	x		x	x
Protein	x			x	x	x		x	x
Phosphate					x		x		x
Calcium		x		x	x	x	x	x	

Micro-nutritional deficiencies

The following micro-nutritional deficiencies were reported by practices in the provinces:

Deficiencies	MP	G	L	NW	FS	KZN	EC	WC	NC
Iodine									
Copper			x		x	x		x	
Zinc						x		x	
Selenium	x			x	x	x			x
Magnesium								x	
Manganese								x	
Vitamin A				x		x	x	x	x
Vitamin B 1						x			

There are antagonists such as calcium, iron and sulphur which hamper the uptake of micro-minerals. Have water and soil samples analysed to see what the levels of these antagonists are. Arrange with your veterinarian to have liver samples analysed to determine the status of these micro-minerals in your herd or flock.

Beware of fluoride poisoning as borehole water levels drop..

Supplement animals with vitamin A during drought conditions.

Multifactorial diseases and other conditions

The following conditions were reported by practices in the provinces

Multifactorial diseases and other conditions	MP	G	L	NW	FS	KZN	EC	WC	NC
Abortions	x	x		x	x	x	x	x	x
Stillbirths	x				x	x		x	
Abscesses	x	x	x	x	x	x	x	x	
Intestinal ulcers									
Bladder stones –urolithiasis					x			x	x
Blindness	x								
Bloat	x				x	x		x	
Blue udder				x	x	x	x	x	x
Diarrhoea	x	x	x	x	x	x		x	x
Epididymitis								x	

Eye cancer				x	x	x			
Eye infections	x	x	x	x	x	x	x	x	
Joint ill	x	x			x	x			
Lameness/foot problems	x	x	x	x	x	x	x	x	x
Lung infection	x	x	x	x	x	x	x	x	x
Mastitis	x	x		x	x	x	x	x	
Navel ill	x				x		x		
Red gut (sheep, torsion of gut)	x				x			x	
Rectal prolaps									
Trauma	x					x		x	
Teeth wear									
Plastic bags (ingestion)									
Downer	x	x			x			x	

Lung disease is one of the most prevalent diseases during the winter. There are excellent vaccines available and should be considered.

Discuss the origin, treatment and prevention of these diseases with your veterinarian

Metabolic diseases

The following diseases were reported by practices in the provinces:

Metabolic diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
Acidosis	x	x			x	x	x	x	
Displaced abomasums	x					x	x	x	
Ketosis (Domsiekte)					x		x	x	x
Milk fever		x		x	x	x		x	

Make sure that you adapt animals to feed containing concentrates.

Discuss the etiology, treatment and prevention of these diseases with your veterinarian.

Reproductive diseases

Reproductive diseases	MP	G	L	NW	FS	KZN	EC	WC	NC
Dystocia (difficult births)	x	x	x	x	x	x	x	x	x
Endometritis					x	x		x	
Hydrops									
Metritis	x			x	x	x		x	
Poor conception				x	x	x	x	x	x
Retained afterbirth	x		x	x	x	x		x	
Sheath prolaps						x			
Uterine prolaps	x		x		x	x		x	
Vaginal prolaps	x	x			x	x		x	
Penis injury									
Orchitis									

Environmental conditions

	MP	G	L	NW	FS	KZN	EC	WC	NC
Exposure to cold	x		x					x	
Frozen to death								x	
Heat stress									
Lightning									
Drought					x		x	x	x

Other conditions

	MP	G	L	NW	FS	KZN	EC	WC	NC
Drug residues (milk, meat, liver, kidney etc)									
Preditors		x			x				
Theft					x				x
Traumatic pericarditis (wire in fore stomachs)									
Trauma (fractures etc)		x							

In the CODE OF CONDUCT of the RPO the following standard operating procedures are documented. The local veterinarian should be your partner to help you achieve the necessary standards. http://www.rpo.co.za/BestPractices/English.aspx

PRECAUTIONARY MEASURES TO SUPPORT BIO-SECURITY.

Precautionary measures are required to protect the herd against diseases acquired because of external contact. The following categories are of concern:

1. DIRECT LIVESTOCK PURCHASES (and own animals returning):
The following should be ***verified*** before importing new animals into the herd:
How long animals have resided at the purchase or previous location?
Have there been any recent disease outbreaks in the location?
Do brand marks clearly confirm ownership?
Was a vaccination program followed (need paper or veterinarian proof). What are the local prevalent external parasites and the routinely implemented control program?
Is a veterinarian supported control program against transmittable diseases followed?
Dates and sufficient number of tests for reproductive diseases of both male and female
Dates and tests for zoonotic diseases
The above should also be verified with the purchaser's own veterinarian.

2. PURCHASES FROM SALES OR SPECULATORS
Purchase only in areas which are not in close proximity to scheduled areas
Visually inspect the animals before purchasing for:
* brand marks
* parasite infestation

3. TRANSPORT TO THE FARM

Use only reputable transporters
Has the truck been cleaned and disinfected?
Truck to follow the shortest uninterrupted route
Truck to take the shortest route to the handling facilities
Do not allow the truck personnel to get in contact with the farm herd

4. ARRIVAL ON THE FARM

Off-load the livestock to limit stress and to be visually evaluated for any unnatural conditions.
Isolate them from the farm herd and shared facilities for at least 21 days (quarantine)
Retest for diseases of concern if needed, before mixing with the rest of the herd
Process new arrivals within 24 hrs after arrival (unique ID tag brand, dip, dose, vaccinate)
Inspect regularly

5. FEED PURCHASES

Ensure bales of hay are sourced from areas that are not bordering scheduled areas
Purchase feed from reputable dealers only
Avoid buying feed in second hand bags
Ensure feed trucks are also disinfected and cleaned, especially if also used to transport animals to abattoirs

6. VISITORS

Do not allow strangers or their vehicles amongst the livestock
Ensure fences are well maintained and preferably jackal and warthog proof

7. EMPLOYEES

Do not allow the employees to eat in feed stores
Supply employees with sufficient ablution facilities
Regularly arrange to let employees be medicated for tape worm and have health check-ups
Keep record of all employee livestock on the property
Treat employee livestock with separate but dedicated health programs
Ensure employees understand the reason behind the implemented bio-security measures to help ensure compliance.

GENERAL AND REPRODUCTION MANAGEMENT

Record keeping: All animals are individually identified and recorded.
To prove ownership: All animals are marked with the registered brand mark according to the Animal Identification Act, No 6 of 2002.
A defined breeding season is the basis of effective management: The breeding season coincides with the rainy season, i.e. the period when nutritive value of the pasture is at its best.
Sufficient energy reserves in the herd as measured by condition scoring are vital, especially for effective breeding, and when inadequate the herd is supplemented in consultation with a nutritionist: Condition scoring of bulls and cows are regularly done, particularly at the onset of the breeding season and supplemented if necessary.
Bull - cow ratios are maintained: A ratio of 1 to 25 is maintained in every separate herd.
Fertility of breeding bulls: All breeding bulls are tested for mating ability and semen quality before the breeding season.
Sexually transferable diseases: Sheath washes or scrapes on bulls are performed annually.
Diseases that can cause poor conception, abortion or weak calves: Cows are vaccinated against such diseases in consultation with the veterinarian.

Breeding success monitored by a veterinarian: Rectal pregnancy or scan diagnosis is done by the veterinarian 8 weeks after the breeding season.
Twenty percent of cows or more not pregnant: Further tests are done to determine cause of low pregnancy rate.
Culling of non-pregnant cows: Non-pregnant cows are removed from the herd and considered a necessary bonus to supporting herd income.

HERD HEALTH AND BIO-SECURITY
Maintenance of herd health is key to a successful enterprise: A veterinarian should visit the farm bi-annually at least.
Calf mortality before 3 months of age is an important reason for poor weaning percentage: Good management practices are applied to limit early calf deaths.
Some diseases and parasites (internal and external) are more often encountered in specific areas: Annual vaccinations and a parasite control program should be applied according to regional requirements and in liaison with the veterinarian.
Farmers selling weaned calves to feedlots may want to have a market advantage compared to others: A specific vaccination program is applied before weaning for that purpose.
Herds may be at risk of being exposed to CA and TB: The herd is tested annually for CA and all heifers are vaccinated against CA between 4 and 8 months of age with an efficient, approved remedy. The herd is tested at least every 5 years for TB
Precautionary measures are required to prevent diseases being imported into the herd: A quarantine program to keep incoming animals separate is followed. All incoming animals have a suitable certificate of negative test results or are of a certified clean, closed herd.
Stock remedies and medicines should be registered, correctly stored and used before the transpire date: All medicines and stock remedies are registered, stored and applied according to prescription.
Prescribed medicines with a specific application are under the control of the veterinary profession: All prescription medicines are obtained and applied under prescription from a veterinarian.

Practices that had nothing to report

Bathurst – Dr. Jane Pistorius
Karino – Dr. Silke Pfitzer
Kareedouw – Dr. Martin Bootsma
Malmesbury – Dr. N.J. Heyns
Mooi River – Dr. Daniel Alexander
Newcastle – Dr. Barry Rafferty
Oudtshoorn – Dr. Glen Carlisle
Smithfield – Dr. Nienke von Hasselt
Trompsburg/Springfontein – Dr. Wyn Irwin
Vaalwater – Dr. Annemieke Müller
Vredenburg – Dr. Izak Rust
National Zoological Gardens – Dr. Emily Mitchell

Ostriches

Western Cape

Oudtshoorn – Ostrimed

Condition	Comments
Tapeworms	1
Biting and sucking lice	1
Poor doers	Slow growth rate/ mass gain – cold mornings hot day times, just too large fluctuations. Poor feed intake = poor growth increased problems
Upper respiratory problems	Few cases of sinusitis/rhinitis – winds and dust
Lung conditions	Dust, kraaled, stress, cold stress
Nutritional deficiencies	Drought – no roughage available – cheaper to feed concentrates such as maize than roughage. Lot of birds just to weak.
Selenium deficiency	1
Energy deficiency	Heat waves reduce feed intake considerably.
Acidosis	2
Cold	2 Very cold day or evenings. Older chicks which are not fully protected suffer most. Show poor intake, negative metabolic rate and long tail of mortalities

Equines

Lydenburg

Babesiosis -1

Gauteng

Muldersdrift

Gastrodiscus – 3

Limpopo

Mokopane

Screw-worm - 1

Eastern Cape

Humansdorp

Opthalmia – Severe infection in a donkey
Coli – 2 moderate cases in horses

Northern Cape

Colesberg

Ascaris – yearlings
Systemic fungal mycosis

Game

Gauteng

Pretoria

Brown ear-tick – 2
Bont tick - 1
Heartwater – 2
Lungs – 2
Abscesses - 2

Limpopo

Bela-Bela
Abscesses – 1 Hippo died
Snare – Warthog with snare around mouth
Rotten carcase – no diagnosis
Makhado - Lungs

Mokopane

Blue ticks - 1
Heartwater ticks – 1
Copper deficiency - 1

Polokwane

Intestinal roundworms – 3
Resistant roundworms – 3
Brown ear-tick – 1
Bont-legged tick -1
Coccidiosis – 1
Diarrhoea – 3
Abscesses – 1
Eye infection - 1
Capture myopathy – 1

North West

Klerksdorp

Protein deficiency – 2
Red-legged ticks - 2

Free State

Parys

Lungs - 1

KwaZulu-Natal

Pongola

Vitamin A deficiency – 1

Eastern Cape

Graaff-Reinet

Rabies – Bat eared jackal

Humansdorp
Malnutrition – 1 Drought - Wildebeest
Cold exposure – 8 Wildebeest died
Uitenhage
Clostridium perfringens A (Blood gut) - game

Western Cape
Wellington
Loss of weight and deaths – 3 Wireworm

Northern Cape
Colesberg
Theileriosis- Roan
Kuruman
Coccidiosis – 1 Young springbok
Rabies – 1 Confirmed in bat eared jackal
Upington
Protein deficiency

Monthly report on Livestock and Wildlife isolations for June 2017 from Vetdiagnostix –Microbiology Laboratory, supplied by dr. Marijke Henton

(henton@vetdx.co.za**)**

Enteritis in young ruminants was again common during May. Most [11/13] of the cases yielded *Cryptosporidium* as well as *E. coli* in calves [4] and lambs [7]; but one case in calves was only *E. coli*, and one in a lamb, only *Cryptosporidium*. *E. coli* strains need to be further characterized [serotyping is presently unavailable] to distinguish them from environmental strains of *E. coli*. In two cases from lambs, PCR tests showed that no virulence factors were present, and so the *E. coli* were certain to be environmental opportunists. Enteritis in a pig also yielded *E. coli*.

Respiratory disease in feedlot cattle yielded *Mannheimia haemolytica* [8], *Pasteurella multocida* [3], *Histophilus somni* [4], *Mycoplasma* [8], *Trueperella pyogenes* [2] and one each of *Mannheimia* biovar 9, *Pseudomonas aeruginosa* and *Staphylococcus pseudintermedius*. Respiratory disease in sheep was due to *M. haemolytica* in one case, and the anaerobe, *Prevotella* in another.

There were two cases of *Salmonella* Dublin in calves.

An abscess in a bovine yielded *T. pyogenes*, and a lung abscess *Mycoplasma*. One abscess in a sheep yielded *Corynebacterium pseudotuberculosis* and the secondary invader *Pseudomonas aeruginosa*, and the other *Actinobacillus lignieresii*. *A. lignieresii* causes Wooden Tongue and sporadic abscesses in the head and neck area of ruminants. Bovine mastitis was caused by *Streptococcus uberis, Actinomyces*, *Nocardia, Enterobacter* and a methicillin resistant *Staphylococcus pseudintermedius*.

Dermatophilus congolensis [Senkobo disease] was isolated from a bovine skin.

Clostridial myositis was associated with *C. chauvoei* and *C. septicum*, and a third case was positive for *C. novyi, C. septicum* and *C. sordellii*, which made the case more likely the result of putrefaction than disease.

Streptococcus zooepidemicus and *S. dysgalactiae* [was *S. equisimilis*] were isolated from various conditions in horses; abscess [1], respiratory tract [1], nasal discharge [2], eye [1] and an infected wound. Other wound infections yielded *Staphylococcus aureus, Actinobacillus equuli*, *Porphyromonas* and two cases of *Actinomyces. E. coli* and *Enterococcus* were isolated from joint infections.

Salmonella Typhimurium was isolated from the liver of a serval, and *Pasteurella multocida* from the liver of a cheetah. A roan abscess yielded *T. pyogenes* and *S. aureus* was isolated from the uterus of a sable. A rhino with a respiratory infection yielded *Klebsiella pneumoniae*, and another rhino *S. dysgalactiae* from the uterus. A cheetah with enteritis yielded an Extended Spectrum Beta Lactamase *E. coli* isolate, which means that the isolate was resistant to all penicillins and cephalosporins. A lion had ringworm due to *Trichophyton mentagrophytes*.

Feedlot report received from Drs. Shaun Morris, Eben du Preez and Pierre Jansen Van Vuuren for July 2017 (edupreez1@telkomsa.net)

Sheep Feedlots:

Relative healthy period experienced with few cases of pulpy kidney, pneumonia, eye infection, Trueperella pyogenes abscesses and lameness mostly due to injury.

In the abattoirs lung lesions, Corynebacterium ovis abscessation, Trueperella pyogenes abscesses in lungs, liver abscesses and trimming of livers due to migration tracts in livers, Stilezia hepatica in bile ducts and occasional localized white spots on kidneys.

Cattle feedlots:

Pneumonia caused many morbidities and mortalities. Dust plays major role in this condition. Acute Interstitial Pneumonia caused acute mortalities in cattle close to finishing and is associated with dust and digestive problems. Calves that die from pneumonia within 10 days of arrival usually arrive with lung lesions and abscesses. They actually got sick while on the farms with the cows. Vaccinating calves against BRD before weaning will prevent most of these losses. This vaccination can occur together with vaccinating against the Clostridial diseases at 4 months of age. Calves can also be protected during the first 4 months after birth if the cows are vaccinated within a month or two before calving.

Acidosis in acute and subacute form also cause losses either by mortality or increased disease due to the effect on the immune system and economic losses due to reduced growth. Red gut is associated with more acute acidosis and cause acute deaths.

Few cases of Black quarter was seen.

Injuries mostly caused by animals playing and riding.

Few Rectal prolapses occurred.

At abattoirs many cases of *Parafilaria* infestation and cysticercosis were seen.

Feedlot report received from Dr. Andy Hentzen for July 2017 (andyvet@mweb.co.za)

Condition	Comments and Specie
Cysticercosis	B3
Blue ticks	B 3
Biting lice	B 2
African red water	B3
Asiatic red water	B3
Anaplasmosis	B2
Blackleg	B2
Red gut	B 3
Ringworm	B 2
BVD	B 2
IBR	B 3
Orf	O 2
Protein deficiency	B 2
Energy	B2
Lameness	B3
Lungs	B3
Diarrhoea	B3
Opthalmia	B 3
Abscesses	B,C 3

Monthly report for July 2017 from Dr R D Last (BVSc; M.Med.Vet(Path); MRCVS)

Specialist Veterinary Pathologist, Vetdiagnostix - Veterinary Pathology Services

Contributors
Mr Butch Bosch, Ms Ntando Magoso, Mrs Beverley Williams, Ms Nicole Genga, Dr Rick Last

LIVESTOCK DISEASE SURVEILANCE			
LIVESTOCK SPECIES	DISEASE AGENT	NO. CASES	LOCATION
Bovine, Aborted foetus	Bovine Herpes virus (IBR) abortion	1	Mooi River, KZN

Ovine, Lamb	*Mannheimia haemolytica* pleuropneumonia	1	Greylingsrust, Free State
Bovine, Beef Weaner	*Pasteurella multocida* bronchopneumonia	1	Kokstad, KZN
Bovine, Beef Cows	Stootsiekte - Cotula/Matricaria poisoning	1	Bergville, KZN
Bovine, Calf 3 months	Mycotic rumenitis	1	Estcourt, KZN
Ovine, Lamb 2 months	White muscle disease	1	Underberg, KZN
Bovine, Holstein Heifers	Citrus pulp poisoning	1	Humansdorp, E Cape
Ovine, Lamb	Listeriosis	1	Porteville, W Cape
Bovine, Adult Cow	Lumpy skin disease	1	Port Edward, KZN
Bovine, Dairy calf	Salmonellosis	1	Ixopo, KZN
Bovine, Steer	*Babesia bovis*	1	Mtunzini, KZN
Bovine, Aborted fetus	*Salmonella* Dublin abortion	1	Creighton, KZN
Bovine, Calf 3 days	*Cryptosporidium*	1	Estcourt, KZN
Bovine, Calf 4 days	*Cryptosporidium*	1	Humansdorp, E Cape
Bovine, Aborted foetus	Bovine Herpes virus (IBR) abortion	1	Kokstad, KZN
Bovine, Heifer	Chronic seneciosis	1	Caledon, W Cape

WILDLIFE DISEASE SURVEILANCE – 2017			
WILDLIFE SPECIES	**DISEASE AGENT**	**NO. CASES**	**LOCATION**
Njala, Cow	Mycobacterial pneumonia	1	Tzaneen, Polokwane
Rhino, Calf	Middelburg Virus	1	Umfolozi, KZN
Rhino, Calf 2 weeks	*Salmonella arizonae* navel-ill	1	Nelspruit. Mpumalanga
Njala, Sub-adult Male	Malformation left AV valve, capture heart failure	1	Brits, Gauteng
Kudu, Adult Bull	Transport tetany	1	Queenstown, E Cape
Zebra, Adult Mare	Aspiration pneumonia	1	Ugie, E Cape
Wildebeest, Adult Cow	Sarcoptic mange	1	Thabazimbi, Limpopo
Rhino, Cow	Ulcerative gastritis with bacterial endotoxaemia	1	Amakhala, E Cape
Sable, Calf	Theileriosis	1	Thabazimbi, Limpopo
Roan, Calf	Theileriosis	1	Thabazimbi, Limpopo
Buffalo, Aborted Fetus	Hyperplastic goitre	1	Port Elizabeth, Eastern Cape

Monthly report for July 2017 from Queenstown Provincial Veterinary Laboratory as supplied by Dr. A.D. Fisher (alan.fisher@drdar.gov.za)

Condition	Area	Comments and Specie

Intestinal roundworms		O 3 – Wireworm and bankruptworms
Lungworm		G 1 - Springbok
Tapeworms		O,C 2 – Taenia multiceps (malkop)
Asiatic red water	Hogsback	B 2
Heartwater	Mthatha, Cofimvaba	B 2
Lumpy skin disease	Cofimvaba	B 2
Brucellosis	Cofimvaba	B 1
Lam dysentry		O 1
E. coli	Lady Frere Cofimvaba	Dairy cows 2
Septic pericarditis		
Rabies	Lusikisiki Mthatha Molteno Cofimvaba Tsolo Sterkspruit Qunu Sterkstroom	Canine 1 case Canine 2 cases Canine 1 case Ovine 1 case Ovine 2 cases Bovine 1 case Bovine 1 case Caracal
Enzootic bovine leucosis (EBL)	Queenstown	Dairy cow – 1
Suspected salt poisoning		O 2
Methamidiphos poisoning	Whittlesea	Avian and C – 1
Energy deficiency		O 3
Domsiekte		O 3

Rabies:Large outbreak (canine associated) continues in Eastern areas of E Cape (former Transkei) and KZN. Two human cases.

New outbreak (Molteno / Sterkstroom) thought to be mongoose associated.

Brucellosis: Communal farming area Cofimvaba – 1 positive in herd (CFT 784). Morbidity is almost always **low** in communal areas – suspected to be due to sparse pasture and exposure of bacteria to sunlight / dessication

Ketosis (Domsiekte): Good late mid to late summer resulted in abnormally high twinning in communal sheep flocks and fat ewes. Harsh winter and overgrazing resulted in ketosis. Not

often seen in communal flocks as sheep are usually too thin.
Cold exposure: Large numbers of lambs and kids died of cachexia / exposure in communal farming areas – lambed in June / July onto very poor winter grazing without sufficient supplementation to ewes. July was very cold. Mating and lambing seasons largely determined by rainfall and not planned mating.

B – bovine; O – ovine; C – caprine; P – pigs; G – game

1 = one case; 2 = 2 to 9 cases; 3 = more than 10 cases

Monthly report for July 2017 from Dr. Lucy Lange: PathCare Vetlab

(lange@pathcare.co.za)

Disease condition	Specie
Brucellosis	**Cattle**
Pnemonia (also foreign body)	**Cattle**
Campylobacter	**Cattle**
Tritrichomonas	**Cattle**
Salmonella	**Cattle**
BMC (Snotsiekte)	**Cattle**
***Candida* & Necrotic placentitis**	**Cattle**
Liver necrosis	**Cattle**
Embolic bacterial nephritis	**Cattle**
Ulcerative abomasitis	**Cattle**
Squamous cell carcinoma	**Horses**
Sarcoid	**Horses**
Pneumonia	**Sheep**
Pulpy kidney	**Sheep**
CCN	**Sheep**
Colibacillosis	**Sheep**
Purulent glomerulonephritis	**Sheep**
Embolic bacterial nephritis	**Sheep**
Septicaemia	**Sheep**
Cryptosporidiosis	**Sheep**
Coccidiosis	**Boer goats**
Pulpy kidney	**Boer goats**
Bakterial meningitis	**Boer goats**

Game:	
Capture myopathy	**Springbok, Gemsbok, buffalo**
Liver necrosis	**Gemsbok**
Ulcerative abomasitis	**Sable**
Hypoproteinaemia	**Buffalo**
Theileriosis	**Reedbuck**
Enterotoxaemia	**Eland, Roan**

Monthly report on Livestock and Wildlife isolations for July 2017 from IDEXX Laboratories supplied by dr. Liza du Plessis (Liza-DuPlessis@idexx.com)

Condition	Comments and Specie
Blackquarter	G 1
Salmonellosis	B 1
E. coli	O 1
Enzootic abortion	O,C 2
Coccidiosis	O 1
BMC (snotsiekte)	B 2
Equine sarcoid	E 2
Protein/Energy malnutrition	G 2
Abortion	B,O,C,G 2
Lungs	B,O,G 2
Diarrhoea	B,O 2
Ink berry toxicity	B 2
Cold exposure	G 2

For the full report visit www.ruvasa.co.za and click on Disease reports