

Brucellosis & Tuberculosis

A VERY REAL THREAT TO LIVESTOCK AND HUMANS



agriculture, land reform
& rural development

Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

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Contents

- Definitions for brucellosis and tuberculosis
- Legislation
- Spread of disease between animals
- Clinical signs in animals
- Disease control actions to be taken (positive herd)
- Zoonosis (humans)
- Prevention & biosecurity
- Further reading

What is the fuss?

- ✓ **Bovine brucellosis** and **bovine tuberculosis** are erosive diseases that primarily affect cattle, but can also affect other livestock, wildlife and humans.
- ✓ Brucellosis and tuberculosis **occur widely** across South Africa.
- ✓ Brucellosis and tuberculosis are both **controlled animal diseases** under the Animal Diseases Act (Act No. 35 of 1984).



Definitions

Bovine brucellosis = caused by *Brucella abortus* bacteria, primarily affects cattle

Caprine brucellosis = caused by *Brucella melitenis* bacteria, primarily affects goats (and sheep)

Bovine tuberculosis = caused by *Mycobacterium bovis* bacteria, primarily affects cattle



Legislation for animal health

Animal Diseases Act (Act No.35 of 1984) as amended

Animal Diseases Regulations (R. 2026 of 1986) as amended

ACT

To provide for the control of animal diseases and parasites, for measures to promote animal health, and for matters connected therewith.

*(English text signed by the State President.)
(Assented to 20 March 1984.)*



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Why are some diseases “Controlled/ Notifiable Diseases”?

- Certain diseases require strict government control because they not only affect individual animal owners but also pose serious risks to other farmers or consumers of animal products and some may even, through their negative impact on trade, compromise the agricultural sector as a whole.
- Thus, the following criteria are proposed for the definition of controlled animal diseases, subject to compliance with at least three of the following five risk factors:

Why are some diseases “ Controlled/ Notifiable Diseases”?

- a) **Zoonosis**: The disease is transmissible to and able to cause disease in humans.
- b) **Rapid spread**: The disease is highly transmissible and has the potential for rapid spread, independent of the actual movement of diseased animals and irrespective of farm boundaries.
- c) **Collective control**: The disease is more effectively managed by collective control strategies than by the efforts of an individual animal owner.
- d) **Threat to industry**: The disease poses a potential serious threat to the performance of the agricultural industry if the current epidemiological and geographic distribution status in South Africa changes.
- e) **Trade sensitive**: The disease can be regarded as a highly trade sensitive issue and poses a potential serious threat to South Africa’s international trading status.

According to the provisions of the present legislation, ‘any animal disease ... which is not indigenous or native to the Republic’ is included automatically in the list of controlled animal diseases.



Controlled & Notifiable Diseases list



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LIST OF CONTROLLED AND NOTIFIABLE ANIMAL DISEASES IN TERMS OF THE ANIMAL DISEASES ACT, 1984 (ACT NO. 35 OF 1984)

Controlled Animal Diseases

- Any animal disease or infectious agent that is not known to occur in South Africa
- African horse sickness (AHS)
- African swine fever (ASF)
- Anthrax
- Aujeszky's disease
- Avian influenza
- Bacterial kidney disease (in fish)
- Bovine contagious pleuropneumonia (CBPP)
- Bovine spongiform encephalopathy (BSE)
- Brucellosis (*B. abortus*, *B. melitensis*, *B. canis*, *B. suis*)
- Classical swine fever (CSF)
- Contagious equine metritis (CEM)
- Contagious hematopoietic necrosis (in fish)
- Contagious pancreatic necrosis (in fish)
- Corridor or Buffalo disease
- Dourine
- East Coast fever
- Equine infectious anaemia (EIA)
- Equine influenza (EI)
- Equine viral arteritis (EVA)

Notifiable Animal Diseases

- Bovine malignant catarrhal fever (Snotsiekte)
- Bluetongue
- Lumpy skin disease
- Rift Valley fever
- Strangles
- Swine erysipelas

continued...

- Foot and mouth disease (FMD)
- Glanders
- Haemorrhagic septicaemia (in fish)
- Johne's disease
- Koi herpes virus disease
- Nagana (Trypanosomiasis)
- Newcastle disease
- Porcine reproductive and respiratory syndrome (PRRS)
- Psittacosis
- Rabies
- Rinderpest
- Salmonella Enteritidis
- Salmonella Gallinarum (Fowl typhoid)
- Salmonella Pullorum (Bacillary white diarrhoea)
- Scrapie
- Sheep scab
- Skin conditions in sheep
- Swine vesicular disease
- Tuberculosis (in all animal species)



Dr Mpho Maja
DIRECTOR OF ANIMAL HEALTH

Date: 2018 -10- 17

Available at:

<https://www.dalrrd.gov.za/Branches/Agricultural-Production-Health-Food-Safety/Animal-Health/disease-control/list>

Current specific BR & TB legislation

- Table 2 of the Animal Diseases Regulations (R.2026 of 1986)
- Bovine Brucellosis Scheme R.2483 of 9 Dec 1988
- Bovine Tuberculosis Scheme R.1953 of 30 Sep 1988

- Manual for tuberculosis in cattle (Sep 2016)
Manual for brucellosis in cattle (Sep 2016)
**disease details, diagnostics, epidemiology and control*
- Tuberculosis testing in sheep and goats manual
- *Brucella melitensis* VPN



Animal Diseases Regulations (R.2026 of 1986) - Table 2

Brucellosis (covers *B. abortus*, *B. melitensis*, *B. canis* and *B. suis*)

Controlled veterinary act to be performed in respect of-		
Susceptible animals	Contact animals	Infected animals
<ol style="list-style-type: none"> All heifers between the ages of 4 and 8 months in the Republic shall be immunised once with an efficient remedy by the responsible person No bovine above the age of 8 months shall be immunised against Brucellosis without the written consent of the responsible State Veterinarian Susceptible animals may be tested by an officer, an authorised person or a veterinarian Sheep and she-goat lambs may be immunised with an efficient remedy at weaning age by the responsible person 	<p>Contact animals shall be isolated and tested by an officer or an authorised person, and all bovines reacting negatively, may with the written consent of the responsible State Veterinarian be immunised with an efficient remedy under the supervision of or by an officer or an authorised person</p>	<ol style="list-style-type: none"> Infected cattle shall be marked as contemplated in regulation 29, isolated and may only be removed from isolation for slaughter purposes. Infected sheep, goats, pigs and dogs shall be destroyed under supervision of or by an officer or authorised person or otherwise disposed of in the manner determined by the director.



Animal Diseases Regulations (R.2026 of 1986) - Table 2

Tuberculosis (*M. bovis*, *M. tuberculosis*)

Controlled veterinary act to be performed in respect of-		
Susceptible animals	Contact animals	Infected animals
<p>1. Susceptible animals may be tested by an officer, authorised person or veterinarian</p>	<p>Contact animals shall be isolated and be tested by an officer, authorised person or veterinarian</p>	<p>1. Infected animals shall be marked as contemplated in regulation 29 isolated and be slaughtered in the manner determined by the responsible State Veterinarian: Provided that the director may in a particular case approve that specific contaminated animals may be treated with an efficient remedy</p>



Bovine brucellosis

- Bovine (cattle) brucellosis is a chronic bacterial disease - Causes abortions, as well as decreased reproduction and production rates (caused by *Brucella abortus*).
- Chronic cases, may see hygromas
- Mainly affects cattle, also sheep & goats, but all mammals susceptible
- No effective treatment – slaughter
- Zoonosis (can infect humans)
- **Cattle are curious creatures!** →



Bovine brucellosis

Infected cows shed the Brucella organism via:

- Birth fluids & birth materials, vaginal discharges (abortion and normal birth)
 - Milk
 - Bulls can shed the organism in their semen
-
- Bacteria contracted through ingestion, mucous membranes (and artificial insemination)
 - *The organism can survive several weeks in cool, damp conditions in the environment (NB micro-environments!)*



Bovine brucellosis complexity

- It is a herd disease
- Infected herd - cattle that test negative may still be incubating the disease
- Short to long incubation period
- **Cattle may look healthy**
- Do not always see an abortion storm in infected herds

- **Highlights the importance of testing the whole HERD to determine the brucellosis status**



Bovine brucellosis



Image source:
<https://www.farmersweekly.co.za/animals/cattle/brucellosis-in-cattle/>

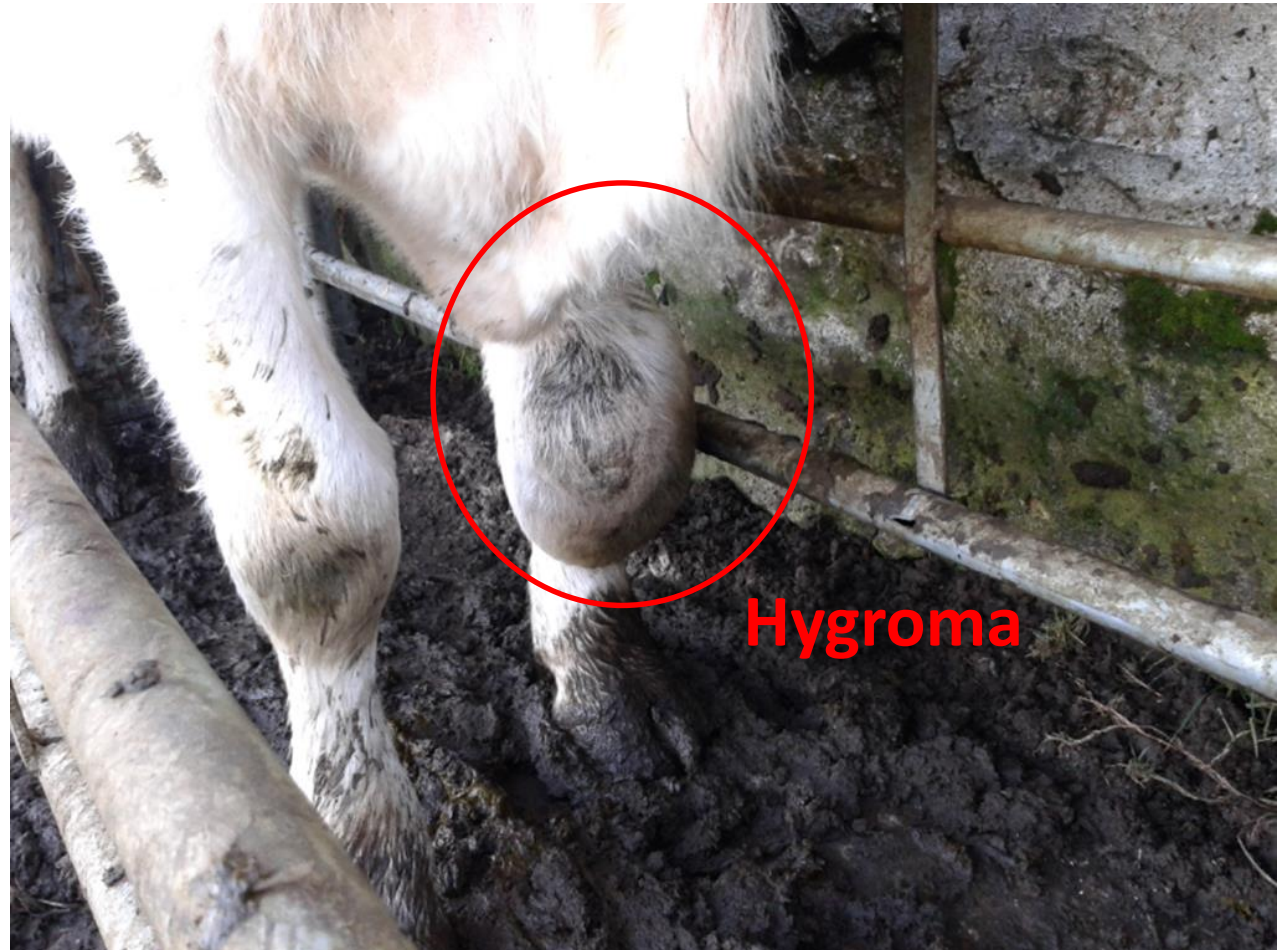


Photo courtesy of WCP Vet Services



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*Caprine brucellosis

- Caprine (goat) brucellosis - Causes similar disease (but is caused by *Brucella melitensis*)
- Mainly affects goats, also sheep & cattle, but all mammals susceptible
- No effective treatment in animals – slaughter
- Zoonosis – worse disease in humans than bovine brucellosis
- Only isolated cases in RSA



Remember – sheep and goats can also get bovine brucellosis!

Remember

- *Brucella abortus* is widespread across RSA
- *Brucella melitensis* – only isolated cases have been reported
- Cattle can get *B. melitensis* and goats/ sheep can get *B. abortus*
- If serological reactors are picked up during brucellosis testing, samples need to be collected from slaughtered animals for **culture** (to identify and confirm the exact *Brucella spp.* involved)



Bovine tuberculosis

- Bovine tuberculosis is a chronic bacterial disease – Causes deterioration, decreased production rates and eventually death (caused by *Mycobacterium bovis*)
- Cattle, livestock and wildlife can be affected, all vertebrates susceptible
- Bacteria shed from infected cattle mainly in respiratory secretions & potentially milk (depending on organ system affected)
- Treatment (INH) no longer allowed in cattle – slaughter
- Long incubation period & disease course
- Herd disease
- Zoonosis (can infect humans)



Bovine tuberculosis

Infected cattle shed the tuberculosis organism via:

- Respiratory secretions
- Milk

- Bacteria contracted through inhalation (close, confined contact), ingestion of contaminated feed, mucous membranes
- *The organism can survive several weeks in cool, damp conditions in the environment (NB micro-environments!)*



Bovine tuberculosis complexity

- It is a herd disease
- Infected herd - cattle that test negative may still be incubating the disease
- Usually long incubation period
- **Cattle may look healthy**
- Do not always see thin, coughing animals in infected herds
- **Highlights the importance of testing the whole HERD to determine the tuberculosis status**



**Do these cattle look healthy?
Would you advise buying
them?**

Brucellosis positive herd



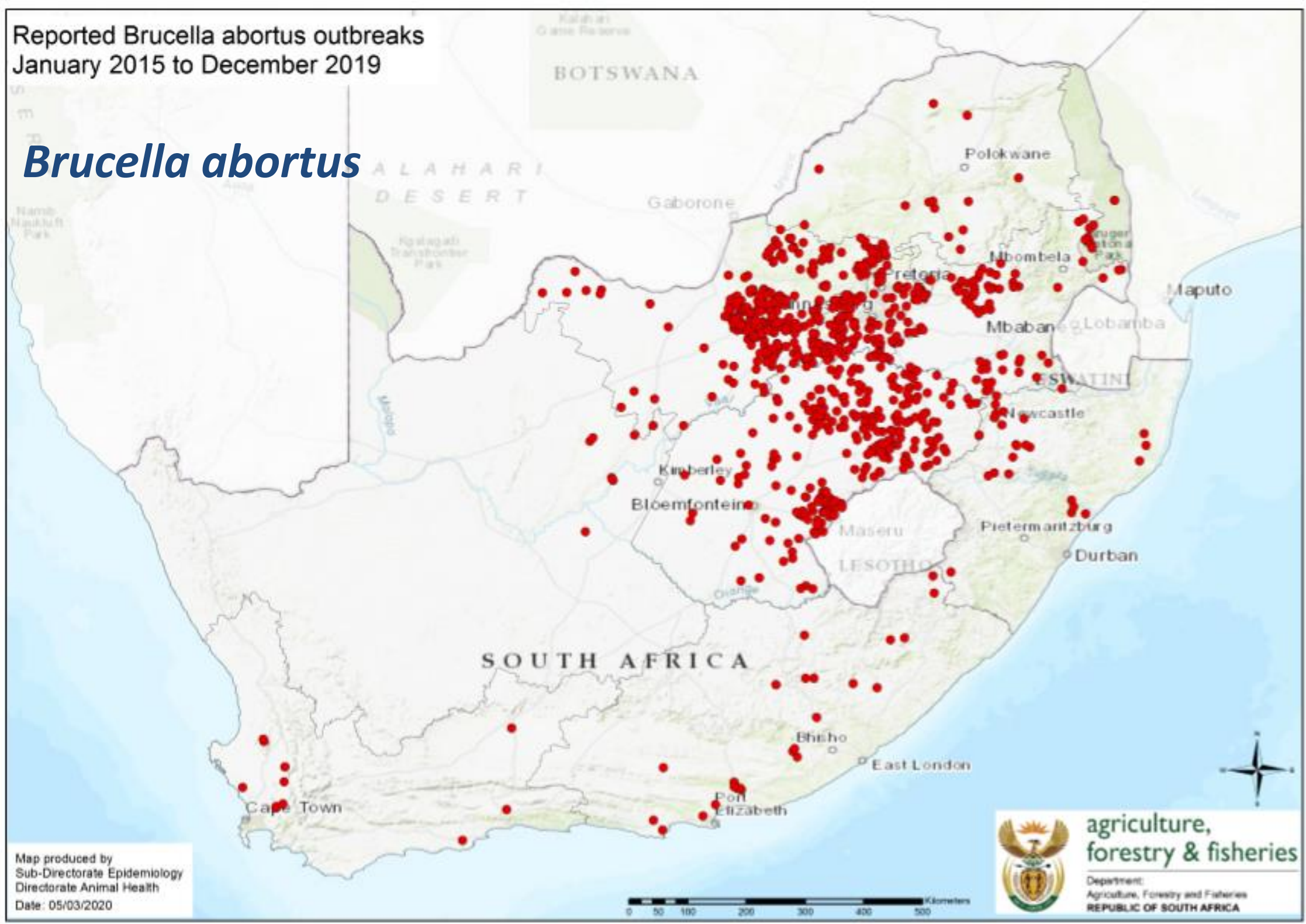
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Photo courtesy of WCP Vet Services

Reported *Brucella abortus* outbreaks
January 2015 to December 2019

Brucella abortus



Map produced by
Sub-Directorate Epidemiology
Directorate Animal Health
Date: 05/03/2020



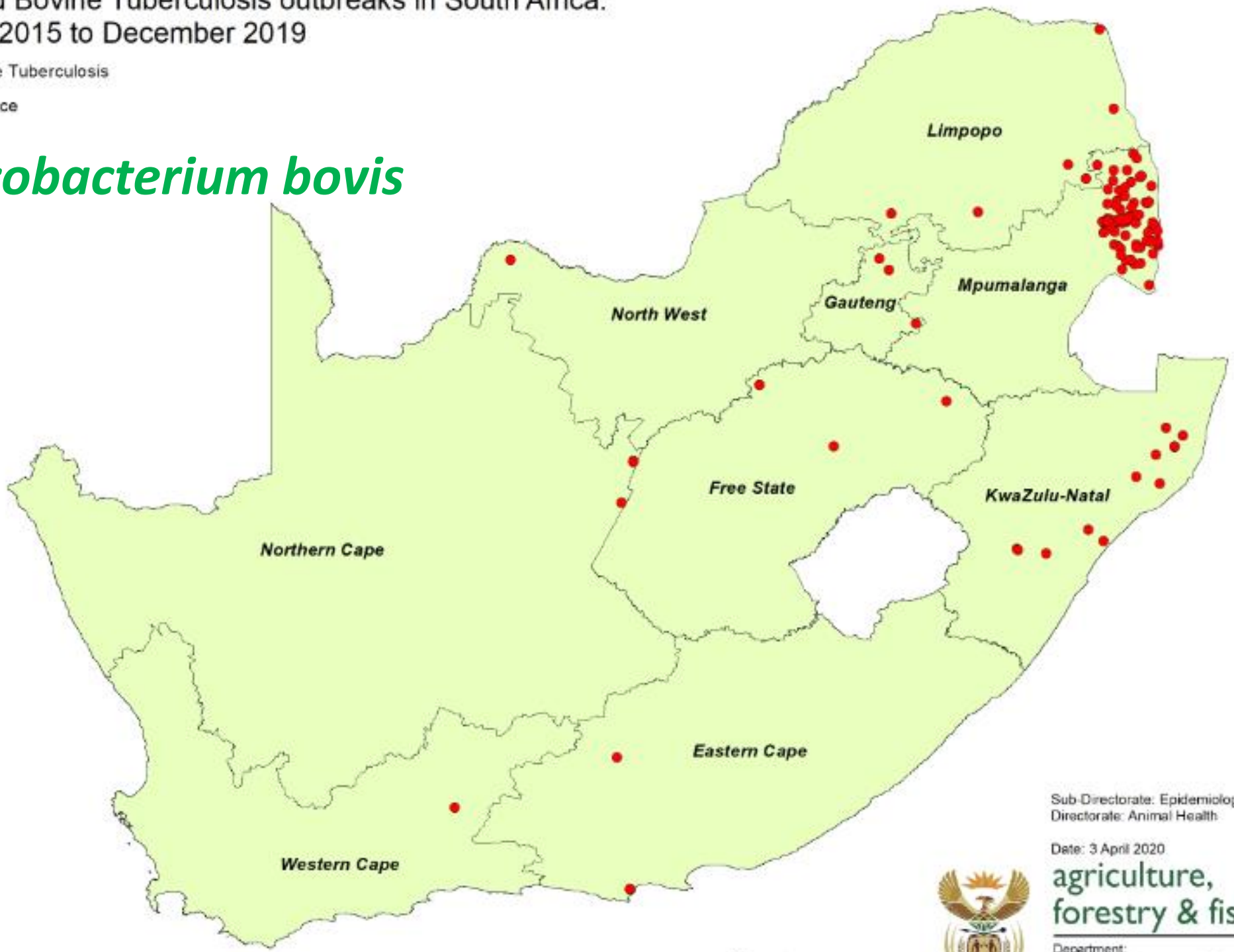
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Reported Bovine Tuberculosis outbreaks in South Africa:
January 2015 to December 2019

- Bovine Tuberculosis
- Province

Mycobacterium bovis



Sub-Directorate: Epidemiology
Directorate: Animal Health

Date: 3 April 2020

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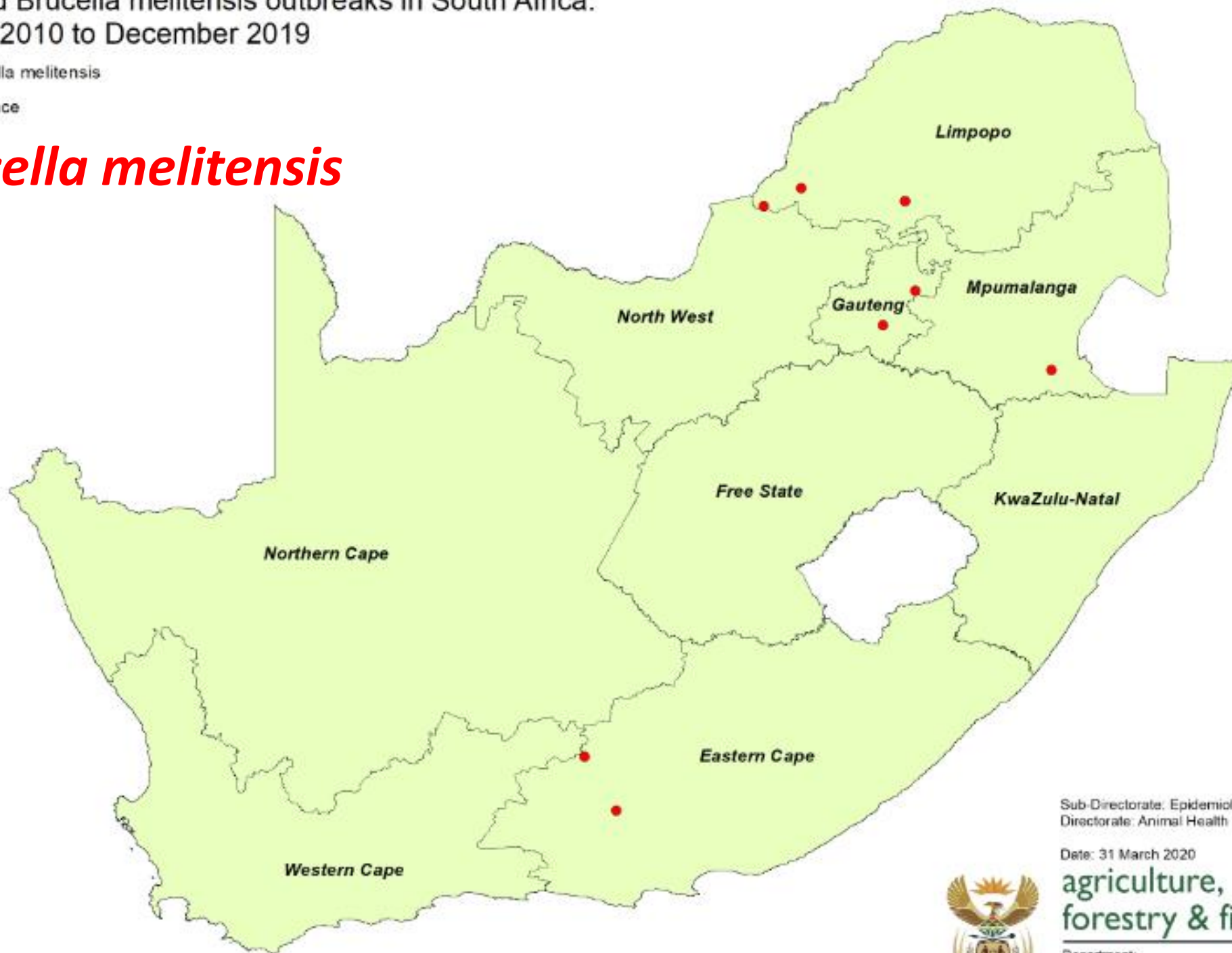
0 62,5 125 250 375 500 Kilometers

Reported *Brucella melitensis* outbreaks in South Africa:
January 2010 to December 2019

● *Brucella melitensis*

■ Province

Brucella melitensis



Sub-Directorate: Epidemiology
Directorate: Animal Health

Date: 31 March 2020

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0 62,5 125 250 375 500 Kilometers

Farmers' responsibility

Section 11 of Animal Diseases Act

Duties of Owners and Managers regarding Health of Animals

- The owner of the animals' responsibility to prevent disease in their animals and to prevent the spread thereof to others (i.e. collective responsibility)
- Know the disease status of your herd
- Insist on buying negative cattle (with proof of regular herd testing for brucellosis and tuberculosis)



Testing Interval for maintenance

Note: BR test interval = 2 months, TB = 3 months. If you are testing for both, do 3 months

- If 1st test neg → Retest after 2-3 months
- If 2nd test neg → BR3/ TB3 declaration
- Owners account up to here
- Annual re-testing on owners account if does not qualify on MRT's (monthly Milk Ring Tests) for BR
- Bi-annual re-testing for TB



BR3 (old CA3)/ TB3 certificate

Note: Not a guarantee...

**Only states last date
of negative test**

Should test whole herd
eligible for testing
(>12 months TB)
(>18 months BR)

BEWYS VAN NEGATIEWE TUBERKULOSE EN/OF BRUCELLOSE TOETSE
CONFIRMATION OF NEGATIVE TUBERCULOSIS AND/OR BRUCellosIS TESTS

CA3

Hiermee word verklaar dat die beeskudde van
This serves to confirm that the herd belonging to

posadres
postal address

op die plaas
on the farm

onderwerp is aan die standaard toetse vir ondergenoemde siekte op die datums aangedui, met negatiewe resultate:
was subjected to the standard tests for the undermentioned disease on the dates indicated, with negative results:

		Datum/Date	Aantal/Number
TUBERKULOSE TUBERCULOSIS	1. Jongste toets/Last test	2003-09-08	875
	2. Vorige toets/Previous test	2002-10-31	564
BRUCELLOSE BRUCellosIS	1. Jongste toets/Last test <i>Melkringtoets</i>	2004-11-30	588
	2. Vorige toets/Previous test	2003-06-09	588

Aantal beeste in kudde ± 1 000 Ras FRIES
Number of cattle in herd Breed

Kudde is geslote / nie geslote* (*skrap wat nie van toepassing is nie)
Herd is closed / not closed* (*delete that which is not applicable)

DR SC DAVEY
STAATSVEEARTS: Malmesbury

Datum: 29 November 2004



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LANDBOU-ONTWIKKELINGSENTRA / AGRICULTURAL DEVELOPMENT CENTRES:
ELS ENBURG • GEORGE • MOORREESBURG • OUDTSHOORN • VREDENDAL

Infected Herds

- Any herds which tested positive automatically join this program
- That herd is now under quarantine and state veterinary control

Herd regarded as positive:

- Blood test serology (BR), tuberculin skin test (TB)
- Culture (prove 100% which organism is involved)
- Official testing of infected herd through SV/AHT, also quarantine, permits (movement control, slaughter)
- **All suspect and confirmed BR/TB cases have to be reported to the local State Vet Office!!**



(Test intervals for infected herds)

- Separate positive and negative reactors
- Positive reactors need to be removed from the herd (slaughter)
- Keep on testing the “negative” group as per guidelines (they may be incubating the disease)
- It takes months to years to “clean” the herd from TB or BR!

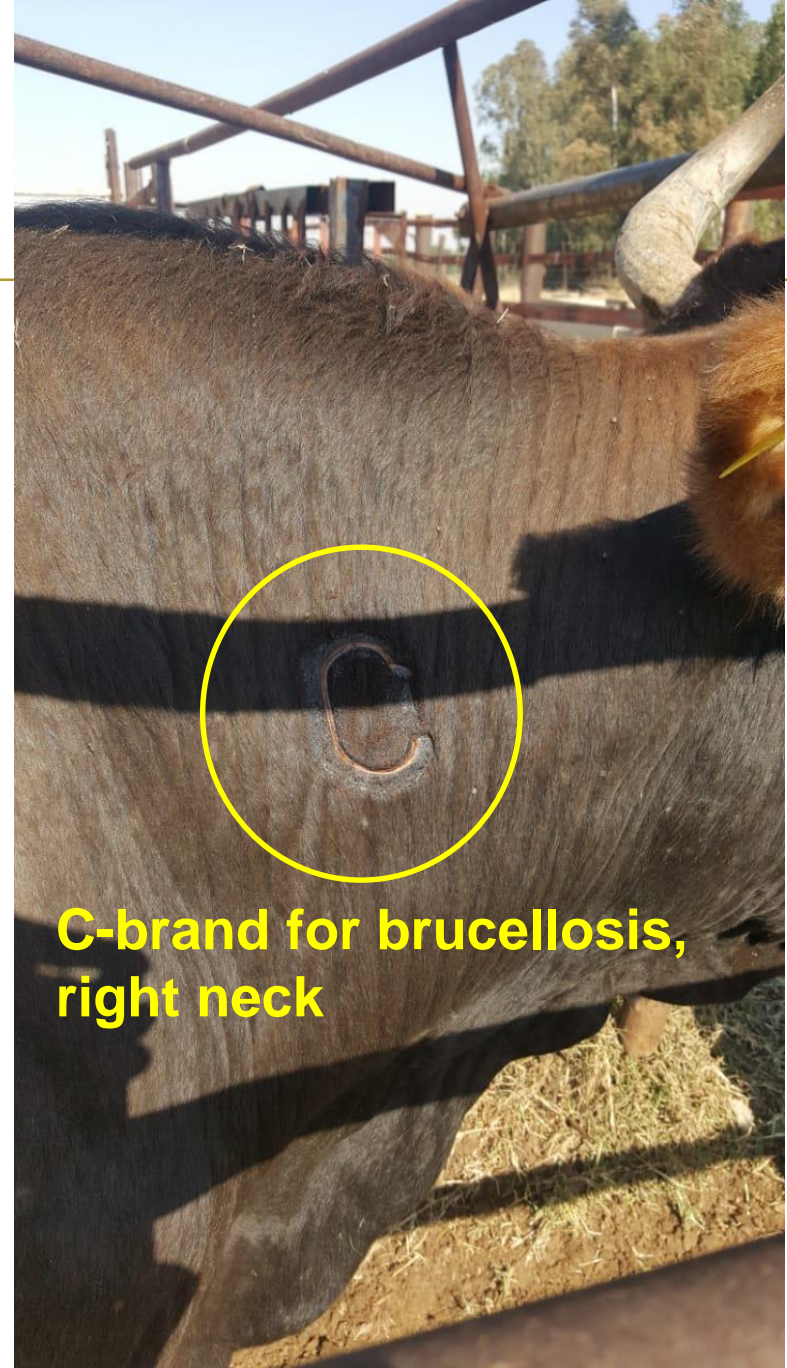
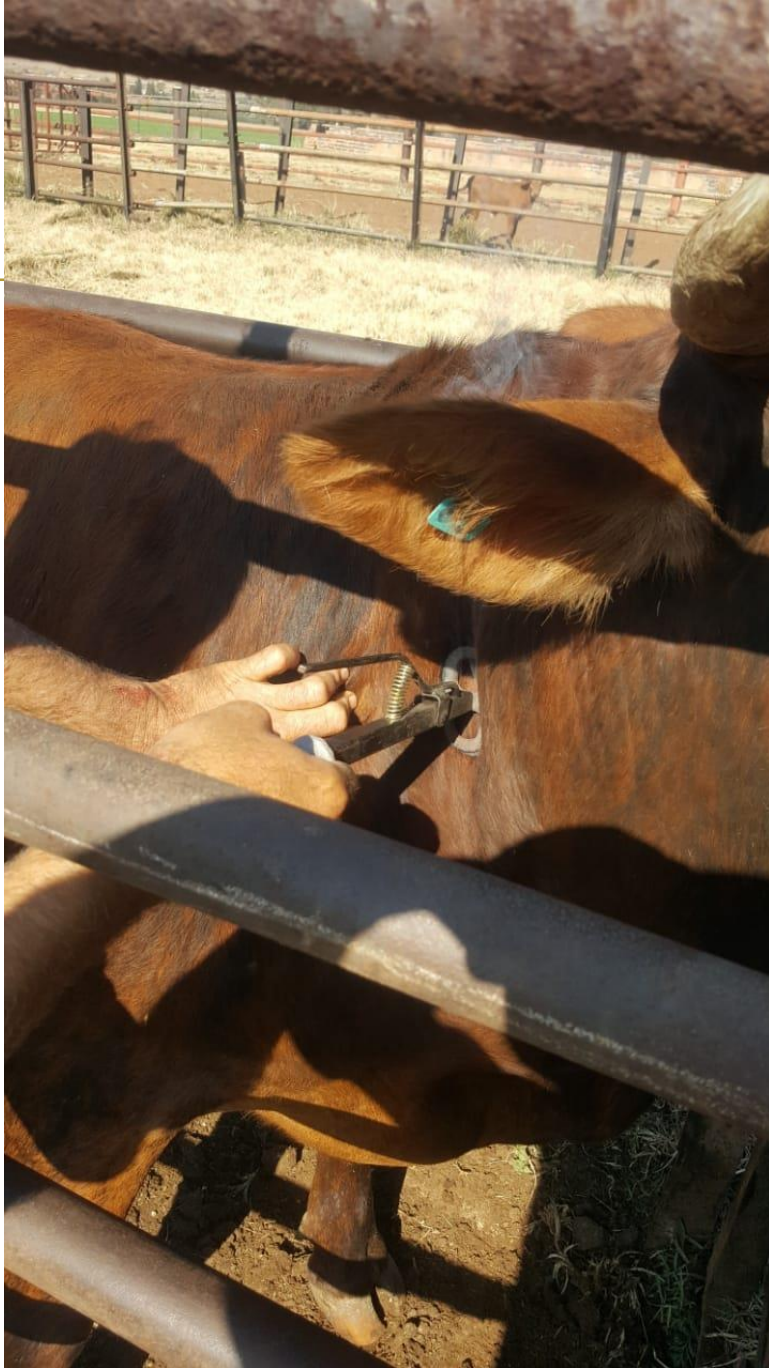


Actions taken (infected herds)

Positive BR serology or TB skin test - **Report to State Vet**

- Branding of all reactors (**C** [right] or **T** [left] side of neck)
- Individual identification...
- Install quarantine (movement control)
- Inform farmers (and neighbours)
- Consequences/ impacts
- Cows and heifers important (BR)
- Bulls and oxen
- Epidemiological investigation, incl. Trace back and trace forward





**C-brand for brucellosis,
right neck**



Why C and T brand infected cattle?

- To protect other farmers from buying these animals unknowingly!
- To warn and protect abattoir workers!



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Image: Limpopo Veterinary Services

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Dealing with reactors

- Slaughter immediately
- Movement to abattoir under cover of Red-Cross permit (SV!)
- Arrange movement with abattoir

Slaughter delay:

- High quality animals
- High % infection rate
- Large numbers of animals
- Calving, lactation
- Maximum for 12 months
- Must isolate these animals
- Prevent conception
- Vaccinate with RB51 (BR)



Dealing with reactors


- **At abattoir - Take relevant samples for culture! (state vet)**
- **TB vs BR samples?**
- **NB if slaughtering delayed – ideally do not allow a pregnant BR positive cow to calve on the farm...or keep in strict isolation... why?**
- **Millions of bacteria are released!**



RCP

- Cattle:
To abattoir only!

G.P.S. 013-9213 AGR 06/053

	Verwysing Reference <input style="width: 80%;" type="text"/>
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REPUBLIC OF SOUTH AFRICA • REPUBLIEK VAN SUID-AFRIKA
DEPARTEMENT VAN LANDBOU
DEPARTMENT OF AGRICULTURE

PERMIT VIR VERVOER VAN DIERE/DIERLIKE PRODUKTE
PERMIT TO MOVE ANIMALS/ANIMAL PRODUCTS

Kragtens die Wet op Dieresiektes, 1984 (Wet 35 van 1984), soos gewysig, en onderworpe aan die voorwaardes hieronder gestel, word toestemming hiermee verleen aan—
 In terms of the Animal Diseases Act, 1984 (Act 35 of 1984), as amended, and subject to the conditions specified below, permission is hereby granted to—

Naam
Name

Adres
Address

Om te beweeg met/Vir die vervoer van
To move with/To transport

Van die plaas/plek
From the farm/place in die distrik
in the district of

Na die plaas/abattoir/plek
To the farm/abattoir/place in die distrik
in the district of

VOORWAARDES

- Hierdie permit—
 - is geldig vir **30 dae** vanaf datum van uitreiking en slegs vir een beweging;
 - moet die diere/produkte hierbo vermeld vergesel en moet vir inspeksie getoon word op die versoek van enige eienaar van grond of vee, 'n lid van die Suid-Afrikaanse Polisiediens of 'n beampte van die Departement van Landbou;
 - moet by die plek van bestemming gehou word totdat dit deur 'n gemagtigde persoon opgeëis word.
- Die diere of produkte moet in verseëldes vervoermiddels vervoer word.
- Tydens vervoer moet alle kwarantengebiede wat besmet of vermoedelik besmet is met 'n siekte wat sodanige diere aantast, vermy word.
- Ander voorwaardes.....
.....
.....

CONDITIONS

- This permit—
 - is valid for **30 days** from date of issue and for **one** movement only;
 - must accompany the animals/products mentioned above and must be produced for inspection on demand by any land owner, stock owner, member of the South African Police Service or any officer of the Department of Agriculture;
 - must be kept at the place of destination until it is collected by an authorised person.
- The animals or products must be conveyed in sealed vehicles.
- The route followed must avoid all quarantined areas and areas infected or suspected of being infected with any disease to which the animals are susceptible.
- Other conditions.....
.....
.....

Plek Datum
Staatsveearts/State Veterinarian

VERSPREIDING • DISTRIBUTION

Die
The

Die
The

Die
The

Hiermee word gesertifiseer dat ek die vervoermiddel verseël het.
I hereby certify that I have sealed the conveyance.

DATUMSTEMPEL
DATE STAMP

.....
Staatsveearts/Veeinspekteur
State Veterinarian/Stock Inspector



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What about milk from BR & TB + herds

- **Must be pasteurized**
- In communal herds - **boil or sour milk (dikmelk)?**
- Inform everyone on farm, including the workers
- Do not feed raw milk to any other animals, including dogs and cats (they can also get BR and TB, acting as a potential continued source of infection later on)



Prevention of BR and TB in the herd

- **Biosecurity principles!!**
- Know the BR & TB status of your own herd (test regularly)
- Only buy from herds that have tested negative recently (BR3/TB3 declaration)
- Don't mix with other cattle/ goats/ sheep unless proven negative
- Intact fences
- **Vaccinate for BR (heifers 4-8 months)** – required by law.
- Note – Humans with active TB can in turn infect animals (i.e. ensure workers are healthy)



Prevention

Good animal management requires planning and prevention:

Prevention is always better than cure

“A stitch in time saves nine”



© Can Stock Photo



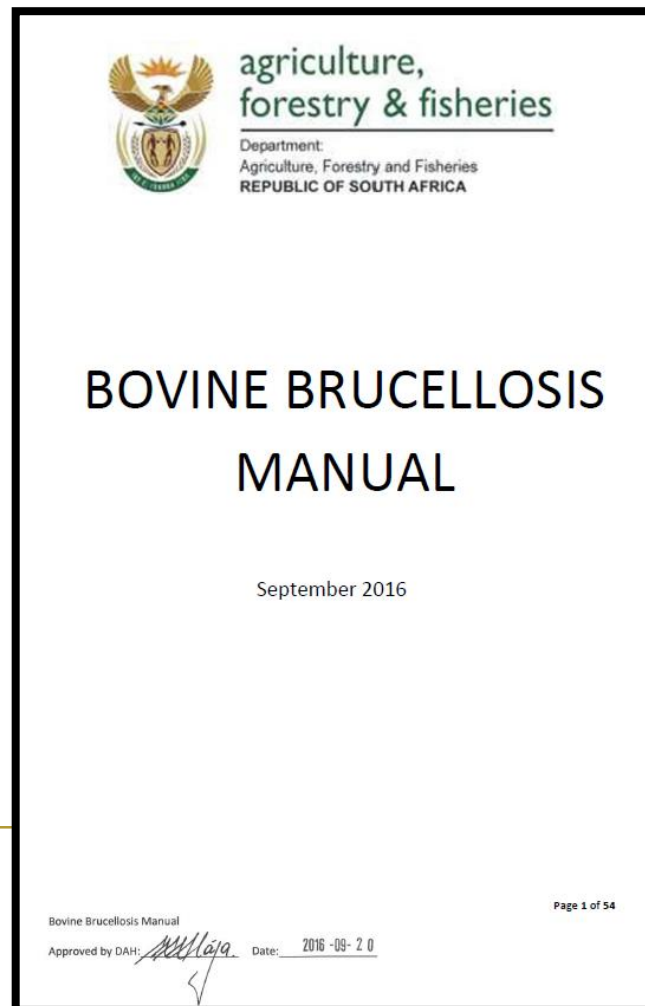
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Interim manual for brucellosis in cattle

Available from:

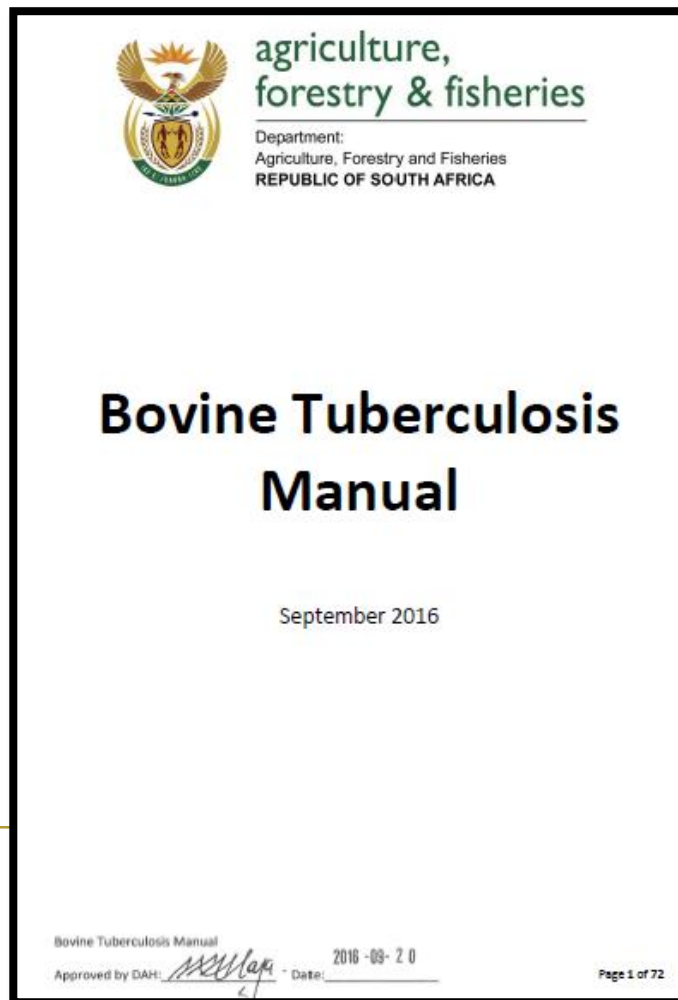
<https://www.dalrrd.gov.za/Branches/Agricultural-Production-Health-Food-Safety/Animal-Health/information/dahpolicy>



Interim manual for tuberculosis in cattle

Available from:

<https://www.dalrrd.gov.za/Branches/Agricultural-Production-Health-Food-Safety/Animal-Health/information/dahpolicy>



Zoonosis

- Brucellosis and tuberculosis can be transmitted to humans = **zoonosis**.
- **If you are a cattle farmer - you, your family and your workers are at risk!**
- If you consume **raw dairy products** that are not regulated, you are at risk!
- **Main focus to prevent brucellosis and tuberculosis in humans = control of the disease in cattle & pasteurisation of dairy products!**



Zoonosis

Occupational hazard

- **Farmers**
- **Herdsman**
- **Abattoir workers**
- **Veterinarians**
- **Animal Health Technicians**
- **Laboratory Technologists**



*Brucellosis in humans

Notifiable disease under the National Health Act, Act 61 of 2003

Incidence of bovine brucellosis in the human population is unknown...but...

- **Is the disease considered in patients presenting with the non-specific brucellosis symptoms?**
- **Are at-risk people and communities adequately warned and tested?**

Highlights the importance of the One Health approach in controlling zoonotic diseases



*Brucellosis in humans

How is it transmitted?

- Contact with the bacteria – mucous membranes (eyes, nose, mouth), cuts on skin, digestive tract.
- Birth fluids, placenta, aborted fetus, vaginal discharge from infected cow (or goat/ sheep, etc.)
- Unpasteurised milk
- S19, RB51 and Rev-1 vaccines (live vaccines, be careful when vaccinating cattle (S19, RB51) and sheep (Rev-1))



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*Brucellosis in humans

Note: Not everyone gets sick if exposed to *Brucellosis spp*, you might seroconvert without even knowing!

What are the symptoms?

- Flu-like symptoms – body aches, pain, headaches, tiredness, depression
- Fever (recurrent)
- Other specific symptoms, depending on organ system affected (e.g. pneumonia, enlarges liver/ spleen, heart disease)
- *B. melitensis* tends to cause worse disease in humans compared to *B. abortus*
- Seek diagnosis and treatment ASAP – the disease can become chronic and impossible to get rid of



**As quoted by n veterinary colleague that
contracted brucellosis:**

**You won't die of brucellosis, but you will wish
that you were dead!**



*Bovine tuberculosis in humans

Notifiable disease under the National Health Act, Act 61 of 2003

Incidence of bovine tuberculosis in the human population is also unknown...

- **Is the disease considered in patients presenting with TB symptoms?**
- **People are mainly tested for human TB and further testing to identify bovine TB is usually not done.**



*Bovine tuberculosis in humans

How is it transmitted?

- Unpasteurised milk
- Close contact with infected cows (or goat/ sheep, etc.) in e.g. milking shed – inhale bacteria that infected animals cough up
- Contact with the bacteria – mucous membranes (eyes, nose, mouth), cuts on skin, digestive tract. Gross handling/ cut into infected organs from infected cow (or goat/ sheep, etc.)



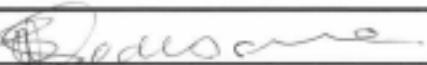
*Bovine tuberculosis in humans

Note: Not everyone gets sick if exposed to *M. bovis*!

What are the symptoms?

- Flu-like symptoms – body aches, pain, weight loss
- Fever
- Coughing
- Other specific symptoms, depending on organ system affected (e.g. spinal TB, cutaneous TB)
- Difficult to distinguish from human TB (*M. tuberculosis*)
- Seek diagnosis and treatment ASAP – basically same long-course treatment as for human TB



	DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT
	BOVINE BRUCELLOSIS CONTROL POLICY, SOUTH AFRICA
POLICY OWNER/ COORDINATOR:	Directorate Animal Health
APPROVED BY:	Chief Director: Animal Health and Production
SIGNATURE:	
APPROVAL DATE:	16/7/2020
NO OF PAGES:	27



Bim

Current – Bovine Brucellosis Policy

- As part of the Veterinary Strategy (2016-2026), the bovine brucellosis control policy was reviewed
- Consultation and solution seeking part of the process
- All stakeholders need to be involved and addressed
- Next step = developing implementation plans for the Policy objectives
- Bovine brucellosis control policy must be **implementable**, **cost effective** and **sustainable**



Current – Bovine Brucellosis Policy

7 objectives:

- Vaccination
- Education
- Testing
- Movement control
- Slaughter
- Reporting
- Effective implementation of control measures



More TB and BR information

- DALRRD website (SA)

<https://www.dalrrd.gov.za/Branches/Agricultural-Production-Health-Food-Safety/Animal-Health/information/dahpolicy>

- NICD website (SA)

<https://www.nicd.ac.za/diseases-a-z-index/brucellosis/>

<https://www.nicd.ac.za/diseases-a-z-index/tuberculosis-general/>

- NAHF website (SA)

<http://nahf.co.za/category/diseases/brucellosis/>

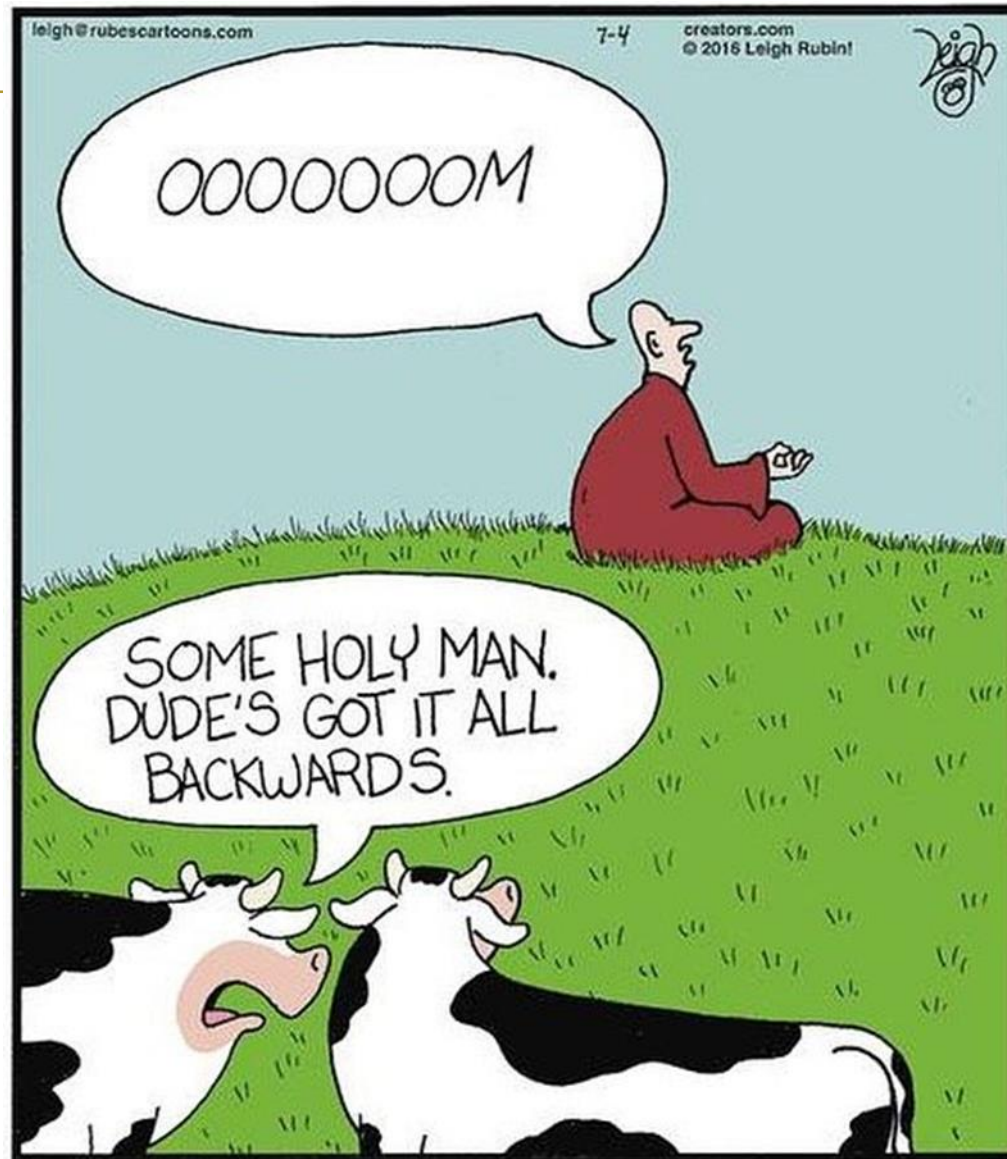
- OIE website (global)

<https://www.oie.int/en/animal-health-in-the-world/animal-diseases/bovine-tuberculosis/>

<https://www.oie.int/en/animal-health-in-the-world/animal-diseases/brucellosis/>



Thank You



agriculture, land reform
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Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

Image: The Far Side