Integrated Disease Surveillance Manual

Namibia

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Articles

Foreword

I warmly welcome the launch of DVS' integrated disease surveillance and response guidelines. These guidelines have been developed by the Division of Epidemiology, Imports & Exports Control and Training, to integrate instructions, guidelines, standard operational procedures and contingency plans related to current approaches to animal disease surveillance and response to disease incursions in various parts of Namibia. I would like to thank all those who contributed to these guidelines.

A lot of what we have done lately have been reactive and often done differently across the 4 DVS subdivisions covering 19 state veterinary office jurisdictions. DVS identified a need for field quick reference guidance notes for both technical and professional staff to ensure correct approaches are employed throughout the country. These guidelines were prepared to meet this need. In the process an online readily accessible repository of laws, circulars, standard operational procedures and contingency plans has been created to complement the printed field quick reference guidelines.

I wholeheartedly endorse these guidelines with sincere hope that they will build on efforts to keep improving our early detection system, safeguarding public health, proving absence of disease and responding to suspected and confirmed disease incursions. It is necessary that these guidelines be continuously updated to meet national needs and international obligations as they are bound to change over time.

Considerable care has been taken to ensure the guidelines are based on current animal health and related Namibian laws. I would like to encourage both technical and professional staff within DVS to utilize these guidelines in order to fulfill government’s commitment to support the agricultural sector, in this particular case, enabling animal agriculture to contribute towards meeting the needs of our country.

Government will remain firmly committed to improving animal health status throughout the country to ensure that animal agriculture remains a vital and relevant driving force for improving rural livelihoods.

A credible animal disease monitoring and surveillance system and an appropriate response to incursions are important issues for all in the livestock sector. I look forward to DVS working closely in partnership with all stakeholders to ensure we safeguard public health, retain access to current markets and broaden marketing opportunities for the northern regions.

We can now look forward with renewed confidence to having an enhanced disease monitoring and surveillance system, and more streamlined and better organised response to disease incursion.

Joseph Iita
Permanent Secretary
Ministry of Agriculture, Water & Forestry

Acknowledgements

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Many people contributed to the development of these guidelines by providing information, advice, suggestions and/or contributing to the review process. In particular, inputs were sought and gratefully received from: Dr. Alec Bishi, Dr. Jessey Kamwi, Dr. Joseph Kapapelo, Dr. Beate Voigts, Dr. Alaster Samkange, Dr. Emmanuel Hikufe, Dr. Siegfried Khaiseb, Dr. Israel Kaatura, Dr Snyder Amuthenu, Dr. Frank Chitate, Dr. Kennedy Shoombe, Mr. Johan Engelbrecht, Mr Nicky Shaumbwa, Mr. Albert Liyali, Mr. Benhardt Neumann, Mrs. Christine Marais, Mr. Ben Diergaardt, Mr Cyprianus Khaiseb, Mr Emmanuel Ashipala, Dr. Albertina Musilika-Shilongo and Dr Baby Kaurivi.

The permission of Animal Health Australia to use the AUSVETPLAN series of manuals as the basis for several sections of this manual is gratefully acknowledged.

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Acronyms

ADCD	Animal Disease Control Division
AHD	Animal Health Declaration Form
AHT	Animal Health Technician
BSE	Bovine spongiform encephalopathy
BVD	Bovine virus diarrhoea
CAHT	Chief Animal Health Technician
CBPP	Contagious bovine pleuropneumonia
CFT	Complement Fixation Test
Codex	Codex Alimentarius Commission
CVL	Central Veterinary Laboratory
CVO	Chief Veterinary Officer
DCHQ	Disease Control Headquarters
DCP	Dangerous Contact Premises
DCVO	Deputy Chief Veterinary Officer
DVS	Directorate of Veterinary Services
EAD	Emergency animal disease
EADRP	Emergency animal disease response plan
EC	European Community
EFSA	European Food Safety Authority
EIA	Equine infectious anaemia
ELISA	Enzyme-linked Immuno-sorbent assay
EPA	Environmental Protection Agency

EU	European Union
EVA	Equine viral arteritis
FANMeat	Farm Assured Namibia Meat Scheme
FAO	Food and Agriculture Organisation of the United Nations
FDA	Food and Drug Administration
FMD	Foot-and-mouth disease
FSIS	Food Safety Inspection Service
GMP	Good Manufacturing Practices
HPAI	Highly pathogenic avian influenza
IP	Infected premise/s
LDCC	Local Disease Control Centre
MAWF	Ministry of Agriculture, Water and Forestry
MRL	Maximum Residue Limit
NAI	Notifiable avian influenza
NamLITS	Namibia Livestock Identification and Traceability System
NCA	Northern Communal Areas
NDEC	National Disease Emergency Committee
NRC	National Residue Committee
NOEL	No Observable Effect Level
NRP	National Residue Program
OIE	World Organisation for Animal Health
PAP	peroxidase-antiperoxidase
PCR	Polymerase Chain Reaction
PPR	Peste des petits ruminants
PR	Public Relations
RA	Restricted Area
RDEC	Regional Disease Emergency Committee
RSA	Republic of South Africa
RVF	Rift Valley Fever
SA	South Africa
SOP	Standard Operating Procedure
SP	Suspect Premises
USDA	United States Department of Agriculture
VCF	Veterinary Cordon Fence
VEIETD	Veterinary Epidemiology, Import/Export and Training Division
VPHD	Veterinary Public Health Division
VRECS	Veterinary Rural Extension Centres
WHO	World Health Organisation

Background

Namibia's veterinary surveillance strategy and approaches to disease response are designed to fulfil the mandate of the Directorate of Veterinary Services, which includes:

- Maintaining and promoting optimal animal health, production and reproduction
- Ensuring the safe and orderly marketing of animals and animal products
- Animal disease control and safeguarding public health
- Animal health and production related extension
- Epidemiology and surveillance
- Providing veterinary diagnostic services and leading research

The goals, objectives and actions related to animal disease surveillance and response to incursions will take into consideration disease detection, prevention, eradication, control and disease contingency planning programs and activities. Good surveillance data are the cornerstone for animal health planning and action as well as appropriate early response to incursions before disease spreads and significant losses incurred. In the case of successful disease control, surveillance plays a key part in recovery of disease status.

National guidelines are required to ensure the correct approaches are employed throughout the country to collect, collate, analyse and interpret data and disseminate information to relevant stakeholders so that appropriate decisions are made and required action can be taken.

Disease surveillance and response guidelines form part of the repertoire of tools needed to improve the capacity detect disease or infection early, monitor disease trends, facilitate the control of disease or infection, provide demonstrable evidence of disease freedom and provide data that underpins export certification.

The main challenge facing Namibia is to successful implement the NCA FMD and Lungsickness Freedom Strategy while maintaining access to current markets serviced by the current disease free zone. The overall objective of this strategy is to expand the disease free zone to include most parts of the Northern Communal Areas (NCA) in order to broaden livestock marketing opportunities for livestock keepers in the NCA and to allow free movement of NCA livestock and their products to the rest of Namibia.

A well-resourced disease monitoring and surveillance system, and a streamlined approach to disease incursion are critical to meeting objectives of the disease freedom strategy. This calls for well-structured integrated disease surveillance and response guidelines, to provide guidance to both technical and professional staff who are at the forefront of disease monitoring and surveillance system, and in field operations related to animal disease control.

Introduction

This document presents animal disease surveillance and integrated surveillance and response guidelines for DVS field staff and management. They were developed by the Division of Epidemiology, Imports & Exports Control and Training, to update and integrate instructions, guidelines, standard operational procedures and contingency plans related to current approaches to animal disease surveillance and response to disease incursions in various parts of Namibia.

In the context of these guidelines, surveillance should be considered as the ongoing systematic collection, analysis, interpretation of data, including the timely dissemination of the resulting information to those who need it for action. Included in these guidelines is special emphasis on surveillance aimed at safeguarding public health and facilitating international trade.

Successful animal disease control and prevention programmes owe their success to well-resourced early detecting systems, obtaining laboratory confirmation of the disease, and using thresholds to initiate action as soon as possible. These guidelines promote rational use of resources by integrating and streamlining currently disparate surveillance activities, which involve similar functions (detection, reporting, analysis, interpretation, feedback, action and evaluation) and often use the same structures, processes and personnel.

The objectives of preparing these guidelines include:

- Strengthening the capacity of veterinary services at all administrative levels to conduct effective surveillance activities
- Use as a resource document in the induction and training personnel at all levels
- Integrating multiple surveillance activities so that forms, databases, personnel and other resources can be used more efficiently
- Improving the flow of surveillance information between and within levels of the veterinary service
- Improving data collection and the use of information to detect changes in time in order to conduct a rapid response to suspect epidemics and outbreaks
- Raising awareness of laboratory diagnostic support available
- Emphasising involvement of community participation in detecting and responding to animal health problems
- Highlighting the approach to conducting basic epidemiological investigations in detection, investigation and reporting of animal health problems
- Improving implementation of effective veterinary public health interventions

These integrated disease surveillance and response guidelines are structured as follows:

- Structure of and functions of its subdivisions
- Animal disease surveillance
- Investigating animal disease
- Emergency Response
- Movement Controls
- Information Management
- Priority Disease Programs
- Disease Summaries

The online version includes a repository of:

- DVS circulars from 1990 to date
- All laws and regulations relevant to animal health in Namibia
- Contingency plans of priority disease
- Residue Program
- General standard operating procedures
- Data collection and reporting forms

The law, as quoted severally throughout the guidelines, is that in force on the date of launch, printing or reprinting of the guidelines. Users should be aware that any of the legal requirements quoted might be subject to change - they should seek confirmation before assuming that these are an accurate statement of the law currently in force.
It is hoped that these guidelines provide both technical and professional staff and other stakeholders with a better understanding of the structure, functioning, methods and mechanisms that form the basis of disease surveillance in Namibia including outbreak investigation and response. If in doubt, please contact your State Veterinarian.

Disclaimer

These guidelines are primarily targeted for use by all technical and professional staff within the Directorate of Veterinary Services. However, the guidelines may become accessible to other stakeholder groups such as private practitioners, farmers and agricultural extension service providers who may choose to make use of them. However, the Directorate of Veterinary Services shall not be held liable for any improper or incorrect use of the information described and/or contained in these guidelines and assumes no responsibility for anyone's use of the information contained herein. In no event shall the Directorate of Veterinary Services be liable for any direct, indirect, incidental, special, exemplary, or consequential damages out of the use of these guidelines.

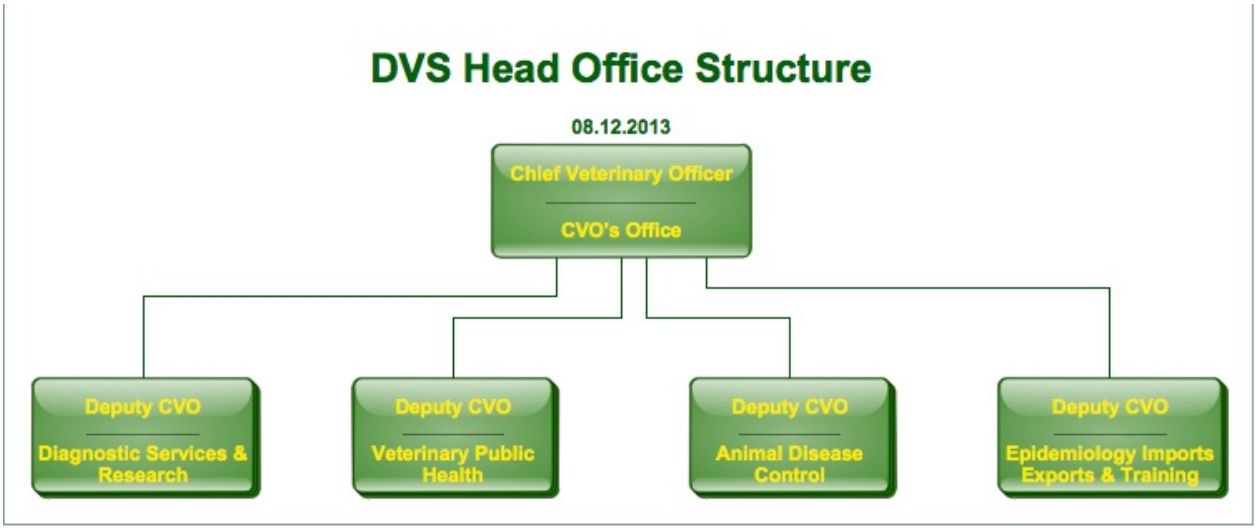
Management

DVS Structure

Directorate of Veterinary Services

The Directorate of Veterinary Services is the custodian of animal health and production in the country and is responsible for establishing local, bilateral and multilateral agreements (particularly on trade and disease control) with local, regional and international organisations.

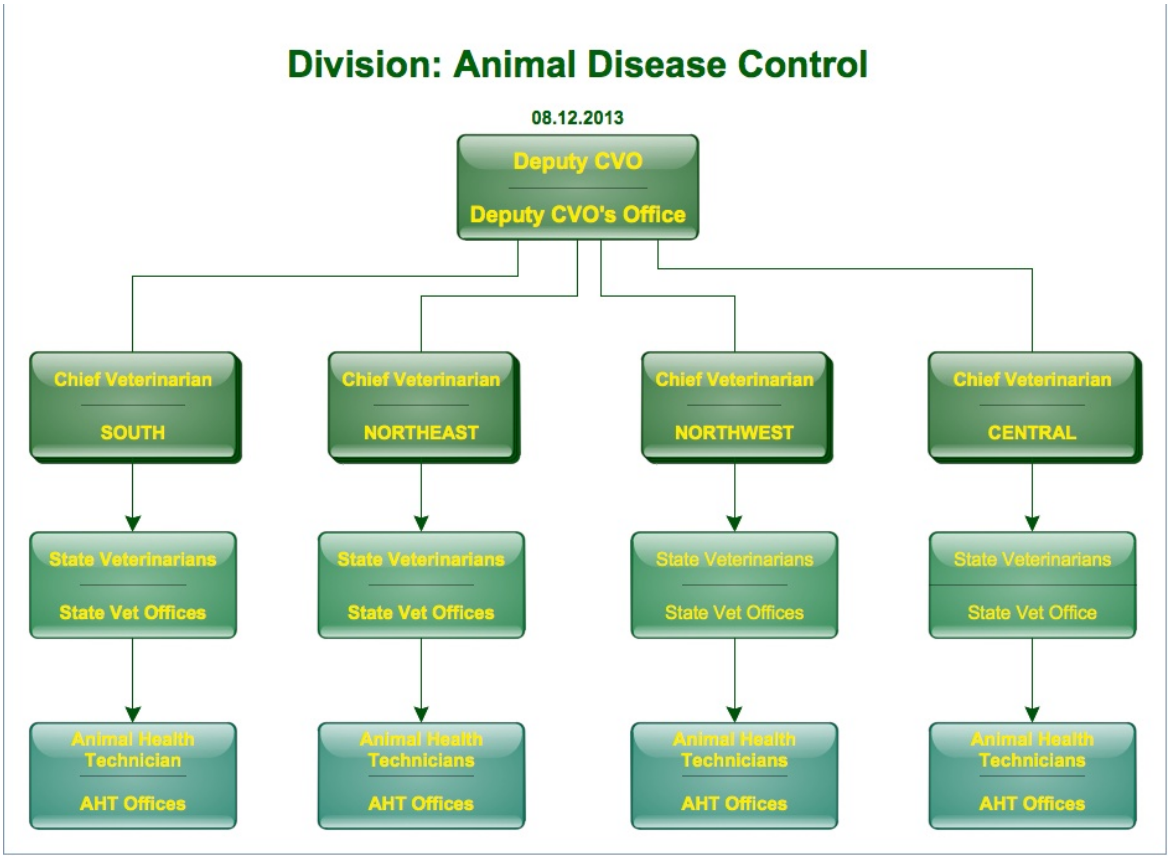
The Directorate falls under the Ministry of Agriculture, Water and Forestry, and fits into the structure shown on the diagram below. Namibia has single unified official veterinary services with a direct chain of command from the Chief Veterinary Officer to each field veterinarian. The diagram below shows the position of the Directorate within the Ministry of Agriculture Water and Forestry.



Roles and responsibilities | Veterinary Offices and Infrastructure

Roles and responsibilities

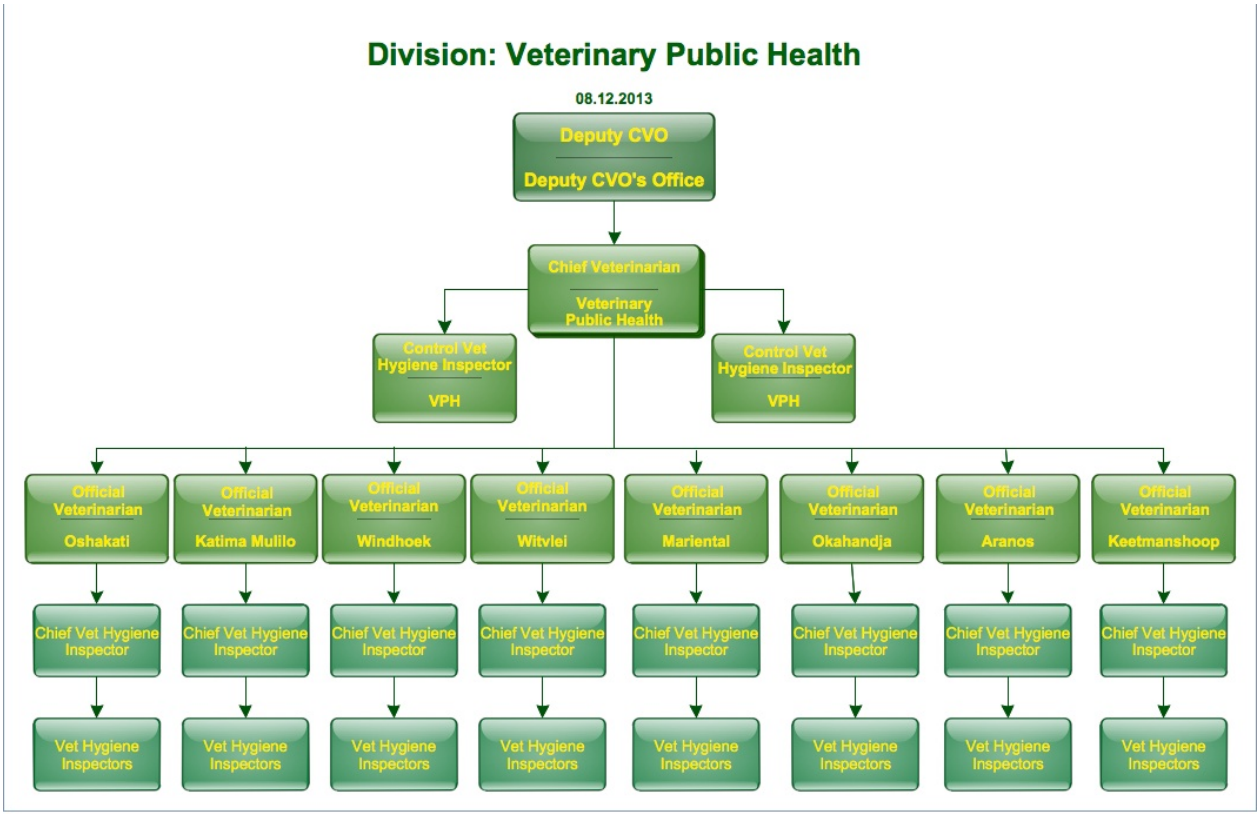
Division: Animal Disease Control



The Animal Disease Control Division is field based and is headed by a Deputy Chief Veterinary Officer. It has the following as its major functions:

- Inspection, evaluating and recommending export establishments for trade in animals and animal products.
- Plan and implement control/eradication programs for diseases of economic and public health significance such as Contagious Bovine Pleuropneumonia, Foot and Mouth disease, Anthrax and Rabies.
- Prevent the introduction and/or spread of animal diseases and pests through movement control.
- Monitoring and surveillance of animal disease and pests in order to react early to outbreaks drafting, reviewing and enforcing animal health legislation.
- Provide clinical, surgical and extension services to smallholder farmers.

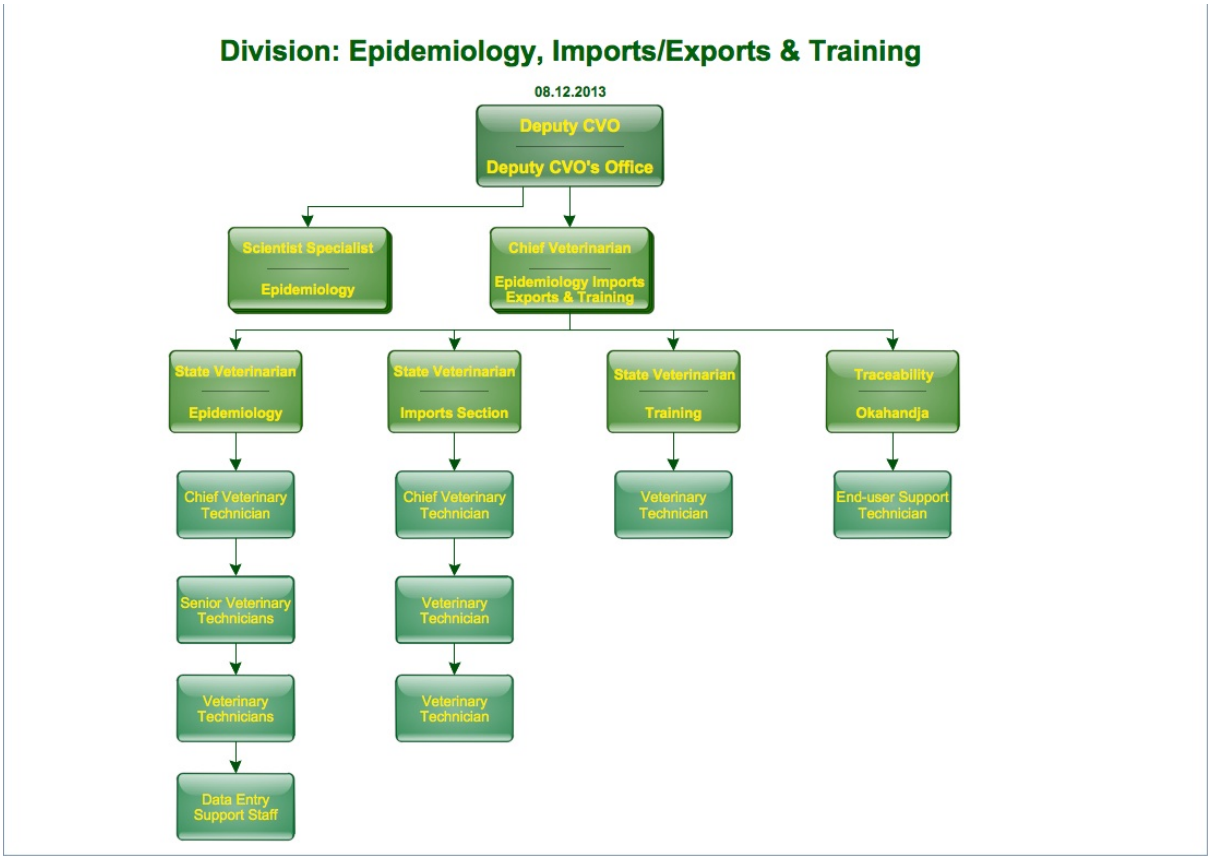
Division: Veterinary Public Health



Headed by a Deputy Director, this division has the responsibility to ensure meat export establishments meet standards and requirements of trading partners in this regard the division is tasked with the following:

- Interpreting, advising and ensuring compliance with international legislation, conventions, protocols and agreements on trade related to veterinary matters.
- Inspection, evaluating and recommending export establishments for trade in animal products.
- Monitoring and guiding export establishments for minimum standards (infrastructure specifications, procedures and quality standards.
- Export Certification for animal products.

Division: Epidemiology, Training Import and Export Control



The Division Epidemiology, Training, Import and Export Control is headed by a Deputy Chief Veterinary Officer. It is subdivided into three sections:

- Epidemiology and Surveillance
- Import and Export Control
- Training

Epidemiology and Surveillance

Functions:

- Collate, process and analyse animal health data and report on animal diseases and other data from other directorates for the purposes of decision-making
- Run a computer-based data management and reporting system
- Assist in the development of epidemiologically-based surveillance and control strategies for animal diseases
- Responsible for all reporting at local, regional and international levels
- Offer technical support and training in epidemiology to field staff.

The section is under the direct supervision of a Veterinary Epidemiologist.

Import/Export Control Section

Functions:

- To safeguard the national animal health status through import control and risk analysis
- Ensure that animals and animal products imported into the country meet import permit requirements
- Ensure that certification for export meets import the requirements of trading partners
- Issuance of permits and handling queries on import and export requirements
- Monitoring activities at border posts to ensure that import and export requirements are complied with

The section is under the direct supervision of a veterinarian who checks and develops import requirements (protocols) as well as being the SPS contact point.

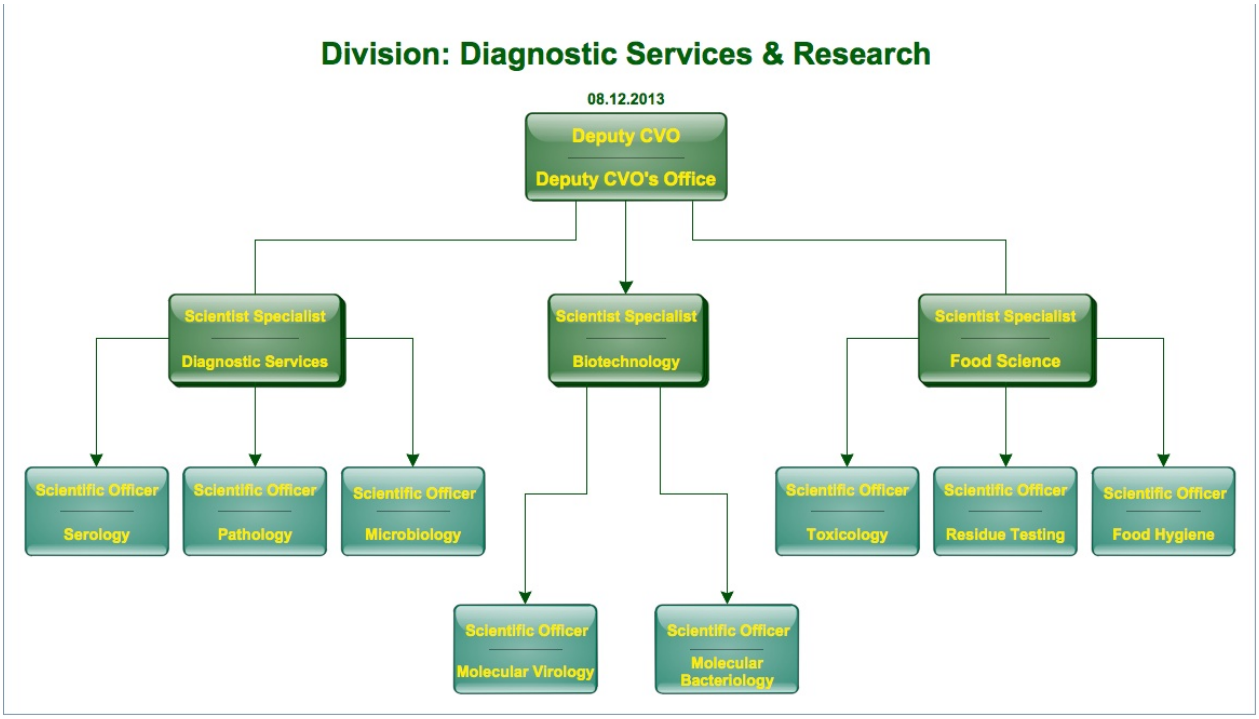
Training Section

Functions:

- Primarily responsible for the provision of continuous education for Directorate staff
- Development of extension material
- Training in animal health at various levels
- Responsible for public relations and publicity
- Developing and updating DVS web pages
- Managing the Namibia Livestock Identification and Traceability System (NamLITS)

This section has two veterinarian; one is in charge of Training & Special Projects and the other manages NamLITS

Division: Diagnostic Services and Research



The Division of Diagnostic Services and Research is headed by a Deputy Chief Veterinary Officer. The Division supports both animal health and meat hygiene services. It is divided into the following three subdivisions and eight sections:

- Diagnostic Services
  - Serology
  - Microbiology
  - Pathology

- Biotechnology
  - Molecular Virology
  - Molecular Bacteriology
- Food Science
  - Toxicology
  - Food Hygiene
  - Residue Testing

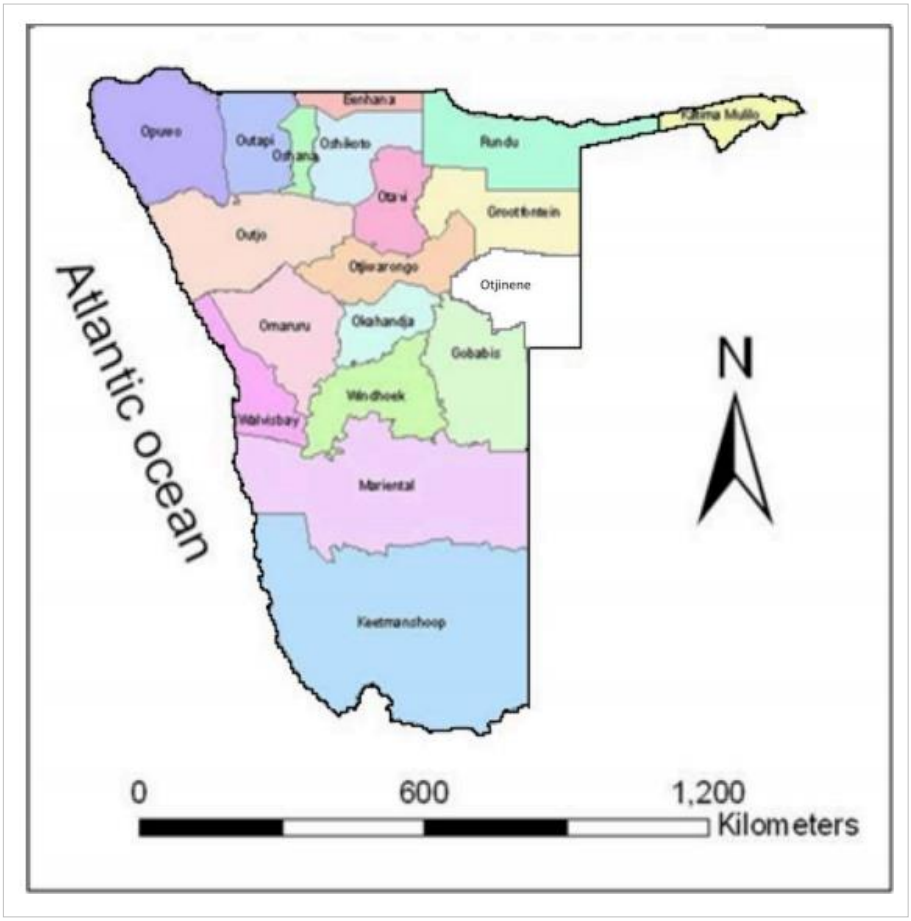
DVS Structure | Veterinary Offices and Infrastructure

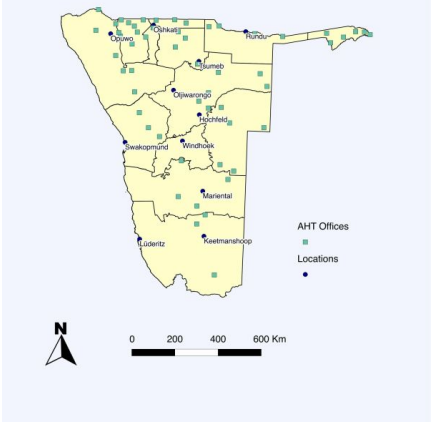
Infrastructure

State Veterinary Districts and Animal Health Technicians

Contact details of the State Veterinary Offices and other locations are listed under **Contact details**.

To fulfill its mandate the Directorate of Veterinary Services has at its disposal a comprehensive network of veterinary infrastructure comprising 19 field State Veterinary offices headed by veterinarians, 36 Animal Health Technician (AHT) offices and 18 Veterinary Rural Extension Centres (VRECS) that are also headed by AHTs. Three new state veterinary offices are planned for Otjinene, Eenhana and Oshikoto. Locations of the State Veterinary offices and Animal Health Technicians offices are shown in the figures below.

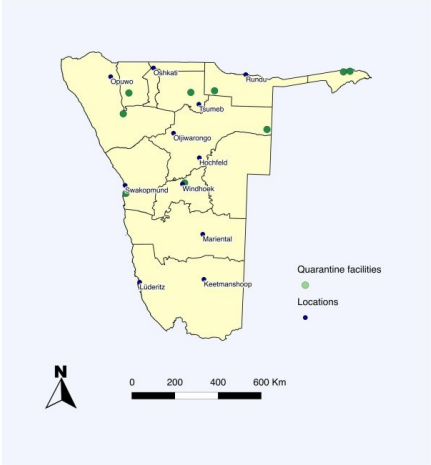




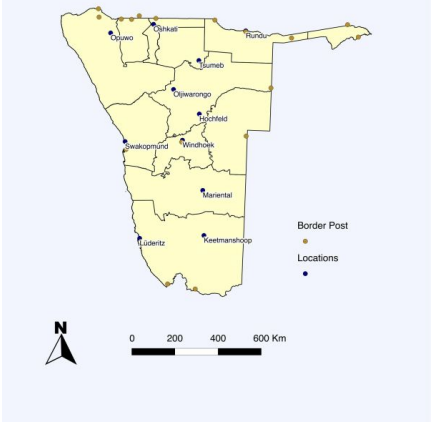
Animal Health Technician Offices

Quarantine Facilities and Border posts

The Directorate also maintains and operates 12 quarantine farms and facilities, five which are headed by Animal Health Technicians (Omutambo Maowe, Oshivello, Okongo, Mangetti and Katima Mulilo) and one by a Chief Veterinary Technician (Bergvlug) (see locations below). The remainder are manned by auxiliary staff). Four main ports of entry into the country (Noordoewer, Ariamsvlei, Buitepos and the Hosea Kutako International Airport) are controlled by fulltime veterinary staff (veterinary hygiene inspection assistants).



Quarantine facilities



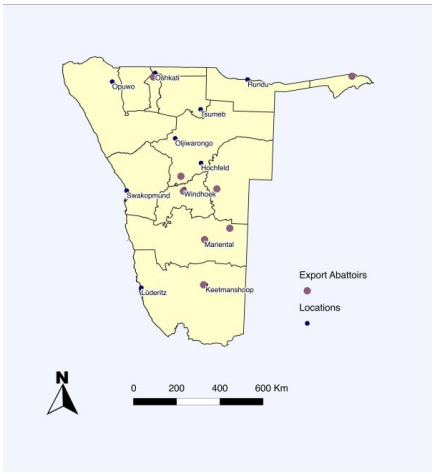
Border Posts Controlled Permanently by DVS Staff

Veterinary Cordon Fence

The Directorate also maintains the Veterinary Cordon Fence which demarcates the OIE recognised Foot and Mouth Disease free zone from the rest of the country. The fence runs for 1251 km from Palmgrave Point in the west to Gam Area (20th parallel) in the east. There are ten veterinary check points mainly along the veterinary cordon fence which are supervised by veterinary staff.

Export Abattoirs

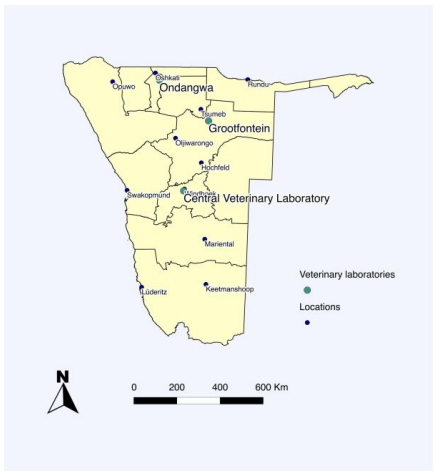
The Division Veterinary Public Health maintains a permanent presence at all export abattoirs. There are 7 export abattoirs where livestock are slaughtered under veterinary supervision. There is one cold storage facility with capacity to handle imports and exports at Walvis Bay Harbour.



Location of Export Abattoirs

Veterinary Laboratories

The Division Veterinary Diagnostics and Research has its Central Veterinary Laboratory in Windhoek. There are three regional laboratories at Ondangwa, Gobabis and Grootfontein.



Central and Satellite Laboratories

Central Veterinary Laboratory

The address and contact details for the Central Veterinary Laboratory are:

Central Veterinary Laboratory
24 Goethe St,
Pr. Bag 13187,
Windhoek

Tel: 061-237 684
Fax: 061-221 099

Contact details of the main veterinary offices and other locations are listed under **Contact details**.

DVS Structure | Roles and responsibilities

Acts and Regulations

A brief explanation of the animal health legislation in force in Namibia is as follows:

Animal Health Act, 2011 (Act No. 1 2011)

The main provisions of this Act are:

- Prevention, detection and control of animal disease, to provide for the maintenance and improvement of animal health
- Provision for a permit for importation of animals, animal products and restricted material for entry into Namibia
- Provision for a permit for importation of animals, animal products and restricted material for conveyance in transit through Namibia
- Provision for notice to be given and health certificate obtained before import
- Dealing with animal, animal product or restricted material imported contrary to Act or presenting risk
- Border security in emergency, fences and quarantine stations
- Health certificate required for exportation of animals, animal products and restricted material
- Export in contravention of Act
- Duties on discovery of incidence of disease and treatment or disposal of infected animal, animal product or restricted material
- Declaration of infected place, quarantine area, control area and protected area
- Handling straying animals
- Animal identification and traceability system
- Powers of entry, search and inspection
- Disposal of isolated, detained or seized animal or thing
- Compensation

Subject to provisions of this Act, the Minister has set the following Regulations:

- **Animal ID Regulations under Animal Health Act, Act 1 of 2011**
- **Regulations under Animal Health Act, Act 1 of 2011**
- **Declarations under Animal Health Act, Act 1 of 2011**

These Regulations are currently undergoing a review and new files will be uploaded as they become available

The Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947)

The main provisions of this Act are:

- Appointment of a Registrar of Stock Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies
- Registration of fertilizers, farm feeds, agricultural remedies and stock remedies, sterilizing plants and pest control operators
- Regulating or prohibiting the importation, sale, acquisition, disposal or use of fertilizers, farm feeds, agricultural remedies and stock remedies
- Designation of technical advisers and analysts

Medicines and Related Substances Control Act, 2003 (Act No. 13 Of 2003)

Amended with the following:

- **Medicines and Related Substances Control Amendment Act, 2007**
- **Amendment of Classification of Medicines and Other Substances under Act 13 of 2003**

The Medicines and Related Substances Act provides for:

- Establishment of the Namibia Medicines Regulatory Council and appointment of the Registrar of Medicines
- Establishment of a Veterinary Medicines Committee and other Committees
- Sale of medicines which are subject to registration and are not registered
- The registration of medicines intended for human and for animal use, and amendments of entries in the register
- Transfer and cancellation of certificates of registration
- Prohibition on sale of medicines which do not comply with prescribed requirements
- Publication or distribution of false advertisements concerning medicines
- Council may authorize sale of unregistered medicines for certain purposes
- Council to cause certain information to be furnished
- Control of medicines and scheduled substances
- Publication of information relating to medicines, scheduled substances

Subject to provisions of this Act, the Minister has set the following Regulations: **Regulations under Medicines and Related Substances Control Act, 2003**

Prevention of Undesirable Residues In Meat Act, 1991 (Act 21 Of 1991)

Amended with the following: **Declaration of Group 1 Substances under Prevention of Undesirable Residues In Meat Amendment Act, 1991**

The main provisions of this Act are:

- The control over the administration of certain products to animals which may cause undesirable residues in meat and meat products
- Prohibition of use of groups of substances in livestock intended to be slaughtered for human consumption
- Prohibition on slaughtering of animals to which certain substances were administered
- Prohibition on the administration of certain substances to certain animals.
- Prohibition on possession of prohibited substances.
- To further regulate the slaughtering of Animals and marketing of meat and meat products
- Setting withdrawal periods for groups of substances that may cause undesirable residues in meat and meat products
- Minister's power in relation to certain substances and delegation of powers by the Minister to any officer or employee in the public service
- Defining powers and functions of inspectors

Subject to provisions of this Act, the Minister has set the following Regulations: **Regulations under Prevention of Undesirable Residues In Meat Act, 1991**

Stock Brands Act, (Act No. 24 of 1995)

The main provisions of this Act:

- Designating the registrar of brands and delegation of the Minister's powers
- To consolidate and amend the law relating to the branding of stock
- Defining the Minister's powers in relation to the kind of animals to be branded and types of brands
- Provision for the application for registration of brands and the allocation of approved brands
- Setting when animals should be branded following approval of brand and change of ownership
- Prohibition of disposal of animals that do not bear a stock brand
- Provision for transfer and cancellation of a registered brand
- Provision for exemptions from applying for registration of a brand and branding animals
- Stipulating duties and powers of pound masters

Subject to provisions of this Act, the Minister has set the following Regulations: **Regulations under Stock Brands Act, 1995 (Act 24 of 1995)**

Animal Protection Amendment Act, 1972 (Act 7 of 1972)

The main provisions of this Act are:

- Consolidating and amending the laws relating to the prevention of cruelty to animals
- Specifying offences in respect of cruelty to animals and failure to consider the welfare of animals
- Prohibition of aiding, abetting, causing, promoting, supporting or participation in organising animal fights or attending such events
- Stipulating additional powers available to the court in respect of a person convicted of an offence in terms of the Act
- Stipulating power of the court to award damages to a person who suffered loss as a consequence of an offence in terms of this Act
- Provision for the police to destroy *in extremis* a suffering or diseased animal
- Powers of officers of society for prevention of cruelty to animals

Veterinary and Veterinary Para-Professions Act 2013 (Act No 1 of 2013)

The main provisions of this Act are;

- Providing for the establishment, constitution, powers and functions of the Namibian Veterinary Council
- Regulating the registration of persons practising veterinary professions and veterinary para-professions
- Specifying the education and training and qualifications of persons practising such professions
- Providing for control over the practising of veterinary professions and veterinary para-professions
- Prohibit the practising of any such profession without being registered
- Repealing the Veterinary and Para-Veterinary Professions Proclamation, 1984

Animal Disease Surveillance

National Surveillance Strategy

Definition and Purpose

The veterinary surveillance strategy of Namibia is designed to fulfill the mission of the Directorate of Veterinary Services which is to maintain and promote optimal animal health, production and reproduction and to ensure the safe and orderly marketing of animals and animal products through animal disease control and animal health and production related extension, epidemiology and surveillance, research and diagnostics and veterinary public health. The goals, objectives and actions of this surveillance strategy will take into consideration disease detection, prevention, eradication, control and disease contingency planning programs and activities. The strategy will be cognisant of the fact that good surveillance data are the cornerstone for animal health planning and action as well as policy formulation.

Animal disease surveillance can be defined as a package of activities which provide early warning (early detection) of animal health and welfare problems including the deliberate use of illegal substances. This is done through an ongoing systematic collection, collation, analysis and interpretation of data and dissemination of information to the relevant authorities so that appropriate decisions are made and required action can be taken. According to the OIE (World Organisation for Animal Health), animal health surveillance is an essential mechanism for the detection of disease or infection, to monitor disease trends, to facilitate the control of disease or infection, to support claims for freedom from disease or infection, to provide data for use in risk analysis for animal and or/public health purposes in support of international trade and substantiate the rationale for sanitary measures.

The guiding principles of animal disease surveillance in Namibia are rapid detection of introduced and emerging animal diseases; monitoring endemic diseases and providing actionable information for their control or eradication.

Aim & Purpose

The **Aim/development objective** of the Directorate of Veterinary Services is to:

maintain and promote optimal animal health production and reproduction and to ensure the safe and orderly marketing of animals and animal products, resulting in increased wealth creation at household, secondary and tertiary industry levels and thus contribute to socio-economic development of Namibia.

The **Purpose** is to:

To operate an animal health service delivery system that:

- ensures the production of nationally and internationally marketable animals and animal products
- protects the public from zoonotic diseases
- Assures consumers of safe food of animal origin
- Promote animal welfare

Strategic goals

Animal Disease Surveillance in Namibia will be guided by the following strategic objectives or goals:

1. Consultative processes involving different stakeholders including trading partners in the formulation of surveillance strategies and activities. DVS will identify all relevant stakeholders and engage them on a regular and continuous basis to ensure inclusivity in decision making. The stakeholders include but not limited to: private and state actors as well as relevant international organisations such as OIE, FAO, SADC, AU-IBAR & EU.
2. Operational participation/contribution by relevant stakeholders: farmers, state actors (e.g DEES, police, MET) , private veterinarians, neighbouring countries and trading partners in surveillance activities.
3. Efficient utilisation of available resources: human, material and financial through careful and detailed planning e.g. strategic planning, surveillance program planning, budgeting, contingency planning to ensure efficient and effective mechanisms for early detection and responses to disease outbreaks.
4. Innovative use of technology and tools in disease diagnostics, information communication technology, livestock identification and traceability, geographic information system and data analysis.
5. Continuous education and training of staff to ensure that staff are knowledgeable and have certain minimum competencies to efficiently and effectively provide services to the livestock industry. The continuing education program will also take into consideration the needs of veterinarians in the private sector
6. To ensure easy accessibility of extension messages and information to the farming community.
7. Constant monitoring and evaluation: e.g. Internal/external audits, OIE-PVS evaluations, peer evaluations e.g. Botswana/Namibia. DVS will on a regular basis allow itself to undergo internal and external audits to ensure that the surveillance system is in keeping with international demands and standards. Quality assurance capacity will be set up for constant monitoring and evaluation. This will also involve use of scientific methods to assess progress in disease prevention, control and eradication as well as risk analysis. These audits will assist in determining strengths of the system and help DVS in coming up with ways of addressing identified weaknesses. Monitoring and evaluation will also involve stakeholder satisfaction surveys.
8. Quality assurance: Ensure that data and information gathered and reports generated are relevant to the needs of the users, the information generated can be relied upon for decision making. Standard operational procedures and protocols will be used to ensure uniformity.
9. An efficient animal health information management system which ensures that animal health related information including surveillance information is available to all who require it through the best communication systems available that ensures easy accessibility to all who need it e.g. farmers, traders, veterinarians, general public -e.g. radio, print media, newsletters, reports, websites, cell-phone networks etc
10. Adaptable and responsive to changing epidemiological landscape (environmental, etiological and host determinants) such as intensification of production, increasing trade, increased interface between livestock and wildlife, the advent of trans-frontier national parks, climatic changes etc.
11. Achievable, practical, implementable, reproducible
12. Timeliness
13. Sustainable
14. Sensitivity: surveillance is able to detect early exotic diseases and changes in the pattern of endemic diseases
15. Infrastructure is available to all farming communities and the public
16. Fitness of purpose depending on the disease in question.

Specific Strategic Objectives/Goals for the NCAs

1. In the Northern Communal Areas of Namibia surveillance is geared towards providing evidence for the achievement of area - wide foot and mouth disease and lung sickness freedom which will result in acceptance of animals and animal products from the area in the local and international markets.
2. The surveillance strategy will be cognisant of transhumance and trans-frontier movements across the Namibia and Angola border with a view to managing the risks of disease introduction and/or spread.
3. Creation of a protection zone along the Angola-Namibia border where there will be high intensity inspections and surveillance.
4. The implementation of NamLITS in the NCAs will go a long way in galvanising the surveillance strategy.
5. It is hoped that during the process of FMD and CBPP freedom, access to national, regional and international markets can be achieved through demonstration of a heightened level of surveillance giving assurance of early detection and early reaction.

Outputs & Benefits

Expected outputs or benefits of the surveillance system are:

1. A system of early detection and early response for animal diseases and hazards in food of animal origin as well as conditions that may precipitate their occurrence is established and operational.
2. Animal welfare requirements are complied with.
3. Internationally recognised disease free zones are established in the Northern Communal Areas
4. Existing disease free zones are maintained
5. Priority animal diseases are eradicated
6. Risk of introduction of animal diseases of public health and trade/economic significance are mitigated
7. The occurrence and impact of endemic animal diseases within the country are minimised
8. The impact of production related diseases and conditions are minimised.
9. Risk of human exposure to zoonotic diseases and hazards in food of animal origin is prevented, minimised or eliminated.
10. The confidence of local and international trading partners in the safety of Namibian animals and animal products is developed and maintained.
11. Evidence based decision making capacity is strengthened.
12. Animal disease control measures are prioritized
13. Policy framework for improved animal disease prevention, control and eradication is established and regularly reviewed
14. Strategic planning for animal disease control is in place and operational.
15. Human resource development program is implemented
16. Animal health infrastructure and operational equipment is in place
17. Adequate resource to carry out surveillance activities are allocated and efficiently utilised.
18. An efficient and reliable communication and feedback system of surveillance programmes is established and operational

Conclusion

This is the surveillance strategy for Namibia which is subject to continuous updating. It is hoped that it will help to generate debate and stimulate new ideas upon which future surveillance programmes will be built. At this juncture the most pressing need is for achievement of FMD and CBPP disease freedom in the northern communal areas. To this end it is necessary that clear road maps and strategies are formulated to see the process through.

NSS Logical Framework

Development Objective	Targets	Performance Indicators	Means of Verification	Assumptions
Overall Objective: To contribute to wealth creation for household and livestock actors and socio economic development in Namibia.	1. Establish new disease free zones (FMD & CBPP) in the NCA and Etosha National park (except FMD in Caprivi) in 5 years 2. maintain the current FMD & CBPP disease free zone 3. Access to high value markets established for all animals and animal products in 5 years including for the NCA.	1. Regions/areas of country freed or maintained free of CBPP and FMD 2. OIE disease free dossier completed and submitted 3. No. of new markets successfully negotiated	1. OIE certificate of disease freedom 2. Trade agreements and protocols negotiated	
Purpose To operate an animal health service delivery system that: ensures the production of nationally and internationally marketable animals and animal products, protects the public from zoonotic diseases, Assures consumers of safe food of animal origin and promote animal welfare	1.Provide comprehensive surveillance and disease monitoring for all farming sectors (Field inspections, laboratory diagnostics & research, Epidemiology & information management, import/export control) 2.Provide oversight and inspection on all local and export abattoirs 3.Control or eradicate disease of trade and public health significance 4. Update animal welfare legislation by December 2011	1.% increase in calving 2. % decreased morbidity and mortality 3.% decrease in zoonotic cases diagnosed in animals 5. % reduction in zoonotic cases diagnosed in humans 6.% reduction in no of positive residue samples detected 7. % Reduction in no. of microbiological contaminants detected in animals or animal products 8. % reduction in welfare transgressions	1. NamLITS statistics 2. Meat Board trade statistics 3. Namib Dairies statistics 4. MOHSS statistics 5. DVS DRF, AHD,FAN reports 6. VPH reports 7. CVL reports 8. No. of product consignments & quantities returned/ recalled 9. Import/export reports at ports entry	1. Global economic and food situation does not affect trade in animal and animal products. 2. No major outbreak of diseases 3. No adverse weather or environmental conditions affecting animal production

Development Objective	Targets	Performance Indicators	Means of Verification	Assumptions
Outcomes				
1. A system of early detection and early response for animal diseases and hazards in food of animal origin as well as conditions that may precipitate their occurrence is established and operational.	1. 100% annual inspection of farms south of the VCF. 2. 100% inspection of animals at animal gatherings e.g. auctions, exhibitions, quarantine, feedlots. 3. Inspect all animals and animal products in accordance with import/ export requirements. 4. 100% monthly inspections in NCA 5. 100% ante/post-mortem inspection of slaughter animal. 6. All priority disease outbreaks investigated and reported. 7. All farmers, transporters, abattoirs, processors and retailers comply with NamLITS requirements 8. All farmers and other stakeholders e.g. private vets are made aware of their obligations to report notifiable diseases. 9. All Importers and exporters comply with import/export control requirements 10. All surveys (disease, census, wildlife, abattoir and lab based) are carried out in accordance with established protocols 11. Disease trends analysis is conducted continuously	1. % of farms/communities inspected each month/year 2. No. of disease investigations 3. Timeliness of disease investigation & reporting 4. No. of surveys conducted 5. % compliance with established turnaround time of lab results 6. % reduction no. of complaints by farmers 7. User satisfaction survey results, suggestion box 8. % reduction in no. of transgressions investigated	1.AHD & community visit database report 2. DRF reports database 2. NamLITS database reports 3. Import/export control database report 4. user satisfaction survey reports 5. Survey reports 6. Monthly, quarterly and annual reports	1.Farmers and relevant industry actors transparently report disease outbreaks or harzards
3. Animal welfare requirements are complied with.	1. Update animal welfare legislation by 2011 1.All farmers, transporters, abattoir operators, traders, speculators, auctioneers, importers, exporters and animal handlers are made aware of welfare requirements 2.All of the above comply with the requirements	1. Updated legislation in place 2. Number of welfare trainings or awareness campaigns conducted 3. No. of welfare guidelines made available to those who need them 4. Number of transgressions handled	1. Training, awareness reports including attendance list 2. Copies of guidelines are available. 3. training materials 4. Welfare reports-Fan Meat report	Farmers and relevant industry actors are responsive to welfare requirements

Development Objective	Targets	Performance Indicators	Means of Verification	Assumptions
3.Internationally recognised disease free zones are established	1.CBPP and FMD freedom to be achieved in 5 years starting in 2010 in accordance with the policy for animal health improvement in the NCA	1. A 10km Protection zone in along the Namibia /Angola border established 2. Areas or regions declared free of FMD and CBPP	1.OIE submission dossier 2. OIE declaration report/response	Cooperation by neighbouring countries is available
4.Priority animal diseases are eradicated	1.Eradication of Sheep Scab by 2015	1.Number of regions declared free of sheep scab	1.Farm inspection reports	Farmers cooperate
5.Risk of introduction of animal diseases of public health and trade significance are mitigated	1.Recruit, train and deploy veterinary border inspectors at all main entry points into Namibia 2.Construct and equip vet infrastructure at all border posts 3. 100% inspection and testing of imported animals 4. Tests conducted on all targeted imported products or consignments 5. Surveillance for exotic diseases (e.g. BSE, Scrapie, TSE, Classical Swine Fever, AI, PPR, ECF. etc) are carried out.	1. Number of veterinary border inspectors trained and deployed. 2. % of border under veterinary supervision 3. Number of infrastructure completed and equipped. 4. No. of samples and tests conducted for import purposes 5. Number samples collected and tested in resident animals	1.Import and export register reports, training reports, list of attendance, training materials used, 2. supervisor's audit reports 3.Tender awarded, handover reports from DVS and MWTC 4. Laboratory result	1.Importers comply with import regulations 2. Farmers report cases
6.The occurrence and impact of endemic animal diseases within the country are minimised	1. All disease reports by farmers, CAHW and public are investigated by DVS 2. All farmers comply with compulsory prophylactic programmes e.g. Anthrax, Brucellosis and rabies in pets 3. Awareness, training on animal disease management and reporting created for all farmers	1. Initial % increase and subsequent reduction in the number of endemic diseases reported 2. % increase in reporting 3. % of farmers complying with compulsory prophylactic measures 4. % of farmers trained at the level of CAHW 5. Number of awareness campaign conducted 6. Training programme, materials available	1.DVS reports, 2. AHD database reports, 3.Farmer training report including attendance list, 4. Attendance certificates issued 5. Training materials produced and distributed. 6. Recordings of radio/TV programmes conducted	1.Farmers and communities cooperate and participate

Development Objective	Targets	Performance Indicators	Means of Verification	Assumptions
7 .The impact of non-infectious production related diseases and conditions are minimised.	1. Extension and advisory services are made available to all farmers (pregnancy tests, breeding soundness examinations, sheath washings, AI, etc) 2. All reported conditions are timely investigated and advice given 3. Awareness creation for all farmers done for these diseases and conditions 4. Humane handling and welfare issues are addressed by farmers	1. % reduction in reports of production/management related diseases and conditions. 2. No. of extension visits conducted 3. No. of investigations conducted 4. Increase in production parameters, e.g. calving % increase	1.DVS reports 2. NamLITS	1.Farmers recognise the importance of production related conditions 2.All farmers subscribe to NamLITS
8.Human exposure to zoonotic diseases and hazards in food of animal origin are minimised.	1. Ensure that all animals slaughtered for commercial purposes are under veterinary oversight. 2. All foods of animal origin are imported/exported under veterinary supervision 3. All consumers are made aware of the dangers posed by zoonotic diseases 4. All animals are vaccinated against zoonotic diseases (e.g. rabies, anthrax, brucellosis) where such vaccines are commercially available. 5. A multidisciplinary team is created involving all food safety experts to exchange information (SPS food safety national committee)	1. % of animals slaughtered under veterinary oversight 2. % Reduction in the number of reported human cases of zoonotic diseases 3. Number of awareness programs conducted 4. % Vaccination coverage for zoonotic diseases 5. Number of meetings of the multidisciplinary food safety committee	1 Register of slaughter facilities processing plants 2 Laboratory test results (microbiological, toxicological, virological etc) 3 Vaccination campaign reports 4 DVS reports: VPH, Import control database. 5 Minutes of meeting of the multidisciplinary committee	Collaboration with key role players such as MOHSS, MET, Local Government and MBN is established

Development Objective	Targets	Performance Indicators	Means of Verification	Assumptions
9.The confidence of international trading partners in the safety of Namibian animals and animal products is established	Establish markets for Namibian animal and animal products in high value markets in EU, RSA, USA, Angola, Israel, DRC, Malaysia, Russia, China, etc	1.Number of new markets established 2.Tonnage of products exported 3.Number of animals exported	1. Trade protocol agreements signed. 2. Export registers 3. Slaughter house reports 4. DVS (NamLITS) database 5. VPH statistics	Importing countries remain interested in Namibia animals and animal products
10.Evidence based decision making capacity and communication/feedback system is established	1.All data gathered during surveillance activities is processed, analysed and reports generated on a regular and timely basis 2.Analytical tools e.g. GIS, statistical are available 3. Data available on the web 4. A DVS communication strategy and plan is in place	1. Number of databases created and maintained 2. Websites created and maintained. 3. Number of reports generated e.g. monthly, quarterly, newsletters, internal reporting (OIE, SADC, AU-IBAR, WTO-SPS) 4.Number of ad-hoc reports generated 5. Number of individuals/organisation assisted with information	1. Copies of reports, newsletters generated. 2. User satisfaction surveys 3. register of clients assisted with information	1.Technical and human capacity is available

Development Objective	Targets	Performance Indicators	Means of Verification	Assumptions
11.An efficient system of resource utilisation is established	1. All DVS activities are regularly supervised 2. Guidelines/check lists for supervisory visits are made available to all supervisors at all levels 3. Monitoring and verification systems for resource utilisation are in place (e.g. vehicle log books, vaccination, staff reports,	1.Number of supervisory visits or audits conducted 2. Number of Guidelines/checklists made available to supervisors 3. % of staff making use of guidelines correctly	1.Supervisory/audit reports 2. field follow-up surprise visits 3. User satisfaction surveys 4. Visitors registers 5.Monitor visit reports 6. correction reports 7. Financial and cash handling records. 8.Records of log books, vaccination, inspections and visits 9. Minutes of staff meetings held. 10. transgression records	Adequate top and middle management capacity is in place
12.Animal disease control measures are regularly reviewed	1. Documented contingency plans, disease control protocols, circulars, instructions and guidelines are designed and updated every two years for all priority diseases	1. Seminars/meetings/workshops held to review the documents 2. Seminars/meetings/workshops held to update stakeholders on reviewed or designed documents 3. All the updated documents available to all staff	1. minutes of review meetings with stakeholders 2. review dates on updated documents 3. Memorandum of understanding available 4. Copies of contingency plans, disease control protocols, circulars, instructions and guidelines	1.Management remains focused on the need for regular reviews of the documents

Development Objective	Targets	Performance Indicators	Means of Verification	Assumptions
13.Policy framework for improved animal disease prevention, control and eradication is established and implemented	1. All animal health related legislation is updated 2. All animal health policies, strategies and activities are in keeping with overall national developmental plans and policies	1.Number of updated legislation available 2.Policies, strategies and activities implemented 3. Number of projects implemented	1. Copies of legislation and policy documents available 2. Policy and strategy implementation reports	Technical capacity to review legislation, policies & strategies is available
14.Strategic and operational planning for animal disease control is in place.	1. All DVS activities are planned 2. All supervisory staff are trained in strategic and operational planning	Operational and strategic plans are in place	1.Copies annual, monthly, weekly as well daily reports are available	Management structures are in place and active
15.Human resource development program is implemented	1.Restructure DVS by 4-2011 2. Recruit adequate & qualified staff at all levels in DVS by Dec 2011 3. Facilitate training and scholarships for critical needs within DVS 4. Provide continuous education for all staff	1. New structure approved 2. % of approved posts filled 3. Number of staff trained 4. Number of scholarships awarded 5. Structured training program in place and implemented 6.Curriculum available 7. Training materials documented 8. Training programmes documents	1.New structure document available 2. Personnel reports of recruited staff 3. MAWF Training division reports 4. List participants of various training courses/workshops 5. Performance reports from supervisors after training	1.PSC approval 2.Funds are available for scholarships 3. Functional training section 4. Adequate trainers
16.Animal health infrastructure, transport and operational equipment is in place	1. All staff operate in functional animal health infrastructure/houses by 2013 2. Animal health infrastructure is available, equipped and accessible to all farmers by 2013 3. Vehicles to carry out surveillance are purchased and available by 2012 4. Latest Information and communication technology is acquired and deployed at all DVS offices and continuously upgraded	1.Infrastructural and equipment acquisition plan is in place 2. Infrastructure, vehicle and equipment acquired and operational. 3.% increase in number of farmers assisted	1.User satisfaction survey reports 3. Capital project reports 4. Vehicle status report by transport officer	1. funds for infrastructure and equipment available 2. Ministry of Works works in time

Development Objective	Targets	Performance Indicators	Means of Verification	Assumptions
17 Adequate resource to carry out surveillance activities are allocated and efficiently utilised.	1. Budgeting is done and approved on time 2. Identify development partners (donors, trading partners, international organisation-FAO, OIE, SADC, AU-IBAR, EU, USAID, Russia, Italy)	1.Budget formulated for each financial year 2. Cooperation agreements entered into. 3.Projects approved and implemented	1. Budget document 2. Agreement documents 3. Project implementation reports	1.Ministry of Finance prioritizes Animal Health activities 2. Donors support DVS programs and projects

NSS Surveillance Activities

A.	Routine Surveillance				
	Objective	**Method**	**Activities**	**Time**	**by who**
1	To ensure that Commercial Farmers contribute to the animal health information system	Completion and submission of self-audit forms/ questionnaires (AHD forms)	Forms designed and printed		Epidemiology Unit/ Stakeholders
		Surveys (including Serosurveys)	Guidelines on use of forms made Forms Distributed and collected Forms completed by farmers Data management: collation, validation analysis Make follow-up visits in case of problems noticed according to farm visit protocol Spot checks where necessary Collection of Samples in accordance with laid down protocol e.g. feed, fecal samples Acknowledgement of receipt	July-Dec (January) Jan to Jun (July) As need Arises As need Arises	Epidemiology Unit State veterinarians Farmers Epidemiology Unit State veterinarians State veterinarians Farmers

	Objective	**Method**	**Activities**	**Time**	**by who**
2	Official inspections of all commercial farms to detect diseases or conditions that may precipitate disease outbreaks	Visit all farms to carryout inspections	AHT Visits farms in accordance with Farm inspection protocol	Annually	AHT
		Surveys (including Serosurveys)	Collection of samples in accordance with laid down protocol Give advice and feedback to farmers e.g. corrective action report, Provide inspection report to farmers	During the visit After the visit	
3	Risk based surveillance (additional)	Target potentially high risk farms: export holding farm, non-compliant, problems picked up at abattoirs or auctions, NAMLITS defaulters	Compile list of problem farms as they arise and arrange to visit them	As need Arises	State veterinarians & CAHT
		Inspections must be thorough looking at selected production parameters	Compile farm history/profile specifying problem areas AHT Farm Visit in accordance in Farm visit protocol Compilation of detailed report to be submitted to the CV	During the visit	AHT
			Give advice and feedback to farmers e.g. corrective action report, police report and follow-up, attending court cases, etc	After the visit	State Vets, CAHT, AHT
			Collection of relevant samples		AHT

	Objective	**Method**	**Activities**	**Time**	**by who**
4	Equipping farmers with skills to recognise animal disease and to enhance their livestock management skills	Communal/Resettlement/emerging Farm visit for Extension, Training, addressing farmers associations, etc	Assist farmers with extension and livestock management e.g. demonstrating castration, dehorning, vaccination, treating wounds, abscesses, clinical services, recognition and management of disease in animals, etc	every six months	State Vets, CAHT, AHT, DVS Advisory Services
5	Official inspections of animals in Communal/Resettlement areas	Communal/Resettlement Farms inspection and Data Gathering	AHT Farm Visits in accordance with Farm visit protocols	Every 6 months in the FMD free zone Every month in the protection & infected zone	AHT, Stock Inspections Assistants
6	Control trans-frontier movement of animals into/from neighbouring countries	Import controls	Recording, inspection of animals and collection of samples for priority diseases as they enter the country.	ongoing	VHAI/vet border control inspectors
			Quarantine and testing where necessary Imported animals ID and tracing	ongoing	SV/AHT

	Objective	Method	Activities	Time	by who
7	Early Detection in the former surveillance Zone	Inspection visits	AHT Farm Visit in accordance with Farm visit protocol	every six months	AHT
		Supervise Quarantine Surveys (including Serosurveys)	Quarantine supervision Report Collection of Samples in accordance with laid down protocols Give advice and feedback to farmers e.g. corrective action report, Provide inspection report to farmers Intensive farmers training		State Vet, AHT
8	Detection of animal diseases or non compliance at places where animals congregate for e.g. auction, quarantine stations, exhibitions, vaccination points (crush pens)	Supervision of Auction Sales	Supervise Auction sale in accordance with auction Protocols	on-going	AHT
		Supervision of Animal Exhibitions Supervision of quarantine. Inspect animals during routine activities e.g. vaccinations, tagging	Supervise Auction in Accordance with Exhibition Inspection protocol Supervise quarantine in Accordance with the quarantine protocol, collection of samples Clinical inspection, collection of serology samples for priority animal diseases	At every Exhibition Ongoing During vaccination campaigns	AHT SV/AHT

	Objective	Method	Activities	Time	by who
9	Monitoring movements of livestock and livestock products	Administer the NamLITS system	Administer the identification & registration of animals, record animal events such as movements, slaughter, births, deaths, vaccinations, tests, exports, imports. Use the information captured for trace-back and trace-forward in cases of disease outbreaks,	Ongoing	CV NamLITS and support staff.
		Manning of check points by trained personnel	Conduct checks in accordance with protocol for check points	Ongoing	Check-Point Personnel
10	Surveillance & Monitoring of Disease at Abattoirs	Ante-mortem inspection	Conduct ante-mortem inspection in accordance with laid down procedures	ongoing	State Veterinarian
		Post Mortem Inspection Conduct abattoir based surveys Traceback and follow-up of problems noticed	Conduct post-mortem inspection in accordance with laid down procedures Collection of samples e.g. BSE, residue, microbiological samples for lab analysis, Reports to responsible field state vet Feedback reports to farmers	ongoing ongoing ongoing ongoing	State Vet VHI/VHIA State Veterinarian Abattoir State Veterinarian Field State Veterinarian

	Objective	Method	Activities	Time	by who
11	Prevent the introduction of animal disease into Namibia	Import Control	Inspection of imported livestock, livestock products and other risky material at entry points.	Ongoing	State Vets
			Inspect import documentation to check its compliance with import requirements	Ongoing	VHIA import/export control
			Identification and Quarantine of imported livestock	Ongoing	SV
			Vaccinate animals at entry points e.g. CBPP	Ongoing	AHT
B	**Structured/non-structured Surveys**				
12	Establish disease status of animal populations	Conduct sample based surveys for priority animal diseases (FMD, CBPP) including post vaccination serology	Study Design, data analysis and reporting	FMD & CBPP= Every year in the protection zone	Epidemiologist
			Sample collection, processing and shipping	During CBPP vaccination campaigns or in specifically planned surveys	Animal disease control
			Testing of samples	Within one month of sample submission	Diagnosticians

	Objective	Method	Activities	Time	by who
13	Laboratory testing for import/export purposes	Conduct surveys/tests in accordance with laid down protocol for specific disease entities	Study design	on-going	Epidemiologist
		e.g. FMD, CBPP, BSE, B. melitensis, B abortus, Newcastle Disease, Avian Influenza, Tuberculosis, EVA, Dourine, RVF, Rabies antibody titres, salmonella, E. Coli O157:H7	Collection of samples for diseases , Lab testing, interpretation of results, Data analysis, publication and feedback of results	Ongoing	Lab/State Veterinarians
		Submit BSE dossier to OIE In 7 years starting from 2010	Sampling and testing in accordance with OIE guidelines	By 2017	Epidemiology
14	Laboratory testing for diseases of economic significance	IBR, BVD, Trypanosomosis, campylobacteriosis, ASF, BT, trichomoniasis, chlamydophila, Brucellosis	Collection of samples for diseases , Lab testing, interpretation of results, Data analysis, publication of results	Ongoing	Lab
15	Disease investigation	React to calls or reports by farmers,	Clinical, pathological and Laboratory diagnosis, prescribing medicines, telephonic advice etc	Ongoing	State & private Veterinarian,

	Objective	Method	Activities	Time	by who
16	Outbreak Investigation and management	Institute investigations, plan and execute control measures	Activate response plans	In response to outbreak	CVO
			Plan and execute control measures	In response to a outbreak	DCVO Disease Control
			Trace back and trace forward animal movement/disease spread		CV NamLITS
			Clinical, pathological and Laboratory diagnosis, prescribing medicines, telephonic advice etc		State & private Veterinarian, diagnostician
			Communication strategy and plan (hotlines, hot email, website, blog)		Advisory services
			review contingency plans and disease control protocols		Epidemiologist

	Objective	Method	Activities	Time	by who
17	Herd health Management	Conduct Head Health Visits to farms Electronic capture of information for herd health and production management via RFID technology	Give herd health advice, conduct fertility tests, pregnancy diagnosis, udder health, nutrition, pasture management, housing, biosecurity, immunisation advice etc collect relevant samples.	ongoing	State Vets, private vets NamLITs CV
			Completion of Herd Health electronic/paper forms	ongoing	State Vets
18	To ensure that private veterinarians contribute to the animal health information system	State veterinarian to liaise with private vets	Completion of questionnaires	Monthly	State Veterinarian
			check drug records	Annually	State Vet
19	To ensure that drug/feed distributors/manufacturers contribute to the animal health information system	State veterinarian to visit with drug/feed manufacturers & distributors	Check drug/feed stores and records Collect relevant samples	every six months	State Veterinarian

	Objective	Method	Activities	Time	by who
20	Ensure that all animal health related data and information are managed in a timely manner.	Animal health information management	Surveillance Data is captured, collated, computerised, and validated analysed, synthesised and reports generated.	Monthly, Quarterly, annual and ad-hoc reports generated	Epidemiology section
			Data bases are constructed surveys are designed	As required	Epidemiology section
			User friendly electronic data capture & analysis methods are developed and staff trained in their use-e.g. digital pen technology, tough book, RFID	As requires	Epidemiology section
			Staff trained in epidemiological principals	As required	Training section
			Desk research on surveillance methodology is undertaken	As required	Specialist epidemiologist
21	Supervision	Internal and external audits at all levels	Regular/risk based & ad hoc audits conducted in accordance with schedules & audit guidelines Writing Audit report	-Quarterly for internal audits -Risk based at abattoirs with minimum of bi-annually -accordance with schedules	Compliance officers Quality assurance managers Middle and top managers OIE-PVS EU FSIS etc
			Corrective action reports	Within the prescribed period	Audited office or establishment

	Objective	Method	Activities	Time	by who
23	Planning	Meetings and workshops	Annual planning of activities	January of each year	CVO
			Budgeting & Projects planning	June -August	CVO, DCVO, CV, SV
			Procurement	June-Planning	Chief Control Officer
			Surveillance	May	CV epidemiology
			Control measures	May	DCVO disease control
			Training, conferences, workshops	January	CV Advisory services
			Bilateral meetings-Angola, RSA, Botswana & Zambia	As per agreement	CVO
			Review policies and legislation	Every 5 years	CVO
			Review contingency plans, guidelines, SOPs	April	CVO
			Review international standards and requirements of trading partners	November	OIE delegate and focal points

The Namibian Epidemiology and Animal Health Information System

Introduction

[Information from DVS Annual Report 2011]

- The Namibian Epidemiology and Animal Health Information System aims to provide timely and accurate information through surveillance and monitoring national animal health to support trade in livestock and livestock products and to meet international reporting obligations.
- The primary objectives of the Epidemiology Section which coordinates the information system are to collect relevant data on animal health status from all 14 regions of the country; collate, manage, analyze and report on data collected, to accurately reflect Namibia's animal health status, surveillance and disease control activities.
- Apart from the outputs aiding the decision making process at national level, the information generated is critical for market access for trade in livestock and livestock products.
- Namibia has a nationwide computerized system for the collection of animal disease and related data (grazing, animal condition, vaccinations, treatment) which was set up in 1985 and has data from 1986 to the present.
- The system consists of a number of sub-systems handling detailed disease and herd health data from Veterinarians, disease and related data from Animal Health Inspectors, laboratory results and abattoir data; and uses different forms for data collection.
- Most of the data collected is geo-referenced allowing for mapping to be done.
- The information system can also handle data collected from surveys and vaccination campaigns.
- The information flow through the disease information system is given in a flow-chart below.

The professional sub-system

- The professional Subsystem is based on data collected by veterinarians using disease report forms (**DRF**), herd health forms (**HHF**) and abattoir high incidence forms (**AHIF**) all of which capture the state veterinary district, farm name, number of animals affected and at risk, as well as the tentative diagnosis.
- The system is incident-based with data only being collected when Veterinarians are called out or after telephonic consultations (passive surveillance). Although coverage is low (about 2% of animals in the region), accuracy is very high.
- The professional sub-system has provision for validation of diagnosis based on additional information or laboratory diagnosis.
- The data has been for many years captured on an in-house developed information system.

Animal Health Technician Sub-system

- The system involves the use of two types of questionnaires which are completed by Animal Health Technician (AHT) after visiting a farm or community.
- The first one is a Animal Health Inspection form (**AHIF**) which is used to report on diseases and a variety of other issues (condition of animals, grazing etc.) on commercial farms south of the veterinary cordon fence.
- Visits to farms are done on a scheduled programme basis. However, instead of visiting each and every farm as was done in the past, the AHT is required to inspect a statistically representative number of farms in his/her area of responsibility.
- The rest of surveillance data is then submitted by farmers themselves after they complete the forms on their own. To ensure uniformity, each farmer was given a manual which explains in detail how to complete the forms. A trial run with 60 farmers indicated that most farmers could complete the **AHD** form competently. The AHT is required to ensure that the forms are distributed to all farmers in his area and that all farmers return the forms back to the office. This ensures that farmers participate in disease surveillance and gives them the opportunity to reflect on their performance in terms of management as well as record keeping on their farms.
- **Community Visit Forms** (formerly crush-pen visit forms) are used in the northern communal areas and are used to collect similar data to that collected on **AHIFs**.
- The system is not incident-based but collects historical data in summary form. Coverage is very good (80% of animals are inspected) but accuracy is not as high because data is based on reports from farmers. The accuracy of the sub-system is expected to improve with better training of AHTs.

The abattoir sub-system

- The abattoir sub-system operates at all export abattoirs manned by official veterinary staff
- Data are collected on slaughter high incidence forms (**AHIF**) to report on diseases and other conditions showing a high incidence in a specific consignment
- Accuracy is good but coverage is limited to animals slaughtered at export abattoirs
- Together with the permit system this system allows for tracing back to be done for conditions of interest.

Data Processing and Report generation

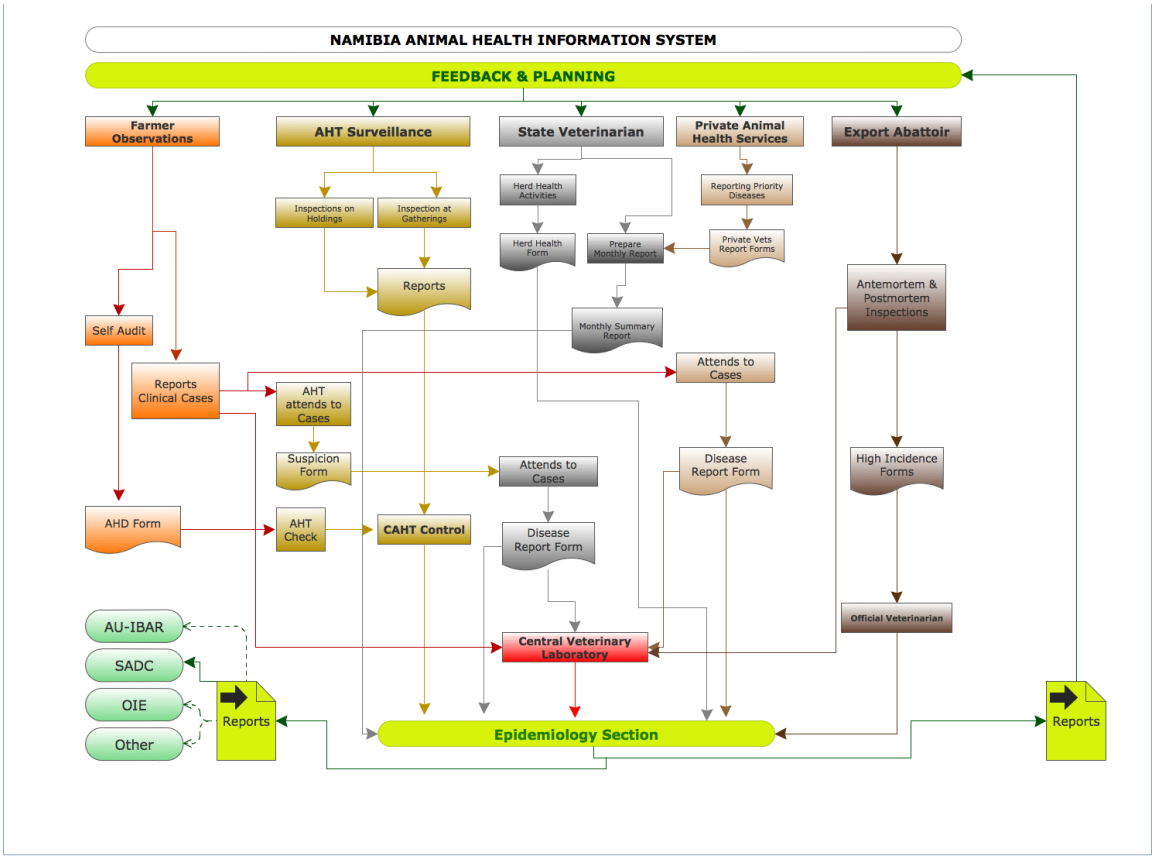
All the data collected are sent to the central epidemiology unit for processing and reporting Epidemiology Section produces reports and feedback to stakeholders, including:

- National Monthly Summary Report
- Disease Listing
- Animal Health Inspection Update
- Epidemiology Update and
- Annual Report

The unit also reports to:

- The OIE twice a year
- Monthly to the Southern African Development Community's (SADC) Livestock Information Management System (LIMS)
- Monthly to the African Union's Inter Africa Bureau for Animal Resources (AU-IBAR).

The flow of information and reporting is shown in the figure below.



Brucella melitensis surveillance

Brucella melitensis sampling protocol and maintenance of free status

For a farm to qualify for export of lamb to the European Union one of the requirements is to be certified free of *Brucella melitensis* at the time of slaughter. In order to fulfill this requirement a sample-based survey targeting both sheep and goats on the qualifying farm must be conducted annually following the protocol outlined in the relevant circular.

Briefly, Sampling should be targeted at both sheep and goats on all holdings supplying sheep for production of lamb destined for the European Union. Sampling should be prioritised to adult males first, followed by adult females. A minimum sample size of 35 applies (or all eligible animals if less than 35) and sampling should be by systematic random sampling, with proportional representation of both species. Animals with clinical signs suggestive of brucellosis (epididymitis, orchitis, abortion, retained placenta, etc) should be preferentially targeted for sampling.

See **Circular V3 of 2013: *Brucella melitensis* surveillance** for more details.

***Brucella melitensis* disease summary**

BSE surveillance

Bovine spongiform encephalopathy has never been diagnosed in Namibia. However because of the seriousness which is attached to this disease particularly in reference to serious trade implications Namibia has a national BSE Surveillance Programme.

Namibia's national BSE Surveillance Programme consists of awareness and extension, inspection visits, sampling and laboratory testing from abattoirs and the field, control of ruminant derived protein (feed ban on feeding livestock with ruminant derived proteins), control and removal of specified risk material at abattoirs, import control and prosecutions of transgressors.

Following an OIE resolution in May 2007 countries were re-categorised based on their BSE risk status into three categories: (I) countries or regions with a negligible BSE risk, (II) countries or regions with a controlled BSE risk or (III) countries or regions with undetermined BSE risk. Namibia has been re-categorised into a country or region with undetermined BSE risk: "A country or region for which the determination of BSE status has not been concluded, or which does not meet the conditions to be fulfilled by the 'country or region to be classified in one of the other categories."

Namibia's national BSE Surveillance Programme includes the following main elements:

- monitoring and enforcement of the ban on feeding of ruminant-derived meat and bone meal
- passive surveillance and investigation of:
  - Cattle over 24 months of age exhibiting clinical signs consistent with BSE (BSE clinical suspects);
  - Cattle over 1 year of age that undergo casualty slaughter (casualty or emergency slaughter); and
  - Cattle over 1 year of age which are found dead or killed on farm, during transport or at an auction (fallen stock).
- active surveillance at abattoirs of:
  - BSE clinical suspects;
  - Cattle over one year of age that are non-ambulatory, recumbent, unable to rise or to walk without assistance;
  - Cattle over one year of age that are sent for emergency slaughter
  - Fallen stock.

Brainstem from affected animals in the above categories should be collected and submitted (fresh or frozen) to the Central Veterinary Laboratory for BSE screening.

Important note: Samples **MUST** be submitted chilled or frozen and should **NOT** be put in formalin.

Namibia's BSE Surveillance Programme is described in detail in **Circular V9 of 2008: Bovine Spongiform Encephalopathy (BSE) risk analysis and on-going surveillance programme**.

Notifiable diseases list

From: **Animal Health Act, Act No. 1 of 2013**

DISEASE	ANIMALS SUSCEPTIBLE
African Horse Sickness	Horses, mules, donkeys, zebras
African Swine Fever	Pigs, wild pigs, warthogs and bushpigs
Anthrax	Cattle, sheep, goats, pigs, horses, mules, donkeys, game and ostriches
Aujeszky's disease	Pigs
Avian influenza (Fowl plague)	Poultry and birds, including ostriches
Bluetongue	Sheep, cattle and all other ruminant species
Bovine malignant catarrh	Cattle, wildebeest (gnu)
Brucellosis	Cattle, sheep, goats, pigs and dogs
Contagious bovine pleuropneumonia	Cattle, buffalo and water buffalo
Contagious equine metritis	Horses, mules, donkeys and zebras
Corridor of buffalo disease	Cattle and buffalo
Dourine	Horses, mules, donkeys and zebras
Equine Infectious Anaemia	Horses, mules, donkeys and zebras
Equine viral arteritis	Horses, mules, donkeys and zebras
Foot and mouth disease	Cattle, sheep, goats, pigs, cloven-hoofed animals and elephants
Glanders (Farcy)	Horses, mules, donkeys and zebras
Hog Cholera (Classical Swine Fever)	Pigs, wild pigs, warthogs and bushpigs
Johne’s disease	Cattle and sheep
Lumpy skin disease	Cattle
Mange (*Psoroptes*)	Cattle and goats
Nagana	Cattle, pigs, dogs, horses, mules and donkeys
Newcastle disease	Poultry and birds, including ostriches
Psittacosis (Avian chlamydiosis)	Poultry and birds
Rabies	Dogs, cats and wild carnivores, cattle, sheep, goats, pigs, horses, mules and donkeys
Rift Valley Fever	Cattle, sheep and goats
Rinderpest	Cattle and other cloven-hoofed animals
Salmonella enteritidis	All fowls, including poultry, and ostriches
Scrapie	Sheep and goats
Sheep scab (*Psoroptes ovis*)	Sheep and goats

Swine vesicular disease	Pigs
Tuberculosis	Cattle, pigs and fowls
Foreign animal diseases not previously reported in Namibia	All animals

A pdf version of this list can be found **here**.

Planning a surveillance program

Planning animal health surveillance

Surveillance is usually undertaken to provide data to support policy or operational decisions in relation to animal disease control or response. Good decisions depend on good surveillance data and good surveillance data will only come from a properly designed and implemented surveillance program.

It is therefore essential that any surveillance program or activity is properly planned and budgeted. Programs that are not properly planned and budgeted can become entrenched in government policy (with little justification), are more likely to fail to meet objectives and often provide poor quality data on which to base policy and operational decisions.

The following sections provide a brief outline of the process for planning and design of a surveillance program. Individual surveillance activities or programs may vary slightly, depending on their specific purpose and requirements, but the following issues will need to be considered and addressed in most cases. Essentially, the headings below can be used as headings for the project plan/design document.

Background

Provide any relevant background information and the reasons for the surveillance:

- what is the purpose?
- what species/diseases are included?
- why is it important – what is the rationale or need for the program? Why is it being done?
- who is affected?
- what is expected to be achieved (in broad terms)?
- what are the main expected benefits?

Purpose/objectives – SMART

Provide any relevant background information and the reasons for the surveillance:

- What are the specific objectives of the surveillance? These should relate to the overall purpose and should be SMART:
  - Specific
  - Measurable
  - Achievable
  - Relevent/Result-oriented and
  - Time-limited

Examples of SMART objectives include:

- To estimate, by [specified date], the true farm-level prevalence of brucellosis in X, with 95% confidence that the estimate is within +/- 5% or the true value.
- To undertake sufficient surveillance by [specified date] to provide 95% confidence that if disease x was present at a prevalence greater than or equal to 1% of herds and 10% of animals within infected herds it would have been

detected.

Well written objectives make the technical design of the surveillance much simpler because they provide clear specifications of the expected outcomes, so that the surveillance has to be designed to match.

Expected outcomes of surveillance

What are the expected outcomes of the surveillance? Include a statement of the broad expected outcomes. This is effectively an extension of the specific objectives to describe what the surveillance is expected to achieve. This should also include some statement as to why this is important and how the information will be used (what decisions will it affect).

For example, the objective might be to estimate prevalence of brucellosis in a region with a certain precision, but the expected outcomes might be to determine brucellosis prevalence in the region to support a decision whether to proceed with eradication or implement an ongoing control program to reduce prevalence.

Identify stakeholders/responsible parties and their requirements

Who has an interest in the outcomes of the surveillance? Stakeholders include any person or group who have an interest in the outcomes of the surveillance or the delivery of the program. Some stakeholders will be direct users of the surveillance outputs (for example government agencies during trade negotiations), some will be interested but not direct users (for example health agencies for surveillance on potential zoonotic diseases), while others may be involved in managing and implementing the surveillance or providing data (delivery). Some stakeholders may have more than one role. Examples of stakeholders include:

- government agencies (agriculture, trade, health, others?)
- farming industry organisations
- individual farmers
- veterinary laboratories
- meat processors
- livestock traders
- local communities
- veterinarians and veterinary associations
- animal welfare groups
- the general public
- livestock exporters

Depending on the nature and purpose of the surveillance, it is important to consult relevant stakeholders to ensure the program meets their needs and can be delivered in an effective and timely manner. Ideally the plan should identify important stakeholders and address how the plan has been developed to meet their needs and concerns.

Define the disease/condition of interest

What are the disease or diseases (or conditions) of primary interest? This could be a single disease (for example BSE), multiple specific diseases (for example arboviruses), or specific syndromes or conditions (sudden death). For each disease or condition include a case definition that can be used to determine whether individual suspect animals are “cases” or not. Case definitions may also be required at a herd or farm level.

Describe the characteristics of the program

Describe the program in terms of:

- **Presence/absence:** Is the disease of interest “known” or “unknown” (i.e. screening for new or emerging diseases) and if known is it present or absent from the country/region of interest?

- **Purpose** of the surveillance:
  - for diseases that are absent – demonstrate freedom, early detection of incursions,
  - for diseases that are present – prevalence estimation, case detection
- **Coverage** of the population:
  - Is the entire population part of the program (comprehensive coverage) or is only a portion of the population covered? If only a portion, is coverage high or low?
- **Representativeness**:
  - does the surveillance need to be representative, or can it be risk-based?
  - Why? Justify the decision
- **Disease focus**:
  - is the surveillance targeted at a specific disease (or diseases), or is it more general
- **Data source**:
  - Is the surveillance an active data collection process specifically for surveillance, or is it passive use of data acquired for other purposes (or is it a mix of active and passive)
- **Timing**:
  - Ongoing (data is coming in all the time)
  - Periodic (surveillance is conducted at regular intervals, e.g. annually)
  - Ad hoc (done repeatedly on an as-needs basis)
  - One-off (e.g. a single survey)
- **Activities**:
  - What are the components of the surveillance?
  - How well do they contribute to the objectives?
  - Are there any gaps and how are they addressed?

Describe potential data sources

Are there existing data sources that can be used?

- What are they?
- Who controls the data?
- Can you get access to the data?
- Is the data sufficient for the purpose or do you need additional data?
- What additional data do you need?

Describe reference/target population

Describe the relevant populations:

- Reference or target population?
  - Intensive, extensive, both, other
  - Domestic, wildlife
  - Terrestrial, aquatic
  - Sedentary, migratory, nomadic
  - Geographic definition (country, province, national park)
- Source/study population?
  - Ideally the same as the reference population
- Epidemiological units?
  - farms, herds, flocks, villages, etc

- Sampling units?
  - animals or farms?

Describe sampling strategy & sample size calculations

- Sampling methods:
  - simple random sampling, systematic, stratified, multi-stage?
  - describe strata and stages if appropriate
  - What is the sampling frame?
- assumptions for sample size calculations
- Tests, sensitivity and specificity, etc
- Final sample size(s)

Dealing with positives (for diseases that are absent)

Don't assume that positive results won't occur. You need to have a clearly described process for follow-up and resolution of any positives that do occur (as either confirmed cases or false positives), particularly if the surveillance is to support claims for freedom (or for detection of incursions). The resolution and response can include a number of elements, including:

- additional testing of original sample(s) using more specific tests
- collection of additional samples from the animals and/or farms of origin for further testing
- necropsy of suspect animals and detailed examination/testing
- investigation by an emergency/first response team

Implementation

Describe how the surveillance will be implemented. This can be quite broad and depends very much on the nature of the surveillance being undertaken. For example implementation of a farmer reporting system is substantially different from a program based on abattoir inspection or active on-farm sampling.

Some examples of broad approaches to surveillance include:

- Passive farmer reporting system
- Sentinel veterinary practice
- Participatory disease surveillance
- Negative (zero) reporting
- SMS or telephone hotline reporting system
- Abattoir surveillance
- Market surveillance
- Diptank surveillance
- Checkpoint / quarantine / export station surveillance
- Sentinel herd / flock
- Syndromic (lay reporting)
- Syndromic (veterinary classification)
- Indirect surveillance
- Representative survey
- Risk-based

Data management & analysis

How will data be collected, managed and analysed? There is an almost infinite variety of approaches to data collection and management, depending on the nature and scale of the proposed activity.

Key principles to bear in mind are:

- Minimise opportunities for errors in data entry and transcription by:
  - data entry at source rather than centrally
  - minimizing paper-based records
  - using data-entry controls in spreadsheets and databases to ensure only valid data is entered
  - quality checking and feedback to users if data doesn't make sense
- For small, one-off projects a simple spreadsheet is likely to meet the needs and the time/cost for developing a more sophisticated database is often unwarranted
- For larger, ongoing projects, particularly at a national or regional scale development of a centralized database is usually required. A centralized database system has significant advantages of:
  - high level of data entry controls to ensure data integrity
  - provision of multiple methods of remote data entry (for example, direct web-based data entry, coded SMS, spreadsheet uploads, etc) to suit different levels of usage and technical capacity of staff
  - ability to extract required data for reporting at multiple different levels (local, district, provincial/regional and national)
  - integration with laboratory and other systems
  - integration with existing reporting requirements at each level.
  - feedback to users to encourage continuing usage.

It is important to also consider how the data will be analysed. For simple projects this may simply be an analysis of the data and report of the outcomes. For more complex and longer term projects there will be a variety of reporting requirements to meet needs at different levels and for different stakeholders. Where possible, reporting requirements and methods of analysis should be specified in the design of the project.

Project management and organization

Describe how the project will be organised and managed, including:

- Who's involved and roles/responsibilities
- Logistics
- Timeline and milestones
- Monitoring progress
- Performance measures and review process (evaluation)
- Reporting and communication

Budget

- What is the budget for the activity?
- Where is funding coming from?
- Are there any supporting agencies providing additional funding or in-kind support?

Investigating Animal Diseases

Disease Investigation - Special Considerations

The following Disease Investigation section is based on material and images obtained from the *Manual for Animal Health Technicians* by Dr. Rainer Hassel, and from the DVS' Disease investigation guidelines.

Social Considerations

- Advise the owner of the farm of your visit.
- When stopping at a village for a disease investigation, know, and follow, the local traditions in greetings and inform the traditional authority of your visit.
- Present yourself and the goal of your visit, avoiding the use of technical jargon such as the scientific name of pathogen agents and medical terms.
- Be very patient to gain the confidence of the farmers.

Human health considerations

There are a number of important infectious diseases of animals which you may come across during your investigations that can be harmful or even fatal for humans. These diseases include **Rabies**, **Brucellosis**, **Rift Valley Fever** and **Anthrax**.

It is essential that you wear personal protective equipment as outlined in **Operator protection**, when investigating animal disease outbreaks of unknown origin.

For basic protection when undertaking a post mortem wear:

- overalls and gumboots
- plastic apron
- gloves
- face mask

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Disease Investigation - Diagnosis and Investigation Principles

Principles of diagnosis and investigation

To reach the correct diagnosis of a disease a complete systematic investigation using the following steps is required (see **Investigation checklist**):

1. Identification or description of the animal or animals (**Animal identification form**)
2. The history of the case (**Case History form**)
3. Clinical symptoms observed by the owner (**Form for Clinical Symptoms observed by the owner**)
4. Complete clinical examination if the animal is still alive (**Clinical examination findings form**)
5. Necropsy if animals are dead or slaughtered (**Findings of necropsy examination**)
6. Taking of samples for laboratory tests (**Field diagnostic procedures** and **Laboratory submission guidelines**)
7. Recording of the findings

Identification and description of the animal/s

The following information about the affected animal or animals must be recorded on the **Animal identification form**.

- Name, address and contact details of the owner
- Farm name or location and farm **NamLITS** number
- District and state veterinary area
- Other available identification e.g. ear tags, tattoo, brand or microchip
- Species and breed
- Sex - in case of male animals whether castrated or not, in case of females, whether they were mated, are pregnant or not pregnant or have given birth.
- Age of sick/dead animals
- Size of the herd (number of animals grazing and/ or drinking together)

This detail is required because certain diseases or condition are more common or occur only in certain species of animals, sexes or age groups and some breeds are more susceptible to certain diseases than others.

History of case

Record the following information on the **Case History** form.

- The number of animals affected/sick
- The number of affected animals which died
- The number of affected animals which recovered
- What percentage of animals from the herd or flock or group was affected?
- How many pregnant animals aborted?
- Were there any stillbirths, weak newborn animals, animals born with any defects or any abnormalities?
- Did any newborn animals die soon after being born?
- Did any female animals become sick of die of causes that could be related to abortions, stillbirths or other problems associated with giving birth?
- The date of onset of the disease and the duration. Is it still ongoing?
- The pattern of the outbreak or interval at which cases occurred, for example many cases within a short time, a few cases within a short time, many cases over a long time, a few cases over a long time, only a single isolated case.
- Did the outbreak or the cases occur at certain times of the year or season?

- What age groups of animals are affected; are certain age groups more affected than others?
- Are both sexes equally or differently affected?
- Did new animals enter the herd, or were two herds recently merged? If so, when?
- Who are the sick animals:
  - Those that entered the herd?
  - Animals that were already there
  - Animals of mixed origin?
- Does the disease only occur in one herd, or does it occur in several herds in the area?
- What game species occur in this area
- Are the cases limited to certain camps or parts or areas of the farm or place
- What is the condition and quality of the veld or grazing where these animals feed
- Are any poisonous plants known to grow in the area or on the farm
- What is the general condition of all the animals in the group or herd, both affected and not affected.
- What additional feeding or supplementation do the animals get, if any
- What is the source and quality of the drinking water; has the water been tested previously
- Have the affected animals received any treatment; with what, how often, for how long and what was the outcome of this treatment. This information may influence the interpretation of certain laboratory results
- What is the vaccination protocol for these animals and was it implemented correctly (in case of vaccinations, those specific infectious diseases can generally be ruled out)
- What is the protocol for the control of internal parasites and was it implemented correctly
- What is the protocol for the control of external parasites and was it implemented correctly
- Were animals exposed or subjected to any stress factors like weaning, sudden extreme weather fluctuations (cold, wind, rain, hail), sudden changes of nutrition, transport over long distances, overcrowding, mixed with strange animals at a show or auction. Diseases like **Pasteurellosis** are associated with stress factors.
- Are any humans ill from possibly related causes due to contact with affected animals; this could indicate a zoonotic disease like **Brucellosis**
- Are any protocols in place for the control of venereal diseases like Vibriosis or Trichomoniasis
- What is the fertility status of the group (if applicable); lambing rates, calving rates
- Recordkeeping by the owner or farmer
- Any other information

Clinical signs observed by the owner

Why do the farmers say that the animals are sick? What do the animals do that is not right?

Ask the owner about any abnormality observed in respect of the following questions and record the abnormalities they observed on the **Clinical Symptom observed by owner** form.

- **The general appearance or behaviour of the animal**, for example listless, appearing dumb, depressed, inactive, hyperactive, aggressive, interaction with other animals, exercise intolerance, separated from other animals, ability to nurse and feed offspring, pica, etc.
- **Eating and drinking**. Did the owner notice whether the animal was still eating and drinking or not.
- **Body temperature** (did the owner measure and record the body temperature)
- **The locomotor system**; any abnormalities of the gait and balance noticed by the owner; lameness, stiffness, etc.
- **The nervous systems**; any signs of paralysis (partial or complete) either spastic or flaccid, including tongue, eyelids, lips, tail, legs, head and neck; any spasms or convulsions, blindness
- **The digestive system**; excessive salivation, inability to take up chew or swallow food, vomiting (where applicable) regurgitation of food, bloat, constipation, diarrhoea
- **The respiratory system**; discharge from the nose, laboured or difficult breathing, coughing, sneezing

- **The visible mucous membranes**; pale, red, yellow
- **The genitalia and mammary glands** in females; swelling, discharge, discoloration, vaginal prolapse, prolapse of the uterus, retention of foetal membranes (placenta) inability to produce penis, inability to retract penis
- **The urinary system**; animal able to urinate freely, volume and colour of the urine
- **The skin**; swelling, lumps, hair loss, itching and scratching, general condition of the hair coat, wounds, abscesses
- **Any other observations**

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Disease Investigation - Personal Protective Equipment

Personal protective equipment

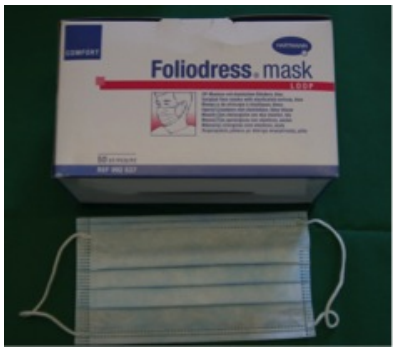
Gloves should always be worn, when:

- Examining or manipulating the mouth and tongue of an animal showing frothing at the mouth or excessive salivation
- Handling the carcass or body parts of an animal that died of unknown causes
- Treating a prolapse of the vagina or uterus
- Treating a retained afterbirth or infection of the uterus, attending to calving and lambing problems, including removal of a dead and decomposing foetus
- Handling of aborted foetuses
- Treating infected wounds and abscesses
- Handling the head of an animal with suspected **rabies**
- Taking faecal samples from the rectum
- All post mortem examinations
- Applying toxic substances like insecticides to animals.

Arm length, disposable plastic gloves

Non-sterile disposable latex gloves

Face mask



Examples of important infectious diseases which can be harmful or even fatal for humans in this regard include **rabies**, **brucellosis**, **Rift Valley Fever** and **anthrax**.

Protection of the person performing the investigation is therefore very important.

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Disease Investigation - Clinical Examination

Clinical examination

At the end of the examination, write the abnormalities you find on the **Findings of own clinical examination** form.

If many animals are sick, select 2 or 3 for individual clinical examination and then take a general look at the others, concentrating on clinical abnormalities found on the animals you have examined. Look carefully, touch and palpate body parts that do not look right, and do not rush or take shortcuts.

Wherever possible a digital camera or cell phone camera should be used to record any abnormal clinical signs observed during the clinical examination.

Personal protection

Examples of important infectious diseases which can be harmful or even fatal for humans in this regard include **rabies**, **brucellosis**, **Rift Valley Fever** and **anthrax**.

Protection of the person performing the investigation is therefore very important and gloves and other protective equipment should always be worn when handling potentially infectious animals or specimens. See **Personal Protective Equipment** section for more information.

General condition

Firstly, look at the animal from a distance to avoid disturbing it.

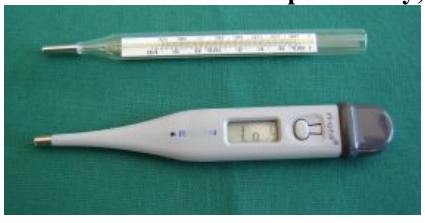
- Is the coat rough or smooth?
- Does the animal look bright, alert and responsive?
- Does it walk around, stand still, or lie down?
- Is breathing normal, or faster or more difficult than usual? Does it cough or grunt?
- Is the abdomen swollen? If yes, on which side? Is the body of the animal symmetrical?
- Does the animal show a strange behavior? If yes, what is abnormal?
- Observe the ability to eat and drink, lack or absence of appetite.

Physical examination

The animal will need to be restrained for you to examine it. It should be held in a crush if one is available, or you ask the herd boy to catch it.

- Rectal Temperature – Take rectal temperature and record abnormal temperatures.
- Also take pulse and respiratory rates
- See **Normal physiological parameters** for normal temperature ranges, pulse and respiratory rates.

Rectal thermometers - top: mercury; bottom: digital



Taking the rectal temperature with a digital thermometer

Head and neck

- Check inside the nose for wounds and/or discharges – are discharges watery or thick?
- Look into the mouth for any abnormality on gums, teeth, tongue. Check for excess salivation, erosions, ulcers, bleeding and check the colour of the mucous membranes; check for foreign bodies in the mouth.
- Look at the eyes: eyeball, conjunctiva and eyelid. Note the presence of:
  - Ocular discharge: uni or bilateral, abundance, aspect
  - Conjunctivitis (pink eye)
  - Abnormal color of the conjunctiva: white or pale, yellow.
- Look into the ears: are there any ticks and which ones?
- Palpate the mandibular lymph nodes; are they enlarged?
- Look at the skin and palpate it if necessary: are there any lumps or wounds? Pinch skin to check for dehydration.

Legs

- Does the animal suffer any pain, stiffness or lameness of one or more legs?
- Feel the legs, mainly the articulation: are they painful, swollen and/or hot?
- Are the claws painful or wounded?
- Palpate the prescapular lymph nodes; are they enlarged?

Chest

- Feel the skin and the ribs; is there any swelling or wound?
- Is the respiration normal or abdominal? Any coughing, sneezing, grunting?
- Put your ear against the chest and listen to the noise: is it silent or noisy, regular or not.

Digestive system

- Note condition score of animals
- Look for signs of excessive salivation, regurgitation of food, bloat, constipation and diarrhoea; check for rumen movements by pushing fist into left flank.

Nervous system

Is animal able to see, stand, walk, balance; any signs of paralysis, spasms, convulsions; walking in circles; pressing head against objects

Genital system

- Inspect and palpate testes, sheath and penis in male animals; try to extrude and examine penis
- Inspect the vulva in female animal
- Inspect and palpate the udder; swelling, pain, heat redness; check the milk for the presence of blood or pus.

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Disease Investigation - Necropsy Procedures

Post Mortem Examination

A post mortem examination is carried out on an animal if it is dead or if it is slaughtered for that purpose. An animal must only be slaughtered for a post mortem after a clinical examination has been performed.

Never do a post mortem if you see a black fluid or jelly coming from the mouth, the nose, the anus or any other natural body opening: this might be a case of **anthrax**. You would disseminate the disease and might be contaminated during the necropsy.

For basic protection the person performing a necropsy should **at all times take the necessary precautions to protect himself/herself against possible infection**, by wearing appropriate protection like:

- overalls and gumboots
- plastic apron
- gloves
- face mask

Record when the animal died and all observations on the **Findings of necropsy examination** form.

Observations

The following changes and abnormalities must be recorded:

- Changes in colour: pale, red, black, yellow,
- Changes in size: enlargement or swelling; shrinkage
- Changes in consistency: organ or tissue feels abnormally firm or hard; feels abnormally soft, brittle, doughy or spongy.
- The presence of bleeding or haemorrhage
- The presence of gas in organs or tissues
- The presence of abnormal fluids in tissues, organs or body cavities.
- The presence of internal parasites
- The presence of external parasites
- The presence of external wounds
- The presence of specific lesions like areas of hair loss on the skin, erosions and ulcerations, tumours, abscesses
- Abnormalities of the contents of the digestive systems, forestomachs, stomach, small intestine, large intestine.

Wherever possible a digital camera or cell phone camera should be used to record any abnormalities seen on post mortem.

Equipment needed to do a post mortem

Equipment needed to carry out a post mortem is illustrated here: **PM equipment**

External examination of carcass

The external examination of a carcass should be complete and systematic and include a visual inspection of the area or surroundings where the carcass was found, unless it was removed from the place where it died, or slaughtered for the purpose of a necropsy.

The external examination should include careful examination of the skin and hair, head and face, external thorax and abdomen, external genitalia, legs and feet, as well as the mucous membranes of the eyes and the mouth. It should also include a general assessment of the condition of the animal, as well as any discharges from the mouth, nose or anus.

Any changes or abnormalities as specified under **Clinical examination** should be recorded, including the presence of external parasites. Abnormalities which could be found in an external examination are illustrated in **External examination**.

Internal examination - doing a post mortem

The internal examination requires the removal of the skin and the opening of the thorax (chest) and abdomen and will also require cutting into organs, to examine their internal appearance.

Once again all organs and tissues must be carefully examined for the presence of any of the changes or abnormalities mentioned in section. These include the inside walls of the body cavities, the mouth with teeth and tongue, oesophagus, forestomachs, stomach, small intestine, large intestine, kidneys, bladder, liver, spleen, reproductive organs, diaphragm, heart, trachea, lungs, all lymphnodes and brain.

a. Have the animal lying on its right side, the left side facing up. You stand between the legs looking at the bottom of the animal.
b. Cut the 2 left legs loose from the carcass, so that they are only attached to the top of the carcass by some skin and muscle. Have them lying away from you, over the back of the carcass.
c. Carefully cut open the skin and muscle of the abdomen, starting between the hind legs on the bone of the pelvis and working forwards:
d. First make a hole big enough for 2 fingers and the tip of the knife just in front of the pelvis.
e. Then stick the index and middle fingers of your left hand into this hole, pointing forwards, spread them apart, and pull the skin and muscles away from the organs inside the abdomen. Pull hard.
f. Put the point of the knife in between your two fingers with the blade facing out. Take care! Don't cut your fingers.
g. Carefully cut the skin and muscles open without damaging any of the organs inside. Keep the blade away from the organs by pulling the skin away from the organs with your fingers, and always keeping the blade between your fingers where you can feel it.
h. This is the trickiest part of the post mortem, so take your time. If you damage any organs, you will make a big mess, and it will be much more difficult to see anything.
i. When you get to the white flap of cartilage under the ribs, you stop.
j. Now take the skin again at the pelvis and cut it open towards the top of the animal, until you get to the vertebral processes that you always use for condition scoring. Again be careful not to damage anything inside. Cut along the processes towards the ribs. Leave the flap of skin that you have cut open, attached to the ribs, and let it lie on the ribs.
k. Now you start looking at the organs inside the abdomen.
l. Look at the spleen: measure the length with the palm of your right hand how many handbreadths is it long? Is it smooth or wrinkled? Is the edge sharp or rounded? What colour is it? Is it attached to the flap of skin that you lifted off previously by white stringy matter, or is it only attached to the rumen?

m. Find the place where the oesophagus enters the rumen, towards the front end of the rumen, close to the liver. Loosen the oesophagus from the surrounding organs by pulling on it and sliding your fingers in there. Tie off the oesophagus in two places with a piece of string so that nothing can leak out, and cut through the oesophagus between the 2 strings. Cut the rumen and all the intestines loose from their attachments inside the body. Take care not to cut into the intestines or the rumen. Again, look whether there is any stringy white matter attached to the intestines, apart from the shiny foil. Pull the intestines out of the abdomen onto the ground in front of the animal. Don't worry about getting them dirty.
n. Now step around the animal and pull it back, away from the intestines, so that you can stand between them and the carcass.
o. Cut the liver off from its attachments to the body and put it down inside the abdomen. Look at the liver: what colour is it? Is the edge round or sharp? Is the liver smooth, or are there bumps? Cut into the liver in several places; look at the colour again. Are there Fasciola worms inside (Kavango and Caprivi)? How big is the gall bladder? Cut open the gall bladder. What colour is the fluid? Is it thin (watery) or thick (creamy)?
p. Now cut the kidneys off the top of the body wall and look at them. What colour are they? Are they firm or mushy and soft? Cut them in half and look at them again. Look at the difference between the outside and inside part, and the hollow inside the kidney. Note the colours, and any hard stones in the hollow.
q. If it is a cow, look at the uterus and cut it open. What do you find inside?
r. Make a cut across the chest along the top of the ribs close to the vertebrae, so that you can see all the ribs. Now take your panga and chop the ribs off along the cut. Get someone to pull on the flap of skin and muscle that you have cut away from the abdomen. It helps to cut a hole into it for the person to use as a handle. Try not to damage the lungs as you chop. Then cut and chop the ribs off at the bottom where they all join on to the breastbone. You can now look into the chest cavity:
    - Look at the lungs. What colour are they? Feel them: how do they feel? Take them out, but leave them attached to the trachea. You may cut the trachea off at the neck. Cut into the trachea along its length: do you see foam? What is the colour inside the trachea? Cut into the lungs and especially any parts that are not pink, and feel such parts: are they harder than the rest of the lungs?
    - Look at the heart and cut it open. What colour is it? How does it feel?
t. Now look for the following lymph nodes and cut them into two or three pieces: mandibular, prescapular, and prefemoral lymph nodes.
u. Now cut open the rumen and take a look inside. What do the contents look like?
v. Cut open the omasum. What do the contents look like?
w. Cut open the abomasum. What do the contents look like here? Are there any worms?
x. Cut open the intestines. Are there any worms?
y. Any other abnormality?

Abnormalities

Some of the abnormalities which could be found in an internal examination are illustrated here: **Abnormalities**

Note: When carcasses are in an advanced stage of decomposition a post mortem may not yield any useful information.

Sample collection

Once again the general principle applies: Rather take too many samples, than too few.

Samples which are not used can always be discarded but once the carcass has been disposed of or has decomposed, the opportunity for sample taking is lost.

Samples that should be collected in the course of a necropsy include:

1. **A peripheral blood smear.** Cut off a part of one ear with the knife of scalpel. The drop of blood required for a blood smear can be obtained from the cut surface. **NB! In all cases of suspected Anthrax a peripheral blood smear must first be examined before proceeding with the necropsy. Remember an Anthrax carcass may not be opened.**
2. **Tissue samples in 10% formalin** of all tissues or organs which appear abnormal. These samples are used for histopathological examination in the laboratory. Remember that tissue samples must not be thicker than 1 cm and the volume of formalin should at least be 10 x the volume of the sample/s.
3. **Tissue samples in sealable plastic bags** of all tissues or organs which appear abnormal. These samples are used to check for bacteria, viruses and other micro-organisms. It is very important, that these samples must be kept cold (4 – 8 degrees Celsius) until they reach the laboratory.
4. **Faeces and other contents of the digestive tract** which appear abnormal. It can be collected either in specimen jars or sealable plastic bags. The samples must be kept cold (4 - 8 degrees Celsius) until they reach the laboratory. These samples can be used by the laboratory to check for poisonous plants (rumen contents), internal parasites and micro-organisms.
5. **Pus and abnormal fluids.** Pus samples are usually collected, using a sterile swab, but also by using sterile syringe and needle. Other abnormal fluids can be gathered in specimen jars or serum sample tubes. Samples must be kept cold until they reach the laboratory.
6. **In case of an abortion the whole aborted foetus and placenta in plastic bags. These samples must be kept cold until they reach the laboratory.**
7. For **Rabies diagnosis**, pieces of the brain stem (Hippocampus) are collected and preserved in 10% formalin and glycerol-saline which is contained in the Tool Kit but provided to all state veterinary offices by the Central Veterinary Laboratory.

Points to remember with regard to a necropsy

1. When performing a necropsy please remember to:
   - Do an external examination
   - Do an internal examination
   - Take sufficient samples, where applicable
   - Certain samples must be kept cold until they reach the laboratory
2. The examination should be complete and systematic
3. All abnormalities should be recorded
4. Examine all tissues for abnormalities in size, color, consistency, odor, haemorrhage and specific lesions.
5. Look out for abnormal fluids in organs body cavities and abnormalities of the contents of the digestive system.
6. Look out for internal and external parasites.
7. When carcasses are in an advanced stage of decomposition a necropsy may not yield any useful information.

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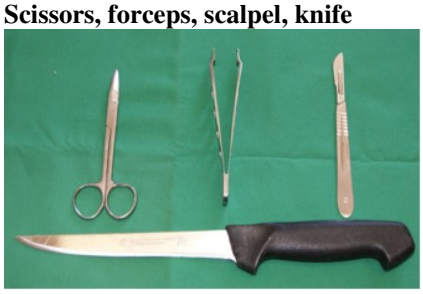
PM equipment

Equipment needed to do a post mortem

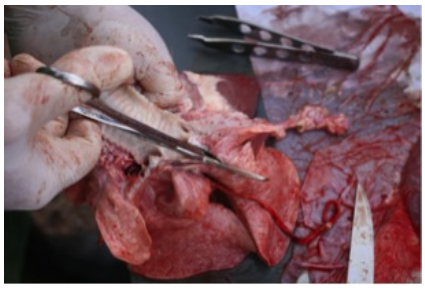
The equipment needed to perform a post mortem include:

Items	Intended use
Scalpel handle and scalpel blades Scissors Forceps Knife	To perform a basic necropsy or post mortem examination and collect samples

Scissors, forceps, scalpel, knife



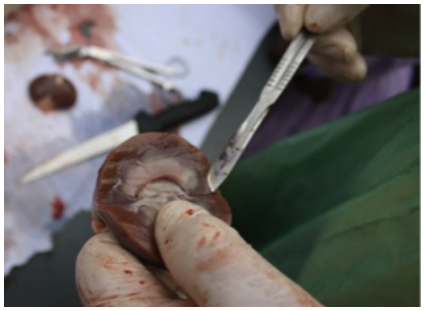
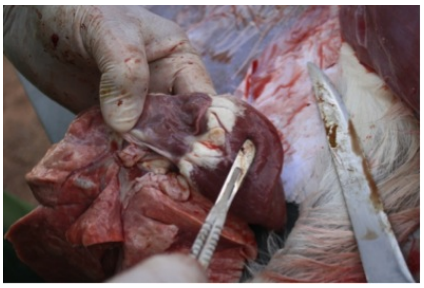
Scissors are used to incise trachea, lung tissue, heart chambers, oesophagus, intestine etc.



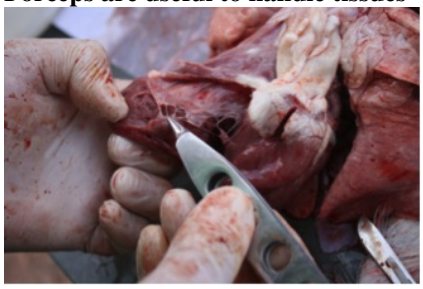
Making an incision into a lymph node using knife

A butcher's knife is used to incise a variety of tissues and organs

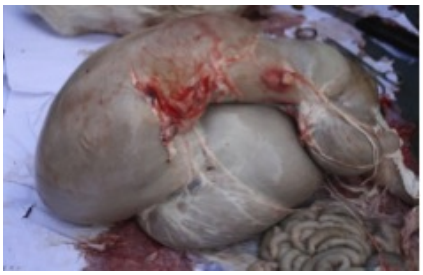
Scalpel handle with disposable blade for incisions and accurate tissue sample taking

Forceps are useful to handle tissues



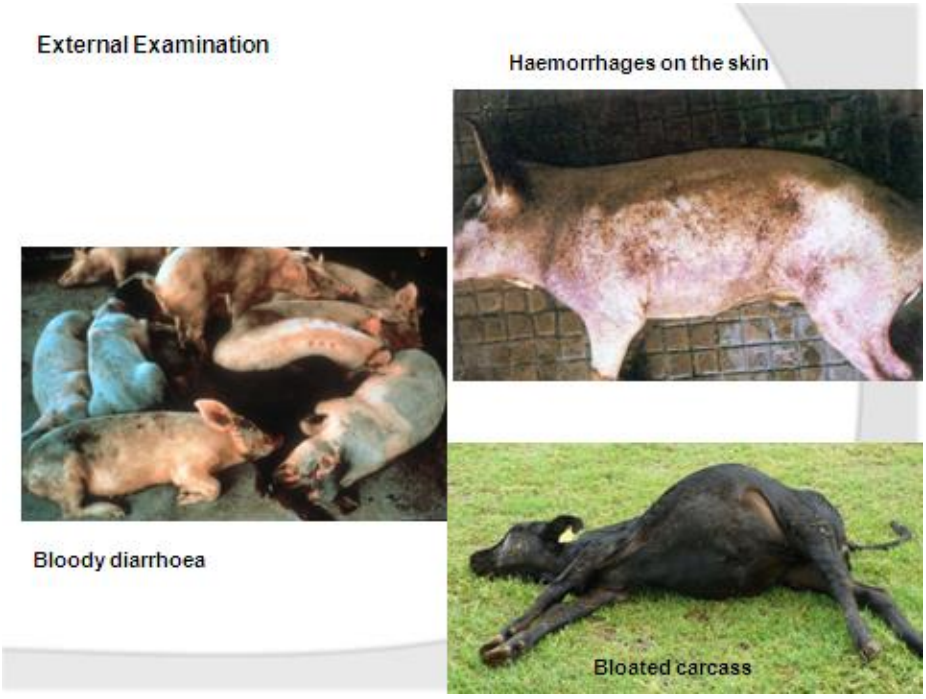
Tie off parts of the digestive system to prevent spillage of intestinal contents

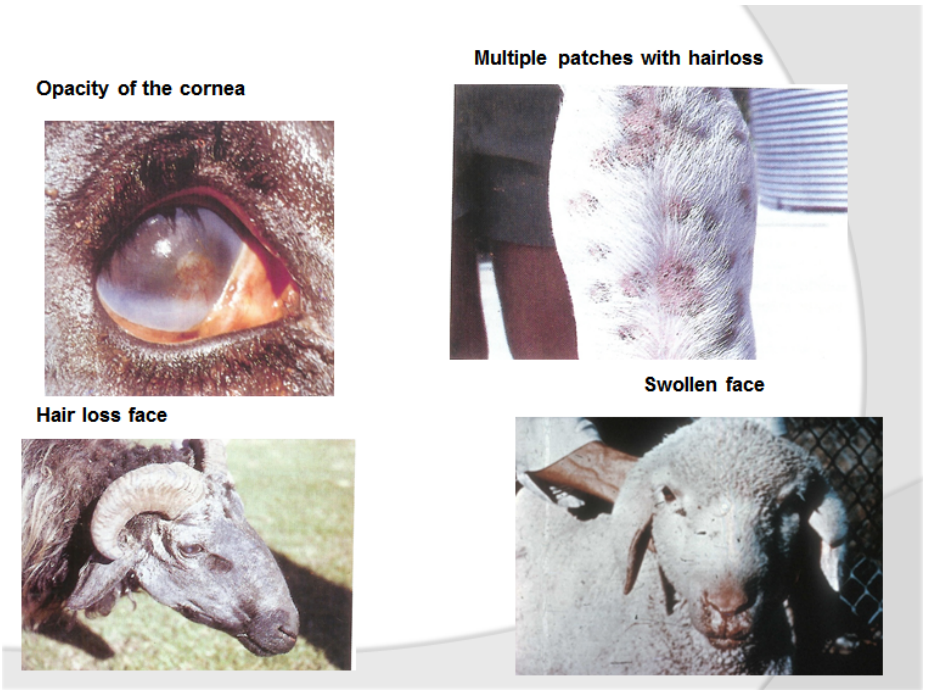



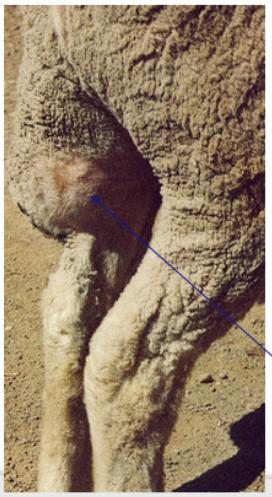
External examination

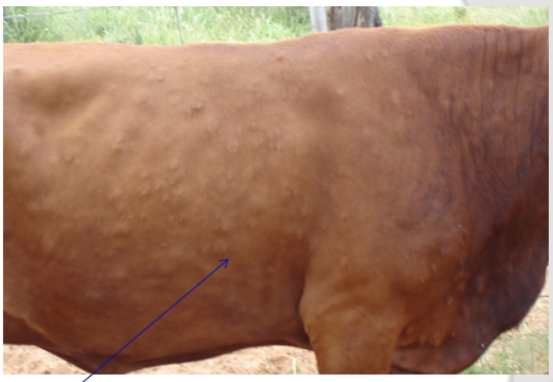
Abnormalities

Some of the abnormalities which could be found in an **external examination** are illustrated below:



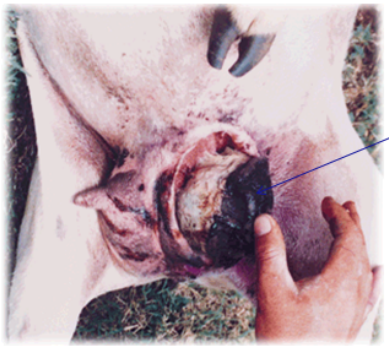




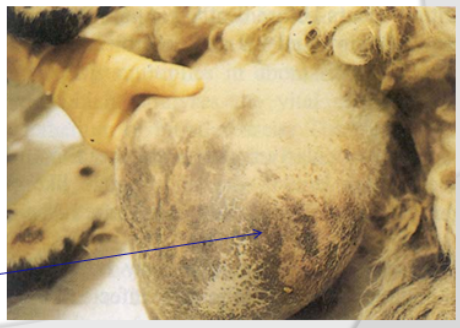


Multiple skin nodules

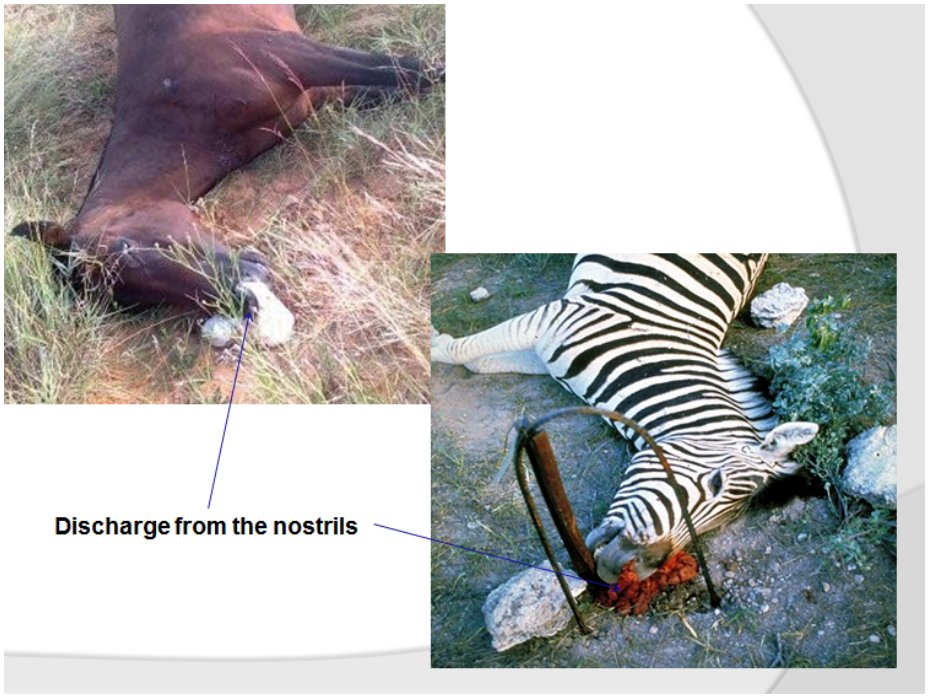
Swollen lymphnode



Gangrene of part of the udder



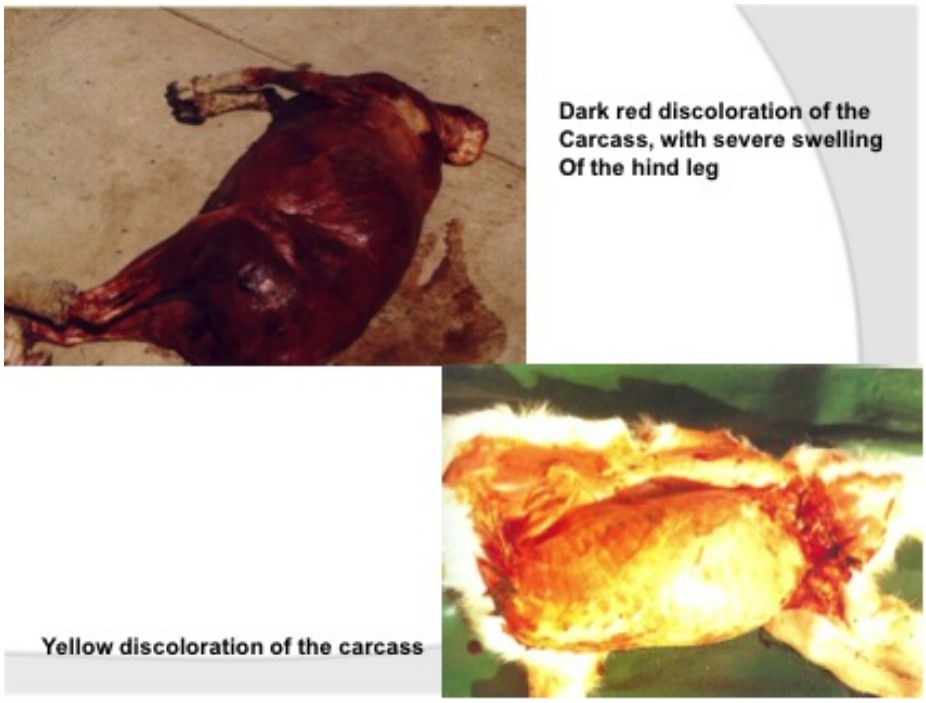
Swelling of one testis



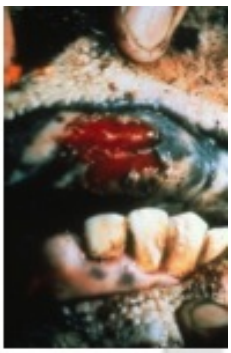
Abnormalities

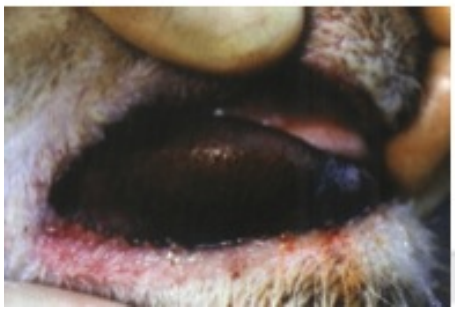
Abnormalities

Some of the abnormalities which could be found in an internal examination are illustrated below:



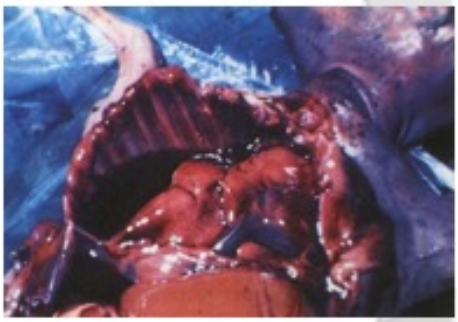
Erosions on the palate

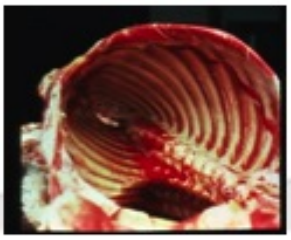




Dark discoloration of the tongue

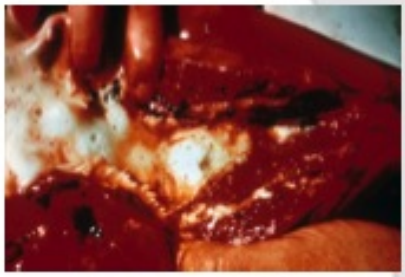
Abnormal fluids in body cavities, in these cases the thoracic cavities



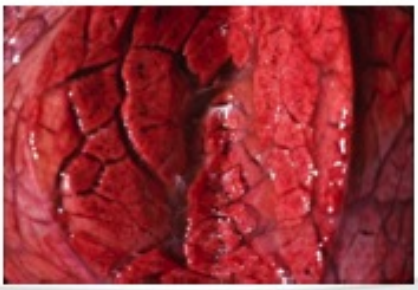


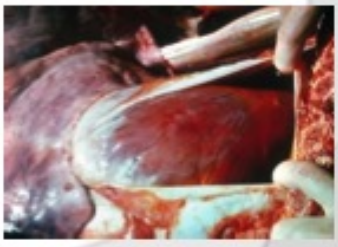
Abnormal accumulation of fluid in organs or tissues

Trachea and bronchi of the lungs
Filled with fluid



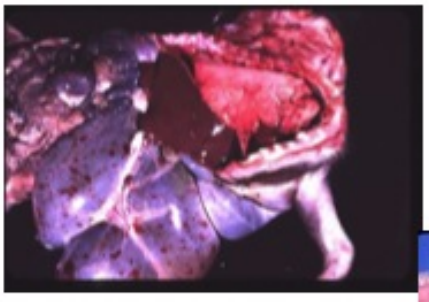
The lungs filled with fluid



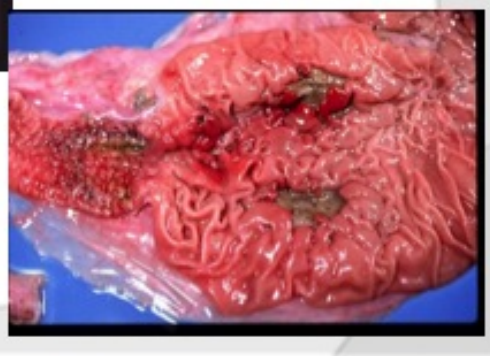


Abnormal fluid in the pericard of heart

The digestive system: specific lesions



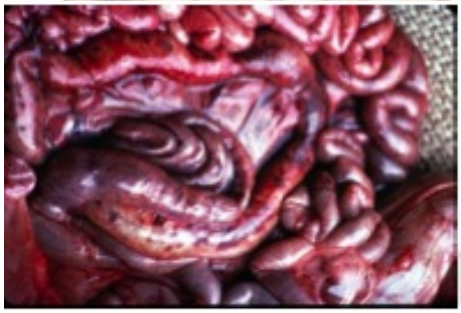
Haemorrhages on the stomach wall



Ulcers on the stomach mucosa

The digestive system: Discoloration of the intestine

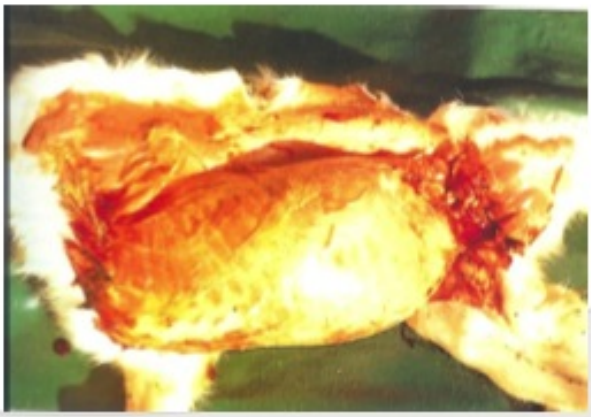
Red discoloration



Red discoloration & haemorrhages

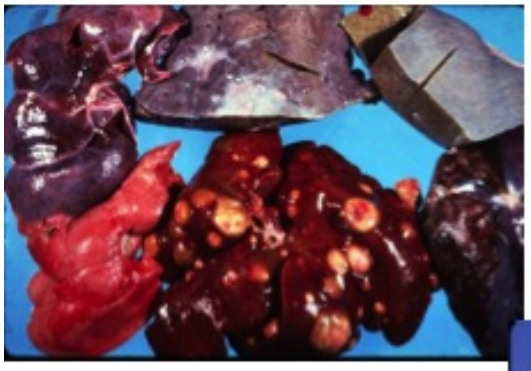
The Liver:

- Severe swelling (round margins) - abnormal size
- Severe yellow discoloration - abnormal color
- Very friable - abnormal consistency

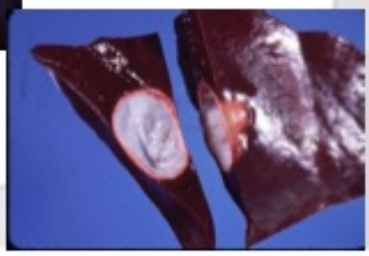


The Liver:

Examples of changes in size, consistency and color of the liver as well as Specific lesions

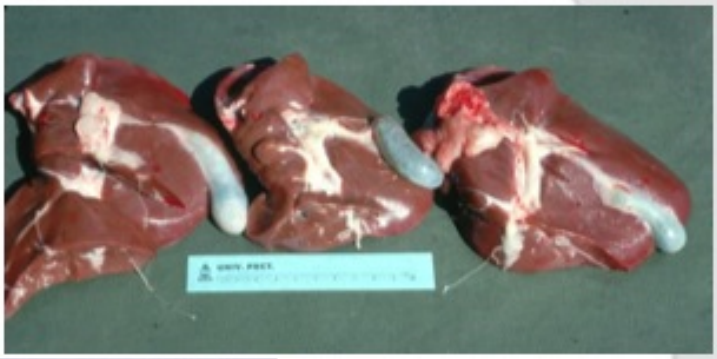


Parasitic cysts



Liver abscess

Parasites of the Liver

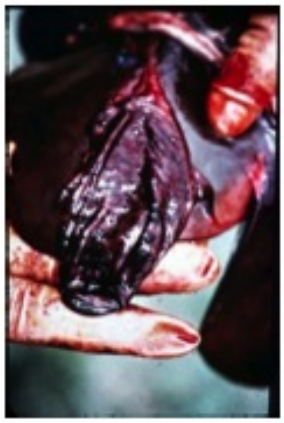


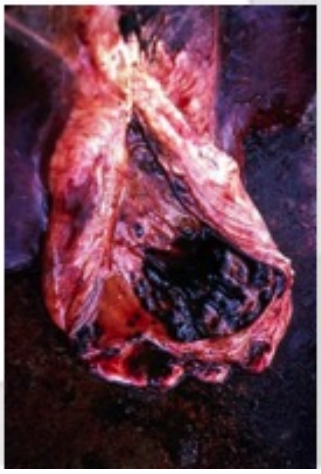
Liver tape worm

Liver Fluke

- The Liver

Haemorrhages in the wall of the gall bladder



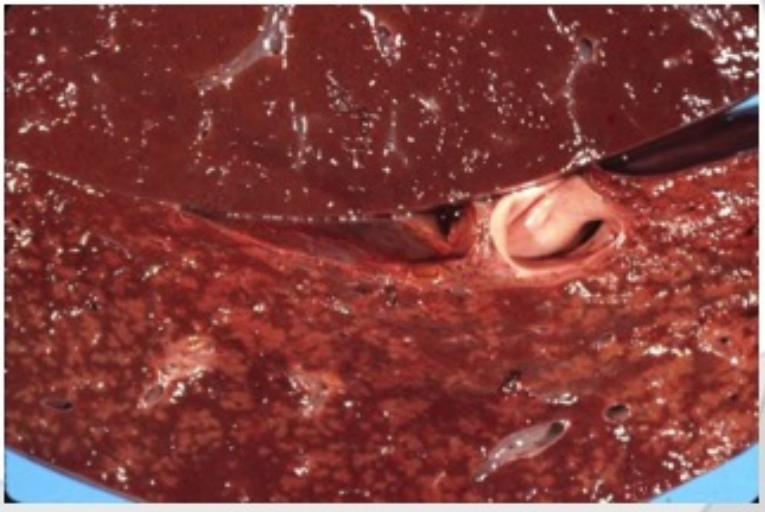


Haemorrhagic contents of the gall bladder

The cut surface of the liver

Normal liver tissue

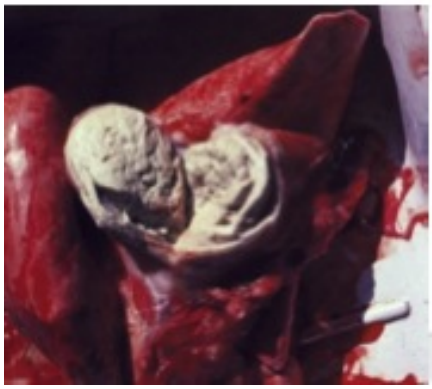
Abnormal liver tissue

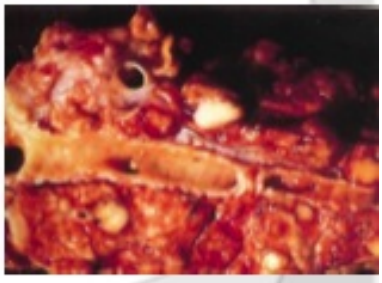


The Lungs: specific lesions

Tuberculosis

Lung abscess

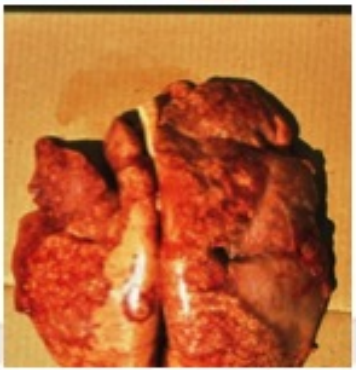




The Lungs: Specific Lesions

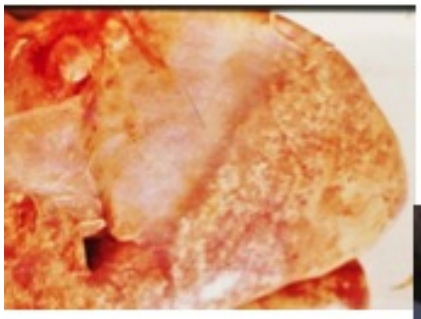
"Marbled Lung" (Lung-sickness, CBPP)

Lung sequestrum (Lung-sickness)

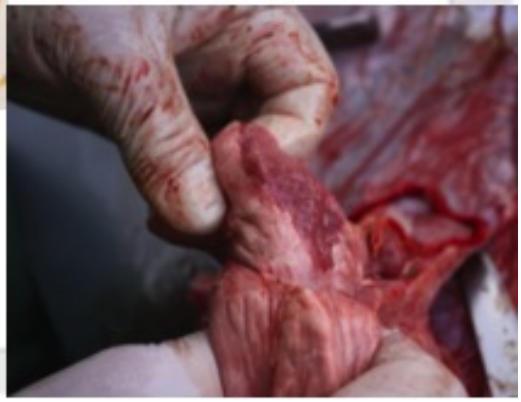


Lung cancer (Ovine Jaagsiekte)

The Lungs: Abnormal color and consistency



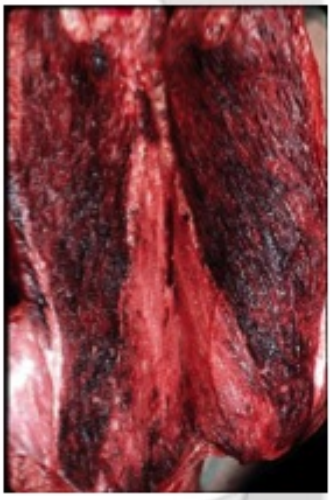
Grey color & firm consistency: Jaagsiekte



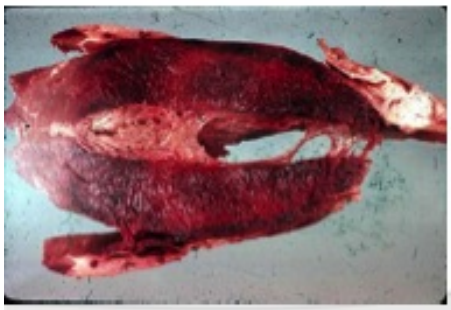
Red color & firm consistency:
Pneumonia

Muscle Tissue: Combination of abnormalities

- Swelling
- Dark red to black discoloration
- Haemorrhages
- Rancid odor

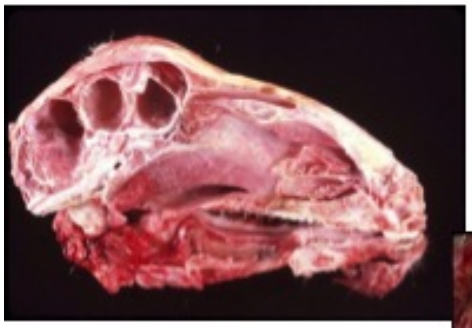


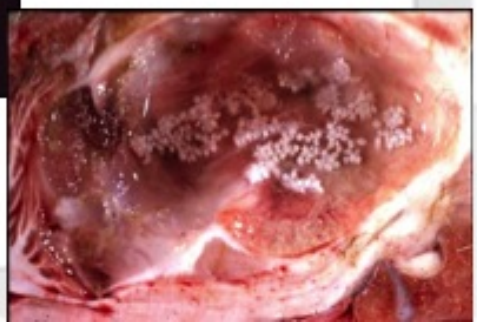
Muscular gas gangrene (Black Quarter)



Internal Parasites

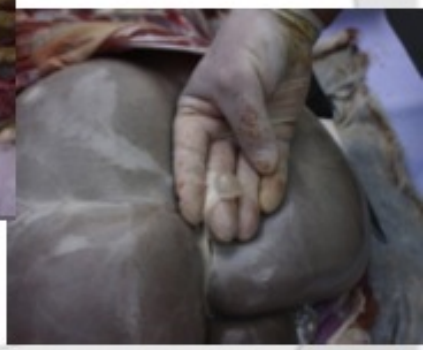
Tape worm cysts: **"Turning Sickness", "Draaisiekte"**





Internal Parasites

Tape worms

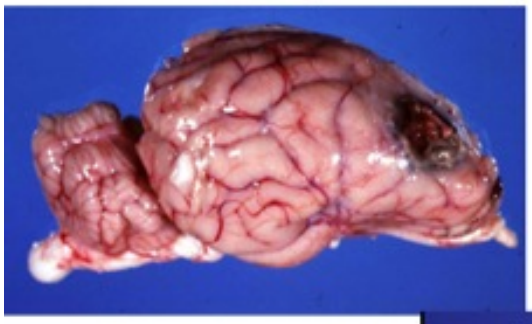


Tape worm cysts

Internal Parasites

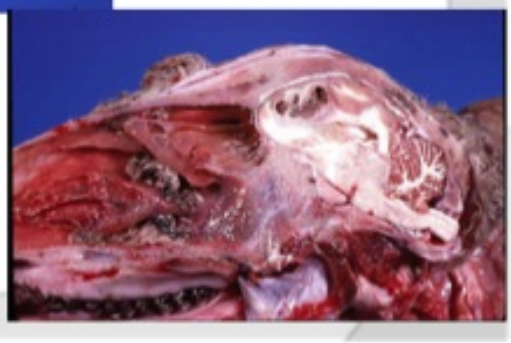
Round worms – Wire Worm (Haemonchus contortus)

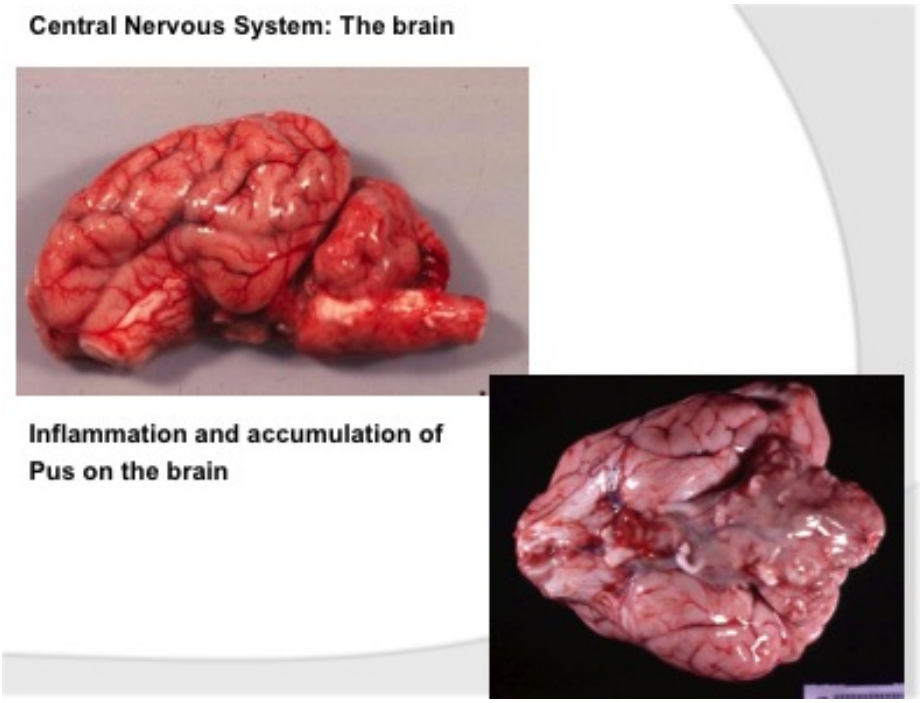
Central Nervous System



Brain abscess

As a result of or secondary to nasal Worm (Oestrus ovis) infection





Samples to be Collected

Samples to be collected

The aim of submitting samples to the laboratory is to make a diagnosis, to confirm the disease you suspect from your field investigation or to eliminate other possible diagnoses.

The samples to be collected for specific diseases are outlined in the **CVL sample receiving guidelines**. The **Disease Summaries** also provide this information for specific diseases.

Samples that should be collected in the course of a necropsy include:

1. A peripheral blood smear. Cut off a part of one ear with the knife of scalpel. The drop of blood required for a blood smear can be obtained from the cut surface. NB! In all cases of suspected Anthrax a peripheral blood smear must first be examined before proceeding with the necropsy. Remember an Anthrax carcass must not be opened.
2. Tissue samples in 10% formalin of all tissues or organs which appear abnormal. These samples are used for histopathological examination in the laboratory. Remember that tissue samples must not be thicker than 1 cm and the volume of formalin should at least be 10 x the volume of the sample/s.
3. Tissue samples in sealable plastic bags of all tissues or organs which appear abnormal. These samples are used to check for bacteria, viruses and other micro-organisms. It is very important, that these samples must be kept cold (4 – 8 degrees Celsius) until they reach the laboratory.
4. Faeces and other contents of the digestive tract which appear abnormal. It can be collected either in specimen jars or sealable plastic bags. The samples must be kept cold (4 - 8 degrees Celsius) until they reach the laboratory. These samples can be used by the laboratory to check for poisonous plants (rumen contents), internal parasites and micro-organisms.
5. Pus and abnormal fluids. Pus samples are usually collected, using a sterile swab, but also by using sterile syringe and needle. Other abnormal fluids can be gathered in specimen jars or serum sample tubes. Samples must be kept cold until they reach the laboratory.
6. In case of an abortion the whole aborted foetus and placenta in plastic bags. These samples must be kept cold until they reach the laboratory.

7. For Rabies diagnosis, pieces of the brain stem (Hippocampus) are collected and preserved in 10% formalin and glycerol-saline which is contained in the Tool Kit but provided to all state veterinary offices by the Central Veterinary Laboratory.

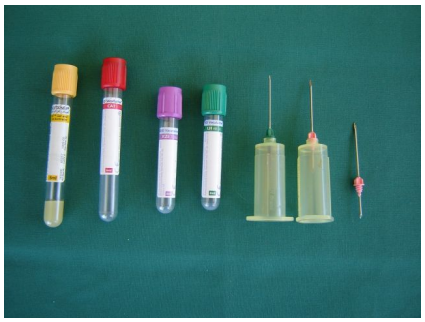
Sample Collection Kit

Other sample collection equipment

Microscope slides and spreader slides

Please refer to **Preparing a blood smear** for detailed instructions on the use of microscope slides and spreader slides.

Blood collection equipment



Left to right:

1. Serum sample tube, red stopper
2. EDTA tube, purple stopper
3. Heparin tube, green stopper
4. Needle holder with 21 ga (thin) needle attached

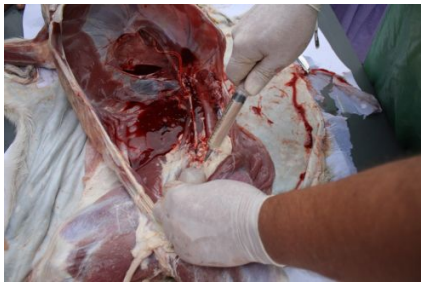
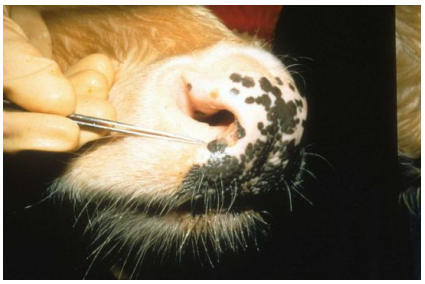
Please refer to **Collecting a venous blood sample** for detailed instructions on the use of blood collection equipment.

Specimen Containers

Left: Sterile specimen jar containing 10% formalin. It is used to collect tissue samples for histopathological examination by the laboratory

Right: Sterile specimen jar empty used for the collection faeces, intestinal contents, sterile tissue samples, pus and fluids like urine and milk or any abnormal fluids from the body cavities.

Fluids, like for example urine or the contents of a blister can be collected with a sterile disposable syringe and needle.

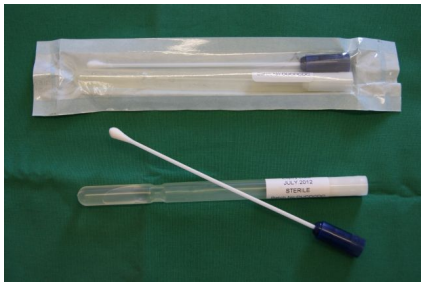
The fluid sample collected in this way can then either be transferred to a sterile specimen jar or submitted in the syringe. In that case the cap is replaced over the needle and the syringe labeled.

Sealable plastic bags

Sealable plastic bags can be used for larger tissue samples or whole organs as well as larger quantities of rumen contents.


Equipment to collect samples for bacterial cultures

Sterile swab and storage tube containing transport medium



If bacteriological examinations by the laboratory are required, samples can be taken using a sterile swab. The tip of the swab is used to soak up the fluid or pus to be tested or to touch the lesion of an organ or infected wound. Care must be taken not to touch anything else with the swab. The swab is then inserted into the tube containing the gel (transport medium). It is important that the swab is kept cold until it reaches the laboratory.

Samples - Blood smear

Blood smear

Purpose Microscope examination of the blood cells (directly or after fixation and staining) to look for evidences of blood parasites or other diseases (e.g. **Anthrax**).

Equipment

a. 1 box of clean glass slides
b. 1 spreader slide
c. 1 bag with sterile needles

Technique

a. Two glass slides are cleaned and placed ready.
b. A nick is made in the ear nearest the ground and the first drop of blood obtainable is taken near one end of a slide.
c. This slide in then held between the thumb and forefinger of the left hand with the drop of blood at the forward end of the slide. The other slide is brought up from behind at an angle of 45° until it touches the drop of blood, which spreads along the slide. The slide is then pushed back smoothly toward the left.
d. The completed smear should be waved in the air to dry quickly.
e. It should then be labelled and properly wrapped before flies lick the smear off.
f. Always make duplicate slides.

Illustrated instructions on making a blood smear are provided in **Preparing a blood smear**.

Preparing a blood smear

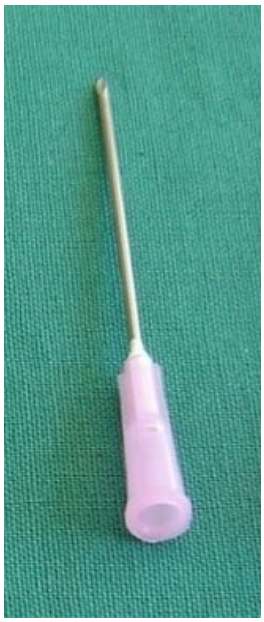
A good quality blood smear, prepared from a drop peripheral, is a very valueable or even indispensable tool to detect blood parasites and examine the various bloodcells, thus an important aid to make a diagnosis.

Points to remember when making a blood smear:

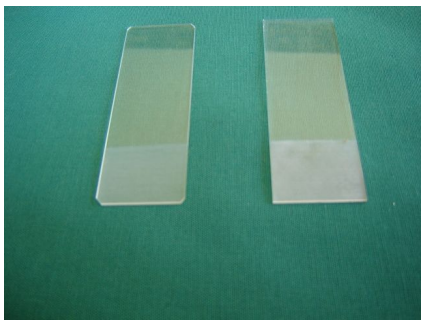
- Make sure the slides are clean and do not contain fingerprints.
- The edge of the spreader slide should not contain residual dried blood from a previous smear.
- Use a drop of blood from the skin (ear or tail), not from a vein.
- Pick up the first drop of blood from the skin prick
- Use a small drop of blood. Too much blood gives rise to a thick smear, which cannot be used
- Work quickly, otherwise the blood coagulates and dries, making it impossible to spread out the blood into a thin film.
- Move the spreader slide on top of the sample slide in one even, smooth, uninterrupted motion.
- Maintain contact between the slides all the time.
- Try and maintain an angle of roughly 45 degrees between the slides all the time.
- Only good quality blood smears are suitable for further examination.
- Bloods smears can also be made using only spreader slides

Microscope slides, spreader slides and sharp hypodermic needles are required to prepare a blood smear,

for example an 18 ga (thick) hypodermic needle (pink hub).

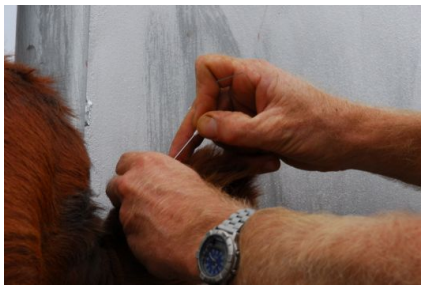


Microscope slides (on right) have straight corners and edges.
Spreaders slides (on left) have cut corners and beveled edges.

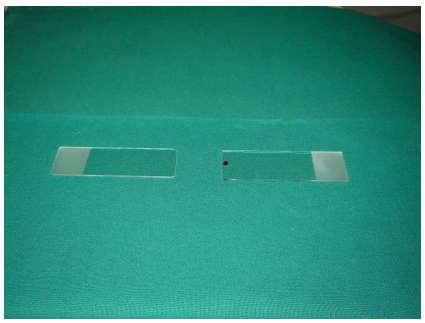


Step 1: Make sure the slides are clean

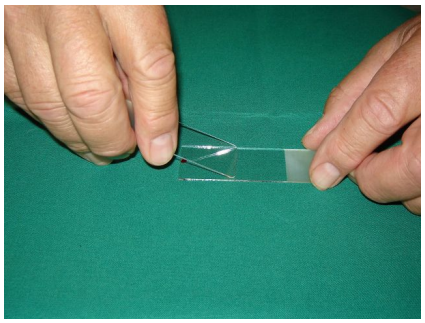
Step 2: Prick the skin of the edge of the ear or tip of the tail with a hypodermic needle



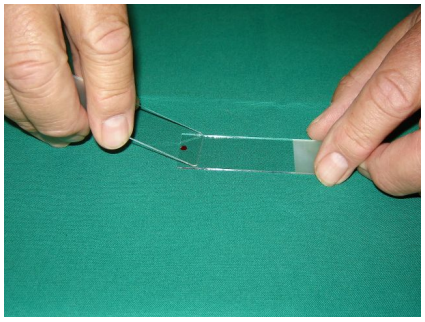
and collect the first drop of blood with the sample slide



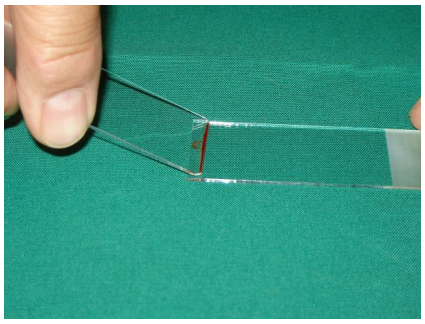
Step 3: Place the spreader slide on top of the sample slide at an angle of roughly 45 degrees in front of drop of blood



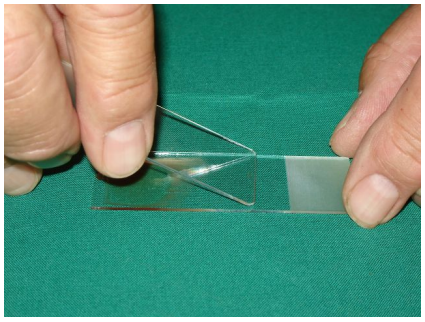
Step 4: While holding the sample slide, move the spreader slide towards the drop of blood



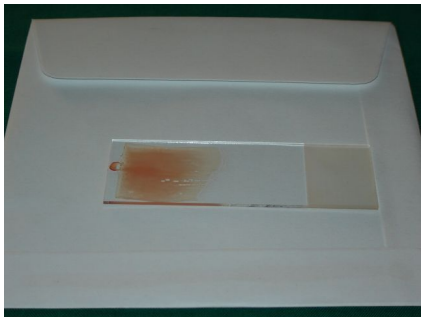
Step 5: Move the spreader until it makes contact with drop of blood. While maintaining the 45 degree angle, wait for the blood to spread along the line of contact between the two slides



Step 6: Push the spreader slide forward in a single smooth motion, on top of the sample slide, until all the blood has been spread. Maintain contact between the two slides at a 45 degree angle at all times

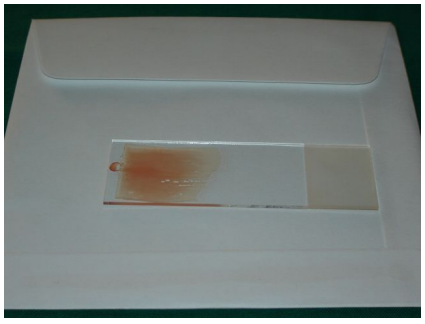


The result should be an even film of blood, getting progressively thinner to one side



Step 7: Let the blood dry in the air. If the smear is thin enough it will dry very rapidly

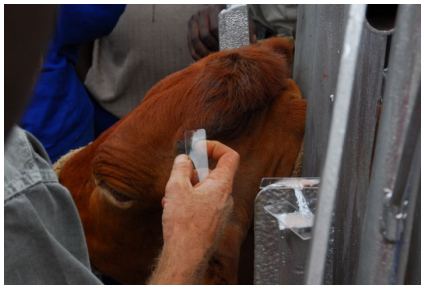
Step 8: To mark the sample, write on the frosted edge of the slide (on right in picture)



Step 9: To transport the blood smear wrap in tissue or toilet paper. The spreader slide is cleaned and re-used.

With some practice a blood smear can be made without using a support and holding both slides in your hands.

In this case it is easier to pick up the drop of blood with the spreader slide and making the smear directly on the sample slide.



Samples - Blood sample

Blood sample

Purpose To take an amount of blood for the laboratory to do their tests on e.g. serology. Usually we take blood for serum, but sometimes the blood is preserved as whole blood without clotting. The blood tubes for serum have a red stopper on top, while those for whole blood may have purple, grey, green or blue stoppers.

Equipment

a. 1 box of Vacutainer® blood tubes
b. 1 box of Vacutainer® bleeding needles
c. 2 vacutainer® tube guides
d. 1 roll of cotton wool
e. 1 shallow dish with water
f. 1 ballpoint pen
g. chilling facilities

Technique

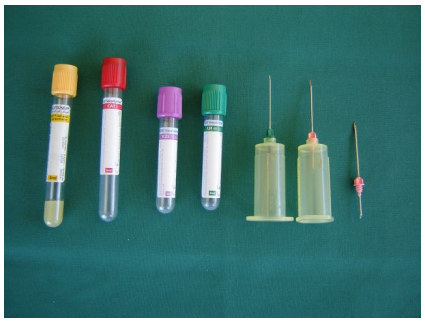
a. Chase the cattle into the crush so that their tails show in your direction. Make sure they stand close together so they can't move their backsides around too much.
b. Take one of the tube guides and attach a needle to it by screwing it into the guide. Put it into your left pocket.
c. Put a few blood tubes into your left pocket so that you can easily reach them with your left hand.
d. Take a piece of cotton wool the size of your palm and put it into your right pocket.
e. If possible, get someone to hold the tail up for you. Make sure the person holds the tail high up and that he holds it perfectly straight; if it is bent to the side, you are going to miss the vein more easily.
f. If the tail is messy underneath where you are going to stick your needle in, wipe it with the piece of cotton wool. Don't throw it away, you can use it a few times. Put it back in your pocket. If the tail is not terribly dirty, leave it as it is.
g. Insert a blood tube into the guide, but be careful that the stopper does not touch the needle tip inside the guide.
h. Bite on the needle cover and pull the needle with the attached guide out. Using your mouth saves your hands.
i. Using your left thumb, feel for the spot where you are going to insert the needle. In the middle of the tail on the underside, the processes of adjacent tail vertebrae leave a row of hollows. Select a hollow close to the tail root, but make sure you can easily feel it (usually between about the 3rd and 4th tail vertebra). This is an important part of the technique, so don't rush. When you have found a spot you like, press hard, so that a little dent is left behind.
j. Insert the needle at a right angle into the dent in the tail. Do not deviate up or downwards, nor to the side. Do not push too hard, or the tip will hit the bone. It becomes blunt and can not puncture the vein any more.
k. Push the blood tube deeper into the guide, so that the needle enters the stopper.
l. Now slowly push the whole assembly deeper into the tail, staying on the midline until the blood starts flowing into the tube.
m. If the blood does not flow yet, you need to search for the vein by pulling the needle out a little and pushing it back in, trying different angles. Do not aim at too much of an angle, the vein runs in the middle. Be careful not to withdraw the needle completely; the tip of the needle must stay in the skin. If the opening of the needle comes out, air will go into the tube, and no blood will flow from then on, no matter if you hit the vein or not. If you want to take the needle out of the tail, pull the blood tube out of the guide first, and then pull the needle out of the tail; never the other way around. Finding the vein is the most difficult bit. When you have done about fifty animals, you will know how to do it. Keep trying.
n. When the blood starts running into the tube, keep the guide still until the blood stops flowing. If you move, you may loose the vein.

o. Pull the blood tube out of the guide and turn the tube upside down, if you are collecting into a tube with a red stopper (serum tube).
p. If you are collecting blood into a tube with a purple, grey, green or blue stopper (whole blood), slowly turn the tube around a few times to let the blood run up and down inside the tube and mix with the preservative. Do not shake.
q. Pull the guide out of the tail and put the cover over the needle. Put it into the dish with water and let it soak while you use your other guide for the next animal. Rinse quickly before re use.
r. With the pen, put the following information down on the piece of paper stuck to the tube: Date, Place, Animal's identification.
s. Remove the needle from the guide and use a new one for the next animal. Never re use needles for different animals.
t. Keep the serum tubes standing upside down for at least 15 minutes, so that the clot attaches itself to the stopper. Do not refrigerate immediately; keep in the shade for a few hours to allow clotting to take place properly.
u. Once the blood has clotted properly, carefully remove the stopper, with the clot attached, from the tube and shake the clot off. Put the stopper back on the tube and refrigerate. Be careful not to touch the inside of the tube or the stopper.

Illustrated instructions on collecting a blood sample are provided in **Collecting a venous blood sample**.

Collecting a venous blood sample

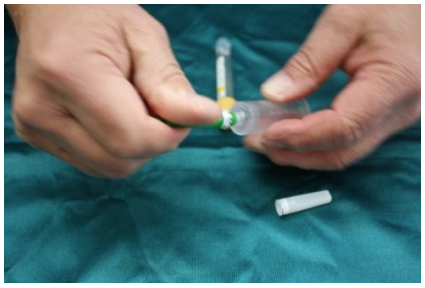
Blood samples collected from the vein of an animal are used for a large number of different laboratory tests. The equipment required for the collection of blood samples consists of sample tubes, needles of different strength and needle holders.



Left to right (1 to 6):

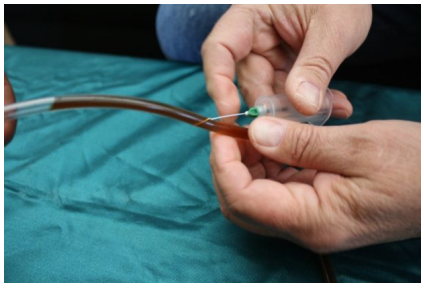
1) Serum tube, red stopper
2) EDTA tube, purple stopper
3) Heparin tube, green stopper
4) Needle holder with 21 ga needle attached (green, thin needle)
5) Needle holder with 18 ga needle attached (pink, tick needle)
6) Loose 18 ga blood sampling needle


Step 1: Remove the cover (white cap) over the short end of the needle
(green cover indicates a 21 ga – thin – needle)

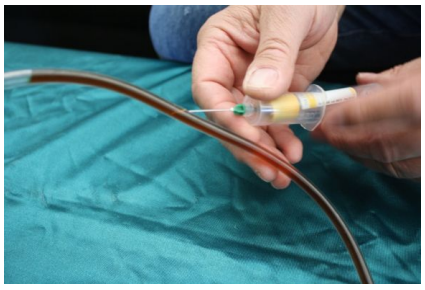


Step 2: Screw needle into needle holder

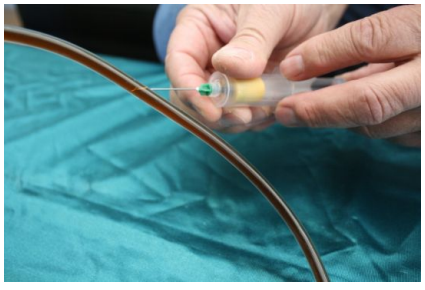
Step 3: Remove the cover (colored cap) over the long end of the needle



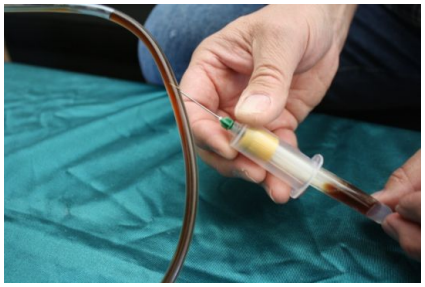
Step 4: Insert the needle into the blood vessel



Step 5: While holding the needle holder in place with one hand, insert the blood collection tube into the open end of the needle holder



Step 6: Push the tube all way against the top of the needle holder, so that the needle penetrates the stopper.



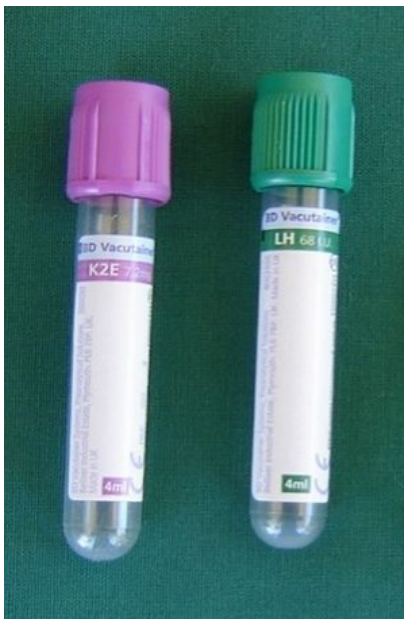
Step 7: Blood is now drawn into the tube by the vacuum

Step 8: When enough blood has been collected, remove the blood tube from the holder. Then remove the needle from the vein. **NB: Do not shake a serum sample tube after blood collection**

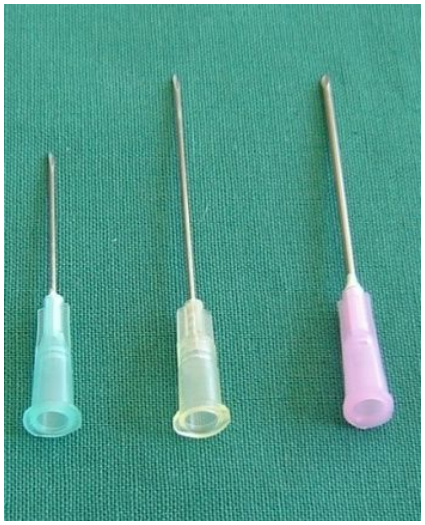
Step 9: Mark the sample tube

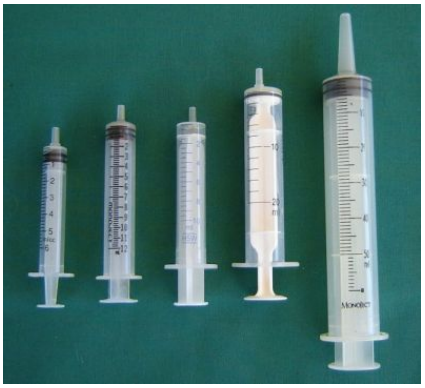
Step 10: Keep the serum tube in an upright position for 24 hours at room temperature so that a clot can form and the serum separates. After 24 hours the serum is poured over carefully into smaller storage tube. The serum is then refrigerated and kept cold until it reaches the laboratory

EDTA and Heparin tubes (purple or green caps) are inverted 4 – 5 times after blood collection to ensure proper mixing of the blood with the additive. These tubes do not have to be stored/transported in an upright position.



Blood samples can also be taken from a vein using syringes and hypodermic needles. Remember to remove the needle, before transferring the blood into the sample tube

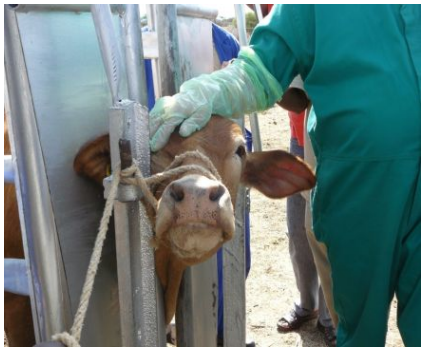




Left to right:

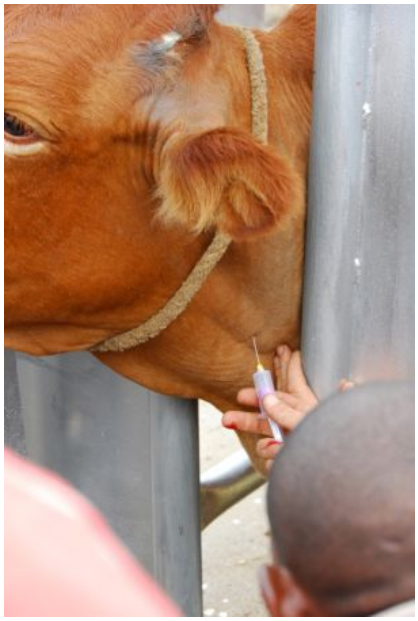
1. 21 ga short thin needle
2. 20 ga long medium needle
3. 18 ga long thick needle

Large live stock usually requires restraint

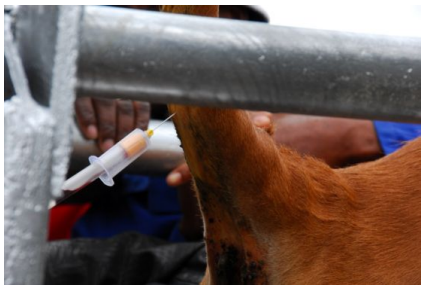


Blood is usually collected from the jugular vein (neck vein)

Before blood can be collected the vein must be distended. This is achieved by applying pressure on the vein



Blood can also be collected from a vein which runs along the underside of the tail. This is a very convenient and time saving method, since the head of the animal does not have to be secured. It does require more practice and experience.



In small stock the jugular vein is used for blood collection. The vein is easily distended by applying pressure with one thumb

Samples - Tissue sample

Tissue samples

Fresh samples

Purpose - for bacterial or viral isolation

- Can be any size
- Must be collected aseptically
- Must be placed in an empty sterile bottle and either frozen or put on ice and kept at 4 – 8 degrees Celsius.
- Should be taken to the laboratory as soon as possible.

Samples in formalin

Purpose - for histopathology

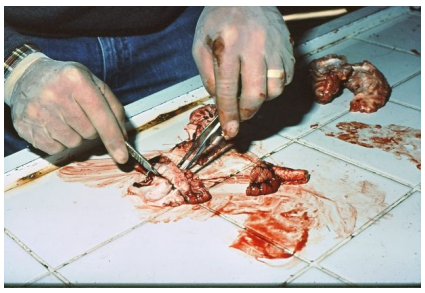
- Pieces of tissue should be cut to a thickness of 1 cm using a scalpel.
- There must be sufficient preservative fluid for the sample. The amount of fluid should be 10 x the volume of the sample.
- Samples from different tissues or organs should be put in separate sample containers.
- The sample should, wherever possible, include apparently normal as well as apparently abnormal tissue
- Good quality laboratory results can only come from good quality samples
- Specimen jars should be leak proof

Illustrated instructions on collecting tissues in formalin are provided in **Tissue samples in formalin**.

Tissue samples in formalin

A variety of laboratory tests are performed on tissue samples preserved in this preservative.

Tissue samples should be cut to the required size using a scalpel



and transferred into specimen jars containing 10 % formalin

Samples should be clearly labeled and sealed for transport to the laboratory

Points to remember when collecting tissue samples

- Pieces of tissue should be cut to a thickness of 1 cm using a scalpel.
- There must be sufficient preservative fluid for the sample. The amount of fluid should be 10 x the volume of the sample.
- Samples from different tissues or organs should be put in separate sample containers.
- The sample should, wherever possible, include apparently normal as well as apparently abnormal tissue
- Good quality laboratory results can only come from good quality samples.
- Specimen jars should be leak proof
- Since laboratories can perform different tests on tissue samples, it is important that not only tissue in formalin be collected, but unpreserved (refrigerated) samples are submitted as well

Samples - Faecal sample

Faecal Samples

Purpose

To take an amount of fresh faeces for the laboratory to do its tests on, e.g. protein or phosphate levels.

Equipment

a. 1 box of plastic gloves
b. 1 container with liquid paraffin
c. 1 marker pen
d. chilling facilities

Technique

a. Chase the animals into the crush so that their tails show in your direction.
b. Put one plastic glove on your right hand.
c. Pour some liquid paraffin onto the back of your gloved hand.
d. Put your fingertips together in a point.
e. Slowly push the tips of your fingers first into the anus. Do not force, but apply gentle, constant pressure until your hand slips in.
f. Open your fingers and grab some faeces from the rectum.
g. Keeping your fist closed, pull it out.
h. Still keeping the fist closed; pull the sleeve of the glove off over your hand so that the faeces are inside the glove and your hand outside.
i. Make a knot in the sleeve to keep the faeces inside.
j. With the pen, put the following information down on the sleeve: **Date, Place, Animal's identification**.

Samples - Rabies

Rabies Sample (straw method)

Purpose

To enable the laboratory to test for rabies. This method is only to be used if the head cannot be brought to the state vet for a post mortem examination.

Equipment

a. 1 pair of resilient gloves
b. 1 box of plastic straws
c. 1 cigarette lighter
d. 1 box of plastic bags
e. chilling facilities

Technique

a. Beware: rabies is contagious, so always wear gloves!
b. Cut the head from the carcass where it is joined to the first neck vertebra.
c. Take one of the plastic straws.
d. Insert the one end into the foramen magnum, the hole where the spinal cord comes out of the head.
e. Twist the straw around backwards and forwards while slowly pushing the straw forward, towards the middle corner of the left eye.
f. Pull the straw out.
g. Press on the end that was deep in the head to empty about 1 cm of it.
h. Heat the end with the lighter until it melts, and press together quickly so that it seals.
i. Seal the other end of the straw where there is no brain matter, in the same way as above.
j. Place a strip of masking tape on the straw so that you can still write on it. Put on it the following information: **Date, Place, Animal's identification**.
k. Place the straw inside a plastic bag, roll that up, tie it up with masking tape and write on it very clearly: "**Beware! Rabies sample! – Dangerous**" and use special red stickers (usually obtainable from the Post Office) to visibly mark the parcel.
l. Keep the straw chilled until you can get it to the state vet.
m. Take the gloves off and wash your hands thoroughly with soap.

Disease Investigation - Laboratory Submission Guidelines

Sample submission

Sample submission form

A sample submission form (part of **Disease Report Form** or **Abattoir High Incidence Form**) must be completed and submitted to the laboratory with any samples collected.

The sample submission form includes:

- Owners name
- Property NamLITS number
- Property address
- Submitters name
- Submitters contact details
- Date of collection
- Diseases suspected
- Description of clinical signs and pathology including:
  - Species affected
  - Number of animals dead, number affected, and number at risk
  - History of disease
- Specimens submitted
- Tests requested

Labelling

Individual samples should be clearly labeled with:

- Animal's identification
- Owners name
- Date of collection

Where a number of animals are being sampled e.g. where blood samples are being collected from a herd for serology, a key list should be used that contains the farm information and each sample should be labeled with a number. The identification of each animal should be recorded against their sample number on the key list. The key list must also provide:

- Owners name
- Property NamLITS number and address
- Number of samples submitted
- Submitters name
- Date of collection

Packaging

Samples must be handled as outlined in Circular No. V10/2013 **CVL sample receiving guidelines**.

Proper packaging, transportation and preservation of samples are essential to ensure accurate laboratory diagnosis. Specimen transport containers should be available at all state veterinary offices and will consist of leak proof primary containers such as glass of plastic universal bottles with leak proof screw-tops. These are then packed into a leak-proof secondary container with absorbent material and ice packs. This is then placed into a robust outer container. The accompanying form must be placed into the outside container but placed in a leak-proof plastic bag.

Sample submission requirements not met

Where sample submission requirements are not met, the following actions may be taken by CVL:

1. Client will be informed in all cases by the relevant diagnostician and a Corrective Action will be launched on the case.
2. Sample/s may be placed on hold pending clarification from client.
3. Sample/s may be rejected and/or returned to client.

Sample rejection

Samples displaying the following will not be considered for testing, therefore CVL will reject them:

1. Insufficient sample information
2. Incorrect sample labeling or no sample labeling, especially hazardous material
3. Conflicting information between samples and submission forms
4. Wrong sample for test requested
5. Incorrect sample size for test requested
6. Wrong transport media
7. Sample too old and not fit for testing

Laboratory address

The address and contact details for the Central Veterinary Laboratory are:

Central Veterinary Laboratory
24 Goethe St,
Pr. Bag 13187,
Windhoek

Tel: 061-237 684
Fax: 061-221 099'

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Disease Investigation - Reporting of Outbreaks

Reporting of outbreaks

AHTs are responsible for routine livestock health inspections and monitoring and report through their Chief AHT. State Veterinarians are responsible for disease outbreak investigations and responding to investigation requests from farmers. State Vets also submit samples to the Central Veterinary Laboratory for diagnostic testing as appropriate.

Full details of the reporting process are provided at **The Namibian Epidemiology and Animal Health Information System**. Responsibilities of AHTs, CAHTs and State Vets are further clarified in **Routine farm inspections** and **Operating in Communal Areas**.

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Disease Investigation - Generic response

Generic response

Before leaving the farm (but after you have undertaken your disease investigation and collected the appropriate laboratory specimens), advise the farmer/headman:

- Of the disease you suspect
- Of basic information about the suspected disease and what they need to do to manage the affected animals and prevent/limit further cases in their herd and prevent spread to other herds
- That a Senior Veterinarian will review the information you have collected plus any laboratory results to confirm a diagnosis
- That you will advise them of the final diagnosis and any follow up action that is needed following the Senior Veterinarian's review

If a notifiable disease is suspected:

- Quarantine the affected herd/s- ensuring that affected and in-contact animals do not come into contact with other animals
- Provide initial instructions to the the farmer/headman on what they must do to contain and eradicate the disease
- Disinfect yourself, equipment and vehicle when leaving farm to prevent spread of disease
- Avoid visiting another herd/village the same day if you suspect a highly infectious disease
- Notify your superiors for further actions
- Complete **Disease Report Form**

Further actions (depending on the disease involved) may include:

- Outbreak investigation: to determine the source of the outbreak and possible further spread (trace back and trace forward)
- Slaughter and compensation
- Movement restrictions which may involve deployment of mobile electric fences
- Vaccination program
- Completion of weekly update reports and follow-up Disease report forms
- Collect information on further cases from livestock keepers in the area and key informants
- Community awareness raising e.g. community outbreak meetings, radio announcements, press releases, distribution of pamphlets etc.

Outbreak Meeting

During the meeting

1. Introduction
    1. Headman
    2. Prayer
2. Introduce the objectives of the meeting
    1. Inform farmers about the situation
    2. Inform farmers about the disease itself
    3. Inform farmers about prevention and control measures
    4. Collect information from the field
3. Inform about the situation of the outbreak
    1. Where is it
    2. From where is it coming (if is possible)
    3. Number of cases (importance)
    4. Risks for farmers
4. Questions from farmers – Discussion
5. Prevention and control of the disease
    1. Presentation of the disease (symptoms, etc…)
    2. Strategy inside the outbreak
    3. Strategy around the outbreak
6. Questions from farmers – Discussion
7. Census of the cases and population in the neighbouring
8. Summary

After the meeting

1. Collect samples and fill suspicion forms and epidemiological survey forms if they are any cases in the community.

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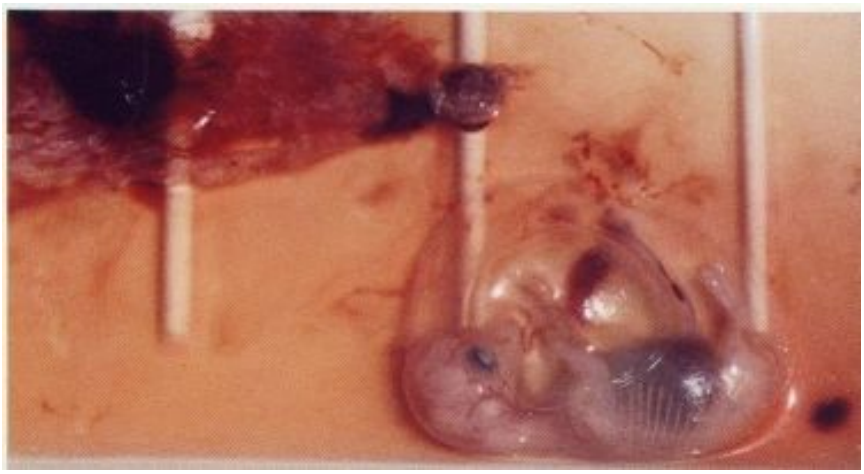
Disease Investigation - Example

The following example serves to illustrate how a combination of findings leads to a diagnosis:

A farmer reports that his goat ewes started aborting about a month after he introduced new ewes into the herd, which he had purchased from another farmer. The Animal Health Technician who investigated this problem made careful enquiries regarding the **case history**, and gathered the following important information:

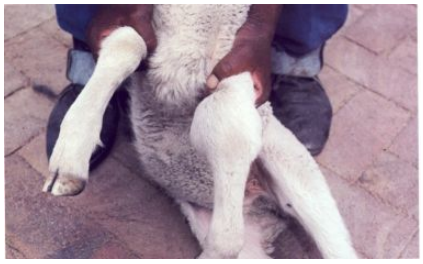
- About 70% of pregnant ewes on the farm aborted at various stages of pregnancy, others had stillbirths or weak kids which died within a few days. There were also 2 kids with birth defects which the farmer killed. One ewe had died.
- 4 other sub-adult goats had developed a respiratory infection. They were listless, stopped eating and drinking and coughed. He treated them with oxytetracycline (Terramycin) injections and multivitamin tables in the drinking water. Three recovered, while one died about a week after falling ill.
- The farmer followed an appropriate deworming program for his goats and kept them free from external parasites. He had dewormed the new goats and treated them for external parasites upon arrival, since he was uncertain whether the previous owner had done it.
- The farmer followed an appropriate vaccination program against Pasteurellosis and a number of Clostridial diseases and had vaccinated the new goats upon arrival on his farm, again since he was uncertain about the vaccination history on the previous farm.
- The farmer had never vaccinated his animals against Brucellosis or Enzootic abortion.
- The animals were in a good condition, the nutrition was sufficient, the veld of sufficient quality and the animals received an adequate lick and mineral supplementation. The drinking water was of adequate quality.

History of abortions and weak abnormal kids



When looking through the affected herd the Animal Health Technician discovered a sick animal showing the following **clinical signs**:

- Listlessness, general weakness,
- slight difficult breathing
- lameness and swollen joints
- fever of 39.5



It was decided to slaughter the goat and perform a **necropsy**. The most important abnormalities that were found were:

- an abnormal straw-colored fluid in the joints and in the thoracic cavity

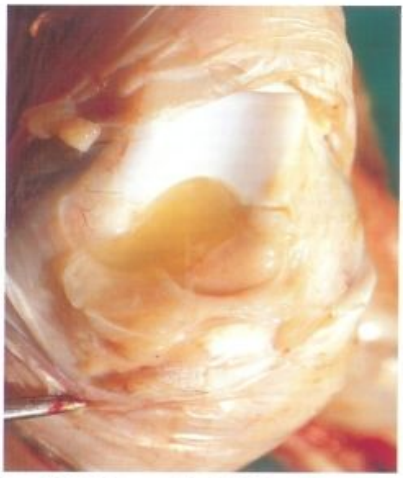
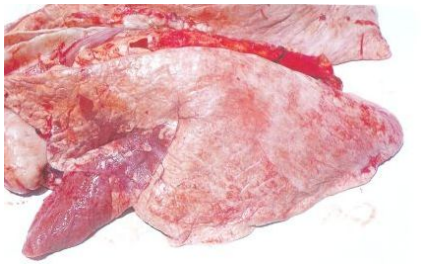


Figure 42.3 Serofibrinous synovitis typical of *Chlamydophila pecorum* polyarthritis infection

- parts of the lungs showing dark red discoloration and firm consistency



From all of the above findings a tentative diagnosis was made of **Enzootic Abortion (Chlamydophila infection)**, since the **history** of abortions, still births, weak and abnormal kids, the fact that sick animals had recovered from oxytetracycline treatment and lack of vaccination, **clinical symptoms** of fever listlessness and respiratory infection lameness and swollen joints, as well as the **necropsy** findings of joint infection and pneumonia are all consistent with Chlamydophila infection.

The following **samples** were collected and sent to the laboratory:

- Serum samples from the ewes that had aborted: 2 samples each collected 4 weeks apart
- Joint fluid drawn up in a sterile syringe and transferred to a sterile specimen jar.
- A piece of the abnormal lung tissue in a specimen jar with 10% formalin.
- A piece of abnormal lung tissue as well as pieces from the liver, kidneys, spleen and a few lymphnodes in sterile specimen jars

Subsequent laboratory tests performed on all the samples confirmed that Chlamydophila infection was in fact the cause of the disease on this farm.

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Emergency Response

Emergency Response Introduction

The Emergency Response section was developed using the Australian AUSVETPLAN series of manuals, and permission to use these manuals by Animal Health Australia is gratefully acknowledged.

An outbreak or suspected outbreak of key notifiable animal disease places heavy demands on animal health authorities at local, regional and national levels, and on livestock and related industries. This section of the manual describes the roles of personnel in the initial stages of activation of an animal disease outbreak response.

General principles

The approach to managing key notifiable animal disease outbreaks should be an effective whole-of-government and industry response to, and recovery from, the key notifiable animal disease in question.

The following principles should be applied:

- The manual must be adapted to local legislative and administrative requirements by each jurisdiction responsible for the management of animal disease emergencies.
- There needs to be an agreed national framework; jurisdictional plans will need to reflect this approach.
- Media and public relations units at local, state and national levels have different responsibilities and target audiences, and must network to encourage the distribution of consistent and relevant messages.
- Key notifiable animal disease outbreak response operations must be resourced as quickly as possible, and then scaled down as necessary to meet ongoing requirements.
- Support agencies must collaborate on technical issues and cost sharing with the DVS.
- National, subdivisional or regional disease control personnel have responsibility for strategic management of the key notifiable animal disease outbreak, for ensuring that industry involvement and communications are in place and for operations outside a Subdivision's area(s) of responsibility. It is imperative that strategic management and operational management be kept separate.
- Subdivisions are responsible for the management of field operations in a defined area.
- The DVS Head Office provides national coordination.
- Communication with all stakeholders, including industry and the community, must be a high priority.
- While section coordinators and managers must report directly to and be directed by supervisors, there must, where appropriate, be informal communication between colleagues in different sections and in other control centres.
- Relief and recovery operations are part of a key notifiable animal disease outbreak response. They minimise community impacts, encourage community cooperation and return the situation to normal as soon as possible.
- Awareness of this area of the manual should be promoted within agencies, industries and the rural community by the relevant parties.
- Industry organisations have an important role and are active participants in a key notifiable animal disease outbreak response. They help manage the response and act as conduits for information to and from industry participants and government.

Management Structure

Chain of Command

The chain of command and general management structure during an emergency response is as set out in the section on **DVS Structure**.

The following is adapted from information contained in the Directorate of Veterinary Services' **Contingency Plan for Bovine Spongiform Encephalopathy** - updated February 2006 and **Contingency Plan for Foot and Mouth Disease** - updated January 2013

Establishment of National Disease Emergency Committee

The National Disease Emergency Committee (NDEC) at Head office will be set up to direct operations during the period of the outbreak and to review the contingency plan annually. This committee will consist of following:

Chief Veterinary Officer

The Chief Veterinary Officer is responsible for:

- Setting up the committee and chairing the committee meetings
- Appraising the Minister on developments
- Coordinating of all control strategies
- Press releases
- Soliciting for international expert assistance
- Securing financial support for the operation

Deputy Chief Veterinary Officer (Epidemiology)

- Monitoring the situation
- Disease reporting local and international
- Contact person for enquiries
- Drafting written instructions and standard operating procedures for operations

Deputy Chief Veterinary Officer (Animal Disease Control)

- Coordination of field operations
- Deployment of human and material resources

Deputy Chief Veterinary Officer (Veterinary Public Health)

- Recalling of possibly infected meat products and their destruction
- Banning of Exports
- Detention of carcasses

Epidemiologist

- Compiling reports
- Advice and documentation
- Disease control plans
- Statistical sampling, etc.

Pathologist

- Will be responsible for laboratory diagnostic back-up of the control effort
- Preparation of sampling materials
- Transportation of samples to reference laboratories
- Communicating of results to the CVO etc.

State veterinarian (NamLITS)

- Provide data on animal movements including imported and exported animals

Representatives from Ministry of Health (Avian Influenza)

- Provide treatment, monitoring of human population in affected areas, acquire medicines and vaccines required for staff and other in-contact persons.
- Provide a platform for publicising information on the disease should it threaten human health. They will be required to have an emergency plan for a response to a human epidemic.

Registrar of Farms Feeds (BSE)

- Provide information on possible sources of contaminated feed
- Recalling of all possible contaminated feed

Relevant stakeholders:

These include representatives from the police, army, Farmers Unions etc.

- To provide support to the CVO

Regional Disease Emergency Committee

To be set up and headed by the Chief Veterinarian of the area concerned. It will be responsible for the execution of control efforts at the regional or sub-regional level and will comprise of:

The Chief Veterinarian

The Chief Veterinarian is responsible for:

- Deploying of human and material resources in the region for the control effort
- Trace back and trace forward of animal movements in region
- Designating control zones
- Making arrangements for compensation
- Making arrangements for slaughter and destruction of animals
- Prepare daily progress reports for the CVO

Key staff members in the region

(State Veterinarians, to assist the Chief Veterinarian)

- To execute the field control measures as instructed
- To carry out clinical investigations and collect the required samples

Chief Animal Health Technician

- To enforce animal movement control

Ministry of Health representative (Avian Influenza)

- Responsible for monitoring the health of staff, making sure that suspect cases are quickly attended to and or referred to the treatment centre.

Relevant stakeholder representatives

These include representatives from the police, army, Farmers Unions etc.

- To provide support to Directorate of Veterinary Services staff as requested
- To assist in animal movement control

A list of stakeholders that need to be informed in the area shall be maintained by the Chief Veterinarian. This list may include:

- Customs officials
- Auctioneers
- Abattoir operators
- Transporters
- Hunters
- Feed companies
- Providers of services such as:
  - private veterinarians
  - artificial inseminators
  - sales representatives
  - extension staff
  - local leadership (governors, councillors, and chiefs etc.).

It is the duty of the Chief Veterinarian to draw up the list and contact details of the organisations or individuals that need to be informed and to contact them in the event of an emergency.

Expert Group

This group will be headed by the Deputy Chief Veterinary Officer responsible for Epidemiology, Training, Import and Export Control. It shall comprise of:

- The Chief Veterinarian (Epidemiology)
- Epidemiologist
- Veterinarian responsible for traceability
- Pathologist at the Central Veterinary Laboratory.

The expert group is responsible for the following:

- Coming up with a comprehensive epidemiological enquiry and provide a broad assessment of the outbreak.
- Research on and provide expert advice to the CVO during the outbreak on problems that arise
- Establish contact with other international experts when necessary

- Train staff members on the contingency plan
- Review and update the contingency plan every year
- Produce epidemiological reports for local, regional and international reporting
- Including other experts as appointed by the CVO
- Will meet at least once a year in June during peacetime.

Financial provisions

Some diseases (BSE, FMD, Avian Influenza, CBPP, ...) are considered as national emergencies and qualify for emergency funding. The National Emergency Fund is administered by the office of the Prime Minister. The immediate reaction expenditure will be covered in the recurrent budget of the Directorate of Veterinary Services. Compensation for slaughtered animals will be in accordance with the **Animal Health Act**.

Although the Act is silent on the issue of time limits for compensation, the state veterinarian in consultation with the Chief Veterinarian of the area where animals or infectious things are destroyed shall work towards ensuring that the owners are compensated within a period of 2 months from the date of destruction.

Communication - General Strategies During a Key Notifiable Animal Disease Outbreak

PLEASE NOTE

The majority of the following information was adapted, with permission, from Australia's `AUSVETPLAN - Operational Procedures Manual: Public Relations' (Version 3.0, 2007) as a general guidance to communicating effectively during a a key notifiable animal disease outbreak.

Communication Strategies during an outbreak

Introduction

Communication during an outbreak of a key notifiable animal disease forms a significant part of any response, and the success of the campaign relies heavily on the ability to communicate effectively with all those affected by the outbreak.

An adage in crisis communications states that at least 50 per cent of a response in an emergency is communications. A critical success factor in the response to a key notifiable animal disease is the effectiveness with which governments and industry communicate with the community and other stakeholders. Timely, clearly articulated, coordinated, well-planned and well-delivered public communications substantially shape people's willingness and capacity to help resolve the emergency. The level of cooperation from producers and affected communities, trust by consumers in response actions, and market access outcomes, all hinge on how well response actions and strategies are explained during an emergency.

It is also essential ground-workers such as Animal Health Technicians (AHTs), producers and communities are able to feel that any information and concerns they raise with authorities are taken into consideration. Open communication between authorities and stakeholders will strengthen the overall response to the key notifiable animal disease, and assists in encouraging all those involved to cooperate in a united approach to controlling the disease.

Background

A key notifiable animal disease outbreak has the potential to cost a country, and/or an industry, billions of dollars in both lost earnings and in responding to the outbreak. In many cases, a country's policy is to eradicate the key notifiable animal disease as quickly as possible. In most cases a stamping-out policy will be employed, involving quarantine and movement controls, the slaughter and disposal of infected and exposed animals, the decontamination of infected premises, surveillance of susceptible animals, and restrictions on the activities of certain enterprises.

Depending on the disease and circumstances, these measures may be supplemented or replaced by vaccination, vector control campaigns, animal treatment and wild animal control. Infected and disease-free zones may be established to contain the disease agent and to facilitate trade.

A major key notifiable animal disease control campaign is a complex operation requiring rapid mobilisation of resources and the coordination of a diverse team of people in a whole-of-government and industry response. The key notifiable animal disease response requires input from all tiers of government and from a range of portfolios, and may need to address financial, social, economic, human and animal health, trade and recovery issues.

Why is public relations important in a key notifiable animal disease response?

Effective communication is essential to any organisation's business, particularly during an emergency or crisis.

Public relations (PR) includes advertising and publicity, media liaison, employee and community relations, and marketing and promotion.

This section outlines how communications will be managed during a key notifiable animal disease response using a PR process known as 'emergency' or 'crisis' communication. Crisis communication is a tool for managing PR and media relations during crises or emergencies that have the potential to damage or destroy the image and/or functioning of an organisation. In a key notifiable animal disease response, PR needs to be handled at the local, communal and national levels by designated communications personnel.

Any report of a possible key notifiable animal disease outbreak will attract media interest. An actual outbreak of a disease has the potential to dominate the media, including television and radio.

Public reaction will inevitably be characterised by a sense of urgency, and the situation will be perceived as potentially damaging or perilous. In an emergency, people fear that something sinister is happening over which they have little or no control. This fear will be heightened by a lack of accurate and timely information — a situation that is commonly encountered at the start of any outbreak. Professionals are trained to cope dispassionately with such ambiguity, but it can be terrifying for ordinary citizens. People who have little knowledge about the nature and effect of an exotic disease (especially one that has the potential to infect humans) will naturally fear the worst for themselves and their families, animals and livelihoods. They could react quite strongly against all Namibian livestock and livestock-based products.

PR that is designed to satisfy the legitimate demands for information from stakeholders, the public and the media will go a long way towards calming anxiety based on ignorance and fear. Effective PR will also help to build the public confidence and media cooperation upon which a successful key notifiable animal disease response may depend.

Proper application of the basic principles of PR will ensure that the public understands and appreciates the need for emergency measures that may temporarily have an adverse impact on them. An informed and supportive community, rather than angry and distressed individuals, will ultimately enhance efforts to deal with an emergency.

During a key notifiable animal disease response, and for some time afterwards, PR efforts will also be crucial in rebuilding domestic and international consumer confidence in Namibian livestock and livestock-based products.

As with other aspects of the key notifiable animal disease response, it is essential to plan crisis communication activities in advance. This includes:

- well-planned and rehearsed crisis communication strategies;

- easily accessible hardware, software and stores; and
- competency-trained communications staff.

Equally important will be the need to ensure that this advance planning is articulated and understood by those likely to be involved in the process.

In an emergency, communications between various 'publics' can be managed through a number of channels. Among these are:

- direct contact with affected or concerned individuals in person or by phone, fax, mail or the internet;
- group meetings; and
- the news media.

In the atmosphere of an emergency, the news media can either become part of the solution to the problem or, if mishandled, part of the problem. Cultivating a professional working relationship with the media under stressful emergency conditions is therefore a critical element in an effective key notifiable animal disease response. This relationship needs to be fostered well in advance of any disease emergency.

Local public relations

Local public relations is an integral part of the overall key notifiable animal disease response. Local public relations target audience includes the local media, farmers, nongovernment veterinarians, key local industry stakeholders, local community members and the RDEC members.

The output of local public relations must be approved by the State Veterinarian and must be technically correct. The SVO will collaborate with other SVOs and the RDEC to identify key messages, which will likely include contact details, facts about the key notifiable animal disease and the key notifiable animal disease contingency plan, current restrictions, the progress of the key notifiable animal disease response, and relief and recovery support.

Core principles

The overall principle for effective communications in a key notifiable animal disease response is to explain policies, plans and practices to all stakeholders clearly, consistently, openly and quickly. The key principles that underpin this are as follows:

- be honest, open and inclusive
- ensure that the facts are right
- correct mistakes as soon as possible
- provide information that is up to date in a timely manner
- provide as much local or regional detail as possible
- tailor information to different audiences
- communicate internally
- be aware and sensitive to cultural and social issues.

It is vital that communication during a key notifiable animal disease response uses both a 'top-down' AND a 'bottom-up' approach. Many communication strategies focus on a top-down approach, i.e. directions and information is channelled entirely from higher management to those implementing these decisions and policy.

During a key notifiable animal disease response, it is essential that those in authoritative positions listen to the information gained from those working out in the field. This allows a more proactive approach to planning and directions, and helps address problems being experienced in the field during the response. In some situations, a pre-determined plan may not suit the circumstances in a particular area or village. When this occurs, management must be open to listening to feedback from those working in the field (such as the Animal Health Technicians) to find a better solution to the problems being faced. This can potentially save time (and money) as management can address what is actually happening during the current outbreak.

Phases of an key notifiable animal disease response

Depending upon the current policy, a key notifiable animal disease response consists of four distinct phases:

- investigation
- alert
- operational
- stand-down.

Public relations (PR) personnel are directly involved in the alert, operational and stand-down phases.

Preparations

The foundations for successful communications during a key notifiable animal disease response are laid well before an incident, with a focus on preparedness to support the PR function in the response. The following checklist is useful.

1. Identify key communications staff and their roles, and backup personnel, ensuring that there are adequate numbers of staff for response 24 hours per day, 7 days per week, if required.
2. Ensure that PR staff are made aware of all developments immediately.
3. Identify media spokespeople and experts ('talent').
4. Provide training for key communications staff and backups.
5. Establish and maintain communication networks (government, industry and media).
6. List those people to be contacted in an emergency (Farmers Unions, associations, government departments, etc).
7. Generate a list of key media (specialist and mainstream).
8. Create a list of regional departmental media officers involved in the response.
9. Create a list of key messages and how these will be used in an emergency.
10. Generate common questions and answers (relate to key messages).
11. Draft media releases and statements (relate to key messages).
12. Establish approval processes necessary for media releases to ensure that clearance is handled promptly.
13. Create web-based information that can be released immediately a response begins.
14. Prepare advertising material to be used in an emergency. Establish telephone information arrangements.
15. Identify and understand media centre arrangements.
16. Collect and summarise market and attitude research (eg on consumer perceptions of food safety and animal welfare).
17. Document communication arrangements and constantly update them.

The alert phase

The alert phase exists when the CVO declares that there is a reasonably held suspicion of a key notifiable animal disease in his/her jurisdiction. In this phase, the CVO ensures that all stakeholders are alerted and key response staff are placed on stand-by.

The operational phase

The operational phase commences when the presence of a key notifiable animal disease is confirmed and the CVO determines that an operational response must begin.

Appropriate communication activities that should be considered at either the national or communal government level include the following:

- Alert key communications staff.
- Set up a media room and media centre.
- Write talking points.
- Write press release.

- Call the minister's office.
- Hold press conferences and media briefings (alert media, brief spokesperson, organise venue).
- Prepare and record radio grabs.
- Prepare maps.
- Go live with website information (frequently asked questions — FAQs, situation report, World Organisation for Animal Health [OIE] notification, maps).
- Obtain vision for pooled television news.
- Obtain media print images.
- Arrange community service announcements or place advertising material.
- Organise in-house secretariat support.
- Alert overseas posts and provide talking points.
- Alert translation services.
- Prepare internal news for agency employees.
- Ensure communications people are on email group lists.
- Screen email traffic.
- Monitor media and obtain coverage as appropriate.

Milestones for PR opportunities

Various `milestones' will be reached during the key notifiable animal disease response. These events are good opportunities to communicate with domestic and international organisations. Milestones might include:

- the lifting of quarantine;
- the negative results of trace-backs;
- the completion of disinfection of infected premises (IPs);
- the installation of sentinel animals;
- the restoration of exports from areas that are 'zoned' disease-free;
- the restocking of former IPs after any necessary spelling and sentinel placement periods.

The stand-down phase

The stand-down phase occurs when the threat from a key notifiable animal disease is no longer present and/or most key notifiable animal disease investigation and operational activities cease in a given area. The control or eradication of the key notifiable animal disease might take weeks or months, and eradication might never be achieved. Restoration of full trading activity in live animals, meat and other livestock products and any other affected industry can be expected to take some time. Addressing trading issues both domestically and internationally begins in the alert phase.

Milestones reached during the stand-down phase will provide a good opportunity to communicate with domestic and international organisations. An example would be the formal notification by the CVO to the OIE that the whole of Namibia has now met the international standard to be considered free from the key notifiable animal disease that caused the outbreak.

Other key communication activities in the stand-down phase include conducting a debrief of communications staff to:

- determine what worked well and what things really made a difference
- judge how well the communication plan worked
- assess perceived deficiencies in equipment and accommodation
- assess the news coverage and its impact
- consider other positive and negative aspects of the crisis communication response effort; and
- consider the lessons learnt.

Lessons learnt can then be integrated into emergency communication plans.

Communication from a national level

During a key notifiable animal disease response it is essential to ensure consistency in public comments to maintain stakeholder confidence in the response to the emergency. The use of a single entity such as MAWF's Media Liaison Office can ensure the development and use of consistent talking points, identify key spokespeople and devise strategic approaches to crisis communication.

In a large-scale key notifiable animal disease response, many different agencies could be directly involved, and the media could legitimately approach any of them for comment. The Media Liaison Office enables a few people to effectively coordinate the overall communication efforts of many.

Tools that may be developed prior to a key notifiable animal disease outbreak to be used during a response could include:

- pre-approved television, radio and newspaper advertising material for immediate use, in multiple languages;
- national telephone information arrangements;
- a national agriculture emergency website;
- a course to train PR professionals for a role in the response;
- a secure extranet site to provide an ongoing repository for crisis communication material and to share information among stakeholders during a response;
- a pool of accredited government PR officers to undertake a communication role in a major pest or disease emergency;
- interpreter services to support foreign media inquiries and the reporting of disease by farmers from non-English-speaking backgrounds;
- a fully operational media centre for national briefing purposes; and
- a rapid response capability that includes a public communication component.

During a response, the Media Liaison Office's role is to advise on, oversee and implement any agreed communications strategy, as well as providing key public relations roles in the disease control centres.

Communication - Instructions for Existing Programs

General principles

Communication strategies during suspected or confirmed outbreaks of particular diseases are guided by the Animal Health Act, 2011 (Act No. 1 of 2011). Under this Act, particular diseases are classed as exotic (for example bovine spongiform encephalopathy), and/or notifiable (for example foot and mouth disease).

Before an outbreak

The contents of the current contingency plans should be communicated to all relevant stakeholders. During times when no outbreak has occurred, ongoing communication programs should be undertaken to educate stakeholders such as farmers, abattoir workers, feed companies and the general public about diseases which will have a serious impact on the country. Staff members should receive on the job training in clinical diagnosis and sampling for diseases. Staff members should also be trained in the use of radio programs, field days, community visits, farmers and staff meetings, and other exercises that can be used to distribute information.

After an outbreak

Once the outbreak has been contained and/or eradicated, it is important that careful consideration is given to the advice given to the media. Any human health implications, trade implications and other consequences resulting from the outbreak need to be addressed and explained effectively. The Ministry of Health and Social Services should be involved with necessary discussions relating to concerns of human health issues in relation to meat consumption. A consistent public health position is essential. The approach will vary, depending upon the disease in question and the source of the outbreak. There may be additional public concern if trading partners decline to accept Namibian exports.

Notification of an outbreak

1. In the event that an outbreak of a priority disease (FMD, HPAI or BSE) is suspected the official carrying out the investigation shall:
   - Collect samples as described under the relevant disease summary or contingency plan for confirmation of disease and submit them to the Central Veterinary Laboratory.
   - notify his immediate superior or directly to the Chief Veterinary Officer.
   - In the case of a private veterinarian or person responsible for the animals, he/she shall within 24 hours report his/her suspicion to the nearest State Veterinarian who shall then report to the Chief Veterinary Officer.
2. In the event of confirmation of diagnosis by the Central Veterinary Laboratory, the Pathologist shall immediately inform the Chief Veterinary Officer and the State Veterinarian who submitted the sample.
3. The CVO shall convene a meeting of the National Emergency Committee whereby the contingency plan shall be activated
4. The Chief Veterinary Officer shall inform:
   - the Minister for Agriculture, Water and Forestry via the Permanent Secretary.
   - other government ministries whose assistance may be required (e.g. the MET, police, army, customs) informing them of their roles.
   - all SV Offices – providing information and instructions e.g. movements to and from infection, movement restrictions; auctions etc – until detection of limits of infection.
   - CVOs of SADC countries.

- the OIE: – First notice of suspicion – then confirmation - Fortnightly reporting afterwards. Reporting to include:

i. Outbreak or case – Disease – Affected species – Number of affected animals (per species)
ii. Clinical diagnosis – Laboratory diagnosis – Identified type (s) of virus
iii. Geographical localisation: farm, village, district, province, etc., or geographical co-ordinates (longitude – latitude)
iv. Seriousness – Measures applied (sanitary and/or veterinary)
v. Signature (code telegraphic address)

- Veterinary directorates in neighbouring RSA/Botswana/Angola/Zambia/Zimbabwe are to be informed telephonically – to allow them for protection of their borders.
- European Commission (local office) / Switzerland / Norway and any other trading partners.
- all other relevant stakeholders initially and subsequently on a weekly basis unless new information requires more frequent updates.

5. Press Release:- Ministry of Agriculture will be responsible for the release of press release. This press release will announce details of the outbreak and relevant measures being implemented to limit spread and effect control and eradication, depending on the disease and the relevant contingency plan. The content of the press release shall be sent to all Veterinary Offices through an internal memorandum first before it is made available to the public.
6. Follow-up reports shall be done in accordance with OIE guidelines.
7. A hotline shall be established at DVS Head office for any enquiries or information to be reported related to the suspected or confirmed outbreak(s).
8. Regular two-way communications will be maintained with all stakeholder groups through media releases, public meetings and telephone hotline.

Communication Strategy

During an outbreak DVS will ensure that all relevant stakeholders are kept informed of actions and activities and are included in consultations as set out in individual contingency plans. DVS will also accept feedback and stakeholder input through stakeholder and public meetings, via field staff and through the disease hotline.

When there are no outbreaks DVS will ensure that the contents of the relevant contingency plans are communicated to all relevant stakeholders. A clear communication strategy with clear activities will be drawn up to ensure that messages do reach the intended audiences ensuring that they reach the majority of them, are relevant to their needs and can be understood by them. The Training section of the Directorate of Veterinary Services will take a lead in this endeavour.

State Veterinary offices through their extension activities such as scheduled farm visits, disease investigations, community visits, meetings with farmers, field days are expected to publicise and make the farmers aware of the dangers of relevant diseases and signs and symptoms of important diseases of concern. Where possible stockman (employees) who look after the animals on a regular basis must also be targeted for training.

Stakeholders

Non-Governmental

(Specific target groups will vary depending on specific disease)

a. Farmers' representative organisations
b. Animal Health Consultative Forum
c. Abattoir operators
d. Meat Board of Namibia
e. Auctioneers, LABTA
f. Private Veterinarians, VAN ExCo
g. Farmers and Farm workers (Livestock, poultry, ostriches, etc)
h. Livestock transporters, NALETA
i. Traditional Authorities
j. General Public
k. Agricultural Students
l. Tourist Farms, guides and Tourists
m. Fishing Communities
n. Bird Handlers
o. Health Workers
p. Traders, consumers and handlers of bird products
q. Primary and Secondary Schools: learners and teachers

Governmental

a. Veterinary Staff (State Veterinarians)
b. Veterinary Staff (AHT)
c. Ministry of Agriculture (top management)
d. Office of the Prime-Minister, Directorate of Emergency Management
e. Ministry of Safety and Security - Namibia Police
f. Namibia Defence Forces
g. Ministry of Environment and Tourism
h. Ministry of Finance - Customs and Immigration

Media of Communications

a. Press Conferences and releases
b. Sets of Information leaflets
c. Weekly Newspaper articles
d. Weekly Radio Programmes
e. Weekly Television Programmes and updates
f. New paper inserts
g. Consultative meetings
h. Public meetings
i. Training workshops for selected groups
j. Information meetings with various groups
k. Door to door information sellers
l. Agriculture Extension Workers
m. Reports: Monthly, quarterly, etc.

Content to be Communicated

a. Basic General Information on relevant diseases
b. Infection, transmission and disease in affected species
c. Control and Management of disease
d. Control and management of transmission Avian Influenza Virus to Humans
e. Preparation and Management of outbreak response
f. Monitoring and status reports from time to time
g. Public awareness programmes and activities
h. Stakeholders' roles in Contingency Plans

Actors

a. Office of the President
b. Office of the Prime Minister
c. Ministry of Agriculture, Water and Forestry
d. Ministry of Environment and Tourism
e. Ministry of Fisheries and Marine Resources
f. Ministry of Health and Social Services
g. Ministry of Information and Broadcasting
h. Ministry of Education
i. Chief Veterinary Officer
j. State Veterinarians

Administrative equipment

It is essentional that veterinary offices maintain their communication equipment such as facsimiles, telephones and photocopiers. In the event that any equipment is not working, the equipment should be repaired immediately and in the meantime facilities at other government departments can be used.

Each office is to have both a computerised and a manual database of animal movements.

Essential forms such as:

- movement permits
- quarantine order certificates
- disease report forms

should be available at all times.

Vehicles that are currently in service in the Directorate will be used for field operations. Should the need arise for additional vehicles, the Chief Veterinary Officer will make the necessary arrangements to get them.

Further information

HPAI Contingency Plan - Communication

BSE Contingency Plan - Communication

FMD Contingency Plan - Communication

Emergency Response - Investigation phase

Investigation Phase

The Investigation Phase exists while information is collected to exclude or confirm the existence of a key notifiable animal disease and prior to the Chief Veterinary Officer (CVO) declaring an Alert Phase.

Notification of a possible key notifiable animal disease may come from any of a number of sources, including veterinarians, farmers or producers, and members of the public.

The investigation involves collection of all the laboratory samples and clinical, gross pathology, and epidemiological information needed for an informed assessment. In some circumstances, if there is sufficient reason to strongly suspect the existence of a key notifiable animal disease, the Investigation Phase may progress to the Alert Phase before investigations are completed. However, since most investigations will be negative for a key notifiable animal disease, jurisdictions must exercise judgment and not promote an Investigation Phase to an Alert Phase unnecessarily.

Where a key notifiable animal disease is suspected, disease information must be collected and collated efficiently without delay.

All personnel involved in key notifiable animal disease responses must keep a record of telephone calls and conversations.

Actions to be taken by the State Veterinarian

As the responsible government veterinarian closest to a possible key notifiable animal disease event, a State Veterinarian is likely to receive initial notification of a suspected key notifiable animal disease.

The State Veterinarian must collect and record all information relevant to the investigation of the report and notify a Chief Veterinarian.

Details of the role of the State Veterinarian are provided in the **checklist for State Veterinarian**.

Actions to be taken by the Chief Veterinarian

During investigations, the Chief Veterinarian should collect, collate and analyse information provided by the State Veterinarian and provide advice to the CVO, who needs warning as early as possible that a key notifiable animal disease investigation is under way. The Chief Veterinarian should also coordinate other field activities to support the investigation.

Details of the role of the Chief Veterinarian are provided in **checklist for Chief Veterinarian**.

Actions to be taken by the diagnostic team

Where further diagnostic expertise is required, the CVO or the Chief Veterinarian may arrange for a specialist veterinarian or diagnostic team to be dispatched to the suspect premises (SP).

For more details, see **checklist for a diagnostic team**.

Actions to be taken by the CVO

The CVO must use sound veterinary judgment to determine the appropriate response at the time. The need to correctly assess the incident must be balanced against the need to ensure that all necessary actions can be taken if the probability of a key notifiable animal disease increases. Although remaining ultimately responsible for the proper investigation of a key notifiable animal disease, the CVO rely on both the Chief Veterinarian and the State Veterinarian to run operations on the ground. This will provide the advantage of having a person who is well briefed

on the incident, and may assist the rapid activation of the national disease emergency committee (NDEC) should the incident proceed to the Alert Phase.

The CVO should keep a diary of events, including telephone calls and conversations, beginning as soon as initial notification is received.

Details of the role of the CVO are provided in **checklist for chief veterinary officer**.

Emergency Response - Alert phase

Principles of early warning and early response

The Alert Phase exists when the Chief Veterinary Officer declares an alert because there is a reasonably held suspicion of a key notifiable animal disease. The Alert Phase is the period when it is believed that resources will be required which enables an increased level of preparedness. It allows planning to occur and the jurisdiction to prepare itself before incurring the expenses associated with activating the response. It helps implementation of a rapid, effective response as soon as the emergency disease has been confirmed. In this phase, the CVO ensures that all stakeholders are alerted and key response staff are placed on stand-by.

Actions during the Alert Phase

- Notify CVO
- Quarantine of affected farm/s or area
- Secure boundaries of affected farms including by removing stock from the boundaries
- Act on urgent tracings
- Rapid laboratory confirmation of cases
- The CVO:
  - advises the Minister
  - advises all support agencies who would be involved in the response to be on standby
  - advises all staff who would take key roles in the response to be on standby
  - activates NDEC and RDEC
  - notifies key industry personnel, MAWF management and DVS staff
- Identify potential control center sites and equipment needed for those sites
- Draft legal documents for Declared Areas
- Check equipment and supplies that will be needed in the early stages of the response, and replenish any gaps identified
- Undertake an assessment of the epidemiological situation - gather and collate epidemiological information so the potential extent and possible impacts of the outbreak can be assessed
- Undertake risk assessment of situation to identify high priority areas for the response
- Plan the overall strategy for managing the disease
  - Identify information that will be needed to plan response and identify sources of information
  - Commence tracing investigations
  - Decide on destruction and disposal methods (if appropriate)
  - Decide on disinfection methods
  - Identify the classes of products that will need to be traced
  - Plan surveillance strategy

Specific actions

Actions to be taken by the State Veterinarian

The State Veterinarian, on the direction of the Chief Veterinarian, must continue to collect field data, in the absence of a diagnostic team collect samples, and initiate disease control activities according to the **checklist for State Veterinarian**.

Actions to be taken by the Chief Veterinarian

The Chief Veterinarian should work closely with the CVO to continue to collate and analyse field data from the State Veterinarian and initiate disease control measures according to the **checklist for Chief Veterinarian**.

Actions to be taken by the diagnostic team

Unless a diagnostic team has already been activated in the Investigation Phase, the CVO may arrange for a team to be dispatched to the SP, or may rely on the Chief Veterinarian's investigation.

The role of the diagnostic team is to:

- collect appropriate samples to ensure that a diagnosis can be confirmed or excluded as quickly as possible;
- assist with the clinical evaluation of affected animals; and
- assist with epidemiological investigations, including risk assessment, determination of the source of the outbreak, and assessment of possible wild animal involvement.

The diagnostic team should have accreditation or access to skills in:

- veterinary pathology;
- veterinary epidemiology (and/or previous experience with the disease concerned);
- packaging and transport of samples for virological examination (as required under International Air Transport Association regulations); and
- decontamination procedures.

Details of the role of the diagnostic team are provided in the **checklist for a diagnostic team**.

Actions to be taken by the CVO

The CVO is responsible for determining which actions are necessary and ensuring that they are carried out according to the checklist in the **checklist for chief veterinary officer**.

The CVO will appoint a director for the NDEC, who will be responsible for coordinating information and activities relating to this phase. The RDEC will also be placed on stand-by.

Other actions to be taken by the CVO

The CVO will appoint a Director of DCHQ to carry out the following additional actions detailed in the **Checklist for DCHQ Director**.

Actions to be taken in nonaffected areas

After notification by the CVO, personnel in nonaffected areas will take the following actions, as appropriate:

- Carry out any immediate actions as directed.
- Place other personnel in the district on stand-by and advise them:
  - that the key notifiable animal disease response is at Alert Phase;
  - of the nature of the suspected key notifiable animal disease;
  - of the location(s) of the SP; and
  - of activation of local plans.
- If appropriate, convey the same information to veterinary practitioners and key industry contacts in the district.
- Check availability of appropriate supplies, including the necessary forms such as:
  - quarantine forms and permit forms
  - surveillance or disease investigation kits
  - protective equipment
  - disinfectants and decontamination equipment.
- Prepare to move immediately to the RDEC or NDEC when requested.

Early response

- Legislate declared areas for disease control purposes and implement those areas
- Impose quarantine and movement controls over animals, animal products and fomites in declared areas, to minimise spread of infection
- Typing of the outbreak strain of virus and ordering of appropriate vaccine (if relevant)
- Tracing and surveillance to determine the source and extent of infection
- Valuation and destruction of animals on infected premises and potentially on dangerous contact premises
- Disposal of destroyed animals and infected animal products
- Decontamination of infected premises and dangerous contact premises
- Decontamination and/or disposal of fomites to eliminate the pathogen
- Recall of products (if appropriate)
- Relief and recovery programs to minimise animal and human welfare issues that could inhibit the effectiveness of the response
- A public awareness campaign
- Industry support to improve understanding of the issues, facilitate cooperation and address animal welfare issues.

Mobilisation and management of response teams

Rapid response team

A rapid response team is a technical, multi-disciplinary team that is readily available for quick mobilisation and deployment in case of emergencies. A rapid response team should be identified during times of preparedness so that they can be quickly mobilised should an outbreak occur.

The rapid response team should include:

- Site supervisor
- Surveillance officer
- Laboratory technician
- Environmental health officer
- Veterinary officer
- Epidemiologist
- Wildlife management experts
- Others, depending upon availability and the nature of the key notifiable animal disease.

Roles and responsibilities

- Investigate rumours and reported outbreaks
- Propose appropriate strategies and control measures
- Coordinate rapid response actions with partners and other agencies
- Initiate implementation of the proposed control measures
- Prepare detailed investigative reports
- Contribute to the final evaluation of the outbreak response

Equipment

Field Equipment

The following equipment is to be maintained at strategic State Veterinary Offices (presently this is available at SV offices Katima Mulilo, Rundu, Ondangwa and Otjiwarongo). The state veterinarian in charge of an office where this equipment is kept shall inspect this equipment every 12 months and record his findings in writing to the Deputy Chief Veterinary Officer Disease Control.

Equipment	Number
Disposable syringes (20 ml) + needles (16-18 gauge) – sterile packing	20
Bottles FMD Transport Medium (Note: it will have expired if the colour has changed from red to pink)	4
Bottles FMD Transport Media for probang samples	4
Liquid Nitrogen or dry ice to be kept at CVL only	
Pair tissue forceps	1
Pair thumb forceps (serrated)	1
Pair rat tooth thumb forceps	1
Pair of scissors	1
Probang cup	1
Box of surgical gloves (All three sizes-small, medium & large to be included +/-50)	1
Cool box	1
washing soda (bicarbonate of soda) packaged into 500g sachets/1kg Virkon-S/500g citric acid powder	5 kg
Bio-secure specimen transport box	2
Nose Tongs	2
restraining rope	2 x 10 metre
Sterilising equipment (1x portable gas stove and 1x wide open pot)	
litre plastic containers	2 x 20
litre buckets (metal)	2 x 25
Stirrup pump (sprinkaanpomp)	
Maps (1:50 000) of the regions	
Vehicles	

Protective clothing (overalls, gumboots, plastic aprons), Tyvek disposable coveralls are available at Ondangwa, Rundu, Katima Mulilo, Otjiwarongo and Head Office state veterinary offices.

Each Chief Veterinarian Office and State Veterinarian Office is expected at all times to have functional communication equipment such as telephones, faxes and email facilities including photocopiers and stationery (e.g. permits, disease report forms etc). Airtime for cell phones will be purchased centrally - $500 per month per individual for key staff involved in the response.

Permit registers (whether electronic or manual) must be maintained and updated with back-ups available at all times to facilitate the tracing back and forward of livestock movements.

The following equipment is stored at Otjiwarongo, Ondangwa, Rundu, Katima Mulilo state veterinary office and quarterly checked by the state veterinarian responsible for that office.

Road signs	Check numbers
Animal disease checkpoint ahead	x20
Stop signs	
Flash lights	

Equipment	Number
Zinc baths	5
Buckets	5
Washing soda	5 x 50 kg
Gumboots	5 pairs of sizes 7, 8, 9 & 10 each
Rubber (surgical) gloves	20 pairs of sizes: medium, large, extra-large
Overalls	6 each of sizes 92 - 122
Black iron pots	5 of No 2
Branding irons	40 - KH
Cattle marking oil paint	4 x 5 litres
Stirrup pumps	12
Tents	4 cottage 3 x 4 M
Camping tables	4
Camping chairs	4
Spades	4
Axes and handles	4
Torches	4 (buy batteries)
Gas – lamps	4 (complete with gas bottles)
20 litre water can	5
Reflective clothing	20 jackets
Diesel/Petrol Generators	4
Fuel in jerry cans	20
Fire Fighters	4

Additional Equipment

- 1000 Litre water carts/tanks to be arranged with HQ
- Radios
- GPS
- Instructions for check points
- Mobile crush-pens - need to be registered - each store must have two.

It is important that handling facilities in the various state veterinary areas are maintained. Since the crush pens in communal areas south of the cordon fence were handed over to local communities, a status report on their condition is required on an annual basis.

Management of Emergency Vaccine

What is a vaccine?

A vaccine is a biological preparation that includes modified strains of disease causing agents. Vaccines trigger an immune response which can provide protection from disease. They are very sensitive to temperature, and breaches in the cold chain can reduce or destroy their effectiveness.

The cold chain

Killed vaccines need to be stored between the temperature range of +2°C to +8°C. The term 'cold chain' refers to a system of transporting and storing vaccines within this temperature range at all times. The cold chain begins from the point of manufacture and must continue until the vaccine is administered.

Cold chain breaches

Cold chain breaches can result in the vaccine becoming less effective, or destroyed. These breaches can include:

- freezing the vaccine
- allowing the vaccine to become too hot; or
- exposing the vaccine to direct sunlight or ultraviolet (UV) light.

Once a cold chain breach has occurred, the vaccine will lose its potency. Exposure to temperatures outside the safe range of +2°C to +8°C have a cumulative, detrimental effect on vaccines. This can not be reversed so ensuring the cold chain remains at all times is crucial.

Emergency vaccine management

Strict vaccine management is important because:

- it helps ensure the effectiveness of the vaccine
- vaccines are expensive, and can be in short supply
- good management reduces the need for revaccination due to ineffective vaccine
- problems with the cold chain can be identified before the vaccine is affected

Ideally vaccines should be stored in purpose-built vaccine refrigerators. These refrigerators are especially designed to provide a stable and uniform temperature between +2°C to +8°C. They have alarm and safety features which are designed to alert management to temperature fluctuations, and have good temperature recovery after the refrigerator has been opened.

Domestic refrigerators are not recommended for vaccine storage due to temperature fluctuations.

If necessary, it is acceptable to store vaccines with blood products, as blood products have a similar cold chain temperature range (+2°C to +6°C).

Vaccine management protocol

The following protocols should be in place in relation to vaccine management:

- A suitably trained, designated person is responsible for vaccine storage and implementation of protocols
- A suitably trained person is available as a backup when the designated person is unavailable
- Orientation and education on safe and effective vaccine management is provided to all staff members involved with vaccine storage
- Contact names and numbers for reporting:
  - cold chain breaches
  - refrigerator issues
  - power failures
- Backup storage options for vaccines.

Operational Phase - Introduction

Operational Phase

The Operational Phase exists when the presence of the disease agent is confirmed, when the CVO of the affected region determines that an operational response must begin.

In this phase:

- the CVO, in consultation with DVS, prepares an emergency animal disease response plan (EADRP) for approval;
- the approved EADRP is initiated under the appropriate legislation;
- whole-of-government and industry emergency management arrangements and response plans are activated, as appropriate; and
- appropriate financial and disease-reporting systems are established.

Actions to be taken by the State Veterinarian as site supervisor

The State Veterinarian should:

- act as site supervisor of the infected premises (IP) until relieved of that responsibility by the Chief Veterinarian;
- make a preliminary assessment of personnel and other resource requirements for the operation; and
- provide information to the occupier of the IP about the disease and response operations, and about support services.

Actions to be taken by the State Veterinarian

The State Veterinarian has the following key functions:

- oversee the establishment of the RDEC;
- fully activate the field operational response; and
- establish effective communications with all key stakeholders in the restricted area (RA).

Actions to be taken by the Chief Veterinarian

The Chief Veterinarian will:

- direct activities set up in the Alert Phase;
- oversee completion of the EADRP and the subdivisional or regional strategies;
- support RDEC operations; and
- establish effective communications with key stakeholders, including industry and the community, outside the RA.

Actions to be taken by the CVO

The CVO is responsible for overall management of the key notifiable animal disease response. This includes ensuring that declarations and notifications in the format required by appropriate legislation are enacted, and ensuring that the Operational Phase is implemented. If legislation is inadequate, the CVO must request the DVS for approval to use the powers available under the **Animal Health Act, 2011 (Act No. 1 2011)**.

See also the **checklist for chief veterinary officer**.

Actions to be taken in nonaffected areas

Advice on the operations will be provided through SVOs in nonaffected areas.

Decontamination - Outbreak

Introduction

Decontamination — the combination of physical and chemical processes that kills or removes pathogenic microorganisms — is vital for disease eradication. It requires the application of appropriate strategies to reduce the microorganism load to noninfective levels.

These guidelines cover general information on decontamination of premises where animals infected with key notifiable animal disease agents have been held. Specific decontamination chemicals and procedures where relevant are covered under response guidelines for key notifiable animal diseases.

Definitions

- **Decontamination —** includes all stages of cleaning and disinfection.
- **Disinfection —** the application, after thorough cleaning, of procedures intended to destroy the infectious or parasitic agents of animal diseases, including zoonoses; applies to premises, vehicles and different objects that may have been directly or indirectly contaminated.
- **Disinfectant —** a chemical used to destroy disease agents outside a living animal.
- **Sterilisation —** the removal or destruction of all forms of life. In the context of disease control, this refers to the removal or destruction of microorganisms on an item or surface.

It is rare that 100% decontamination can be attained or proved in field situations.

Disinfectants/chemicals for the inactivation of emergency animal disease agents

A relatively small number of disinfectants is effective against broad groups of viruses and bacteria. Ultimately, the choice of disinfectant depends on the disease agent, availability of the disinfectant, how the disinfectant is to be applied and how an adequate wet contact time is to be maintained.

Preparatory cleaning

Simple cleaning of surfaces by brushing with a detergent solution is effective in removing contaminating viruses and bacteria and is fundamental for achieving effective chemical decontamination.

Preliminary cleaning work is invariably needed before any chemical disinfectants are used. Most disinfectants have reduced effectiveness in the presence of fat, grease and organic material. Every effort should be made to remove such material from all surfaces to be decontaminated. Hot water and steam are effective for cleaning cracks and crevices where pathogens are likely to linger. The inside of pipework can be cleaned effectively by steam applied long enough to bring the surface temperature close to 100°C or with a 'clean-in-place' system with an appropriate disinfectant product, as is often used in dairy factories.

Natural disinfection

The natural processes of time, dehydration, warmth and sunlight will greatly assist the decontamination operation and should be considered in planning. A hot, dry, sunny day will cause rapid natural inactivation of an agent such as Newcastle disease virus, whereas cold, damp, overcast conditions will help it persist. It follows that the natural effects of solar heat, dehydration and UV radiation will quickly decontaminate fencing and rails in the open, but that disease agents are likely to persist longer on a cold, damp floor inside a shed.

The destocking of a contaminated property for a long period after a disease outbreak is based on the same principle.

Classes of disinfectants

Disinfectants can be grouped into the following classes:

- soaps and detergents
- oxidising agents
- alkalis
- acids
- aldehydes
- insecticides.
- other chemical agents (for example biguanides, iodophores, quaternary ammonium compounds, phenolics).

Estimation of quantities required

The amount of decontaminating agent necessary for particular jobs varies considerably. For a polished, nonporous floor, 100 mL of disinfectant/chemical applied per square metre is probably sufficient. However, for porous surfaces such as concrete or wood, the volume may need to be doubled or tripled. Generalisations are not useful, because the application of liquids to ceilings or vertical surfaces cannot be controlled well.

After adequate cleaning of the contaminated surface, the most critical factor is the time the disinfectant is in contact with the surface. For most applications, disinfectant must flood the surface and keep it thoroughly wet for at least 10 minutes.

In any large-scale decontamination of an IP, the cost of disinfectants will be relatively minor. Because labour and other operational costs will be high, using disinfectants at less than the recommended concentrations would be a false economy. If disinfectants are watered down, they invariably lose effectiveness.

Safety precautions

Chemicals usually kill microorganisms by toxic reactions, and effective disinfectants are often also toxic to animal (including human) tissues. Virtually all disinfectants have to be used with care to avoid occupational injuries or health problems.

If using steam or flame for decontamination purposes, safety precautions must be adhered to in order to reduce the risk of burns.

General safety precautions

First aid boxes must be available on every IP or dangerous contact premises (DCP) or where hazardous chemicals are being used. Such boxes must contain a supply of antidotes and treatments for the chemicals to be used. It is essential to brief workers and the property owner on safety aspects before commencing operations, including the potentially harmful effects of chemicals on animals, humans and the environment.

The use of any chemical or equipment should conform to the manufacturer's instructions and safety standards. All officers and workers must carry out their duties in accordance with current health and safety legislation. All accidents, however small, that require medical attention must be logged and their details reported back to the State Veterinarian.

When diluting concentrated chemicals, the concentrate should always be added to water, never water to concentrate. Contact with concentrates on exposed skin will cause severe burning. All workers engaged in mixing or applying disinfectants must wear boots, overalls, goggles and head covering for protection. A full face guard should be used when applying the diluted chemical. The danger of inhalation can be avoided by not applying a mist spray.

If skin contact occurs:

- wash with copious amounts of water immediately;
- apply vinegar to caustic alkali burns or apply bicarbonate of soda to acid burns; and
- refer for hospital treatment if necessary.

If eye contact occurs, the eyes should be irrigated copiously with eyewash solution and the person referred to a hospital.

Concentrate containers should be stored in one place on the property away from the main area of work in order to remove the danger of containers being ruptured inadvertently. The containers should be checked each day for spillage of concentrate.

Hand and skin care

Hands and skin can be washed safely in a wide variety of commercially available disinfectants, but there are relatively few approved products with antiviral activity. Virkon is reported to have low toxicity and to be effective against members of all families of animal viruses, but it has not been approved for use on skin. Antiviral conditions may be achieved by altering the pH as appropriate for the agent by adding citric acid or sodium carbonate to washing water. Foot-and-mouth disease virus is typically inactivated by such pH adjustments.

Some people have demonstrated sensitivity to skin contact with disinfectants. Reactions tend to occur with repeated exposure or where skin has been affected by pH modifiers such as citric acid.

Environmental considerations

Although selection of the disinfection method will be undertaken primarily on the basis of effectiveness against the target EAD agent, disinfectants used in disease control programs are potentially noxious substances and may have adverse impacts on the environment. The planning process needs to consider in advance the potential environmental impact from decontamination procedures and assess whether methods for containment or neutralisation are viable and acceptable.

Activities should not have significant detrimental impact on the natural environment. Care must be taken to ensure the discharge of chemicals, silt, organic matter or carcases into natural waterways or other environments does not occur. It is essential that authorities are consulted when the decontamination process is being designed and that appropriate disposal of waste materials is undertaken.

The volumes of water requiring disposal will need to be considered during planning. In some cases, it may be possible to release water into waterways following treatment to neutralise chemical disinfectants (for example, treatment of oxidising disinfectants with thiosulphate) or following a prescribed period of time that allows chemicals to dissipate to acceptable levels (for example, hypochlorite and chlorine dioxide). Other options could include discharge onto approved wasteland sites.

Thorough cleaning before disinfection, use of protective clothing and equipment, use of temporary drains to trap and divert waste, and use of lined ponds or tanks for temporary storage are all options to reduce the adverse effects of decontamination activities on the environment.

Decontamination procedures

In decontamination operations, the most important initial information is the (presumptive) identification of the key notifiable disease involved. Once the disease agent's identity is established, its basic properties must be considered. What are the epidemiological characteristics of its spread? Has transmission occurred by aerosol spread, ingestion, close contact or insect vectors?

Most key notifiable animal diseases are viral diseases. Bacterial diseases can usually be approached in the same way as viral diseases, but diseases caused by insects, parasites or prions require different strategies.

In some cases in which the disease agent does not spread directly from animal to animal (e.g. bluetongue), comprehensive decontamination of a premises is not warranted. In contrast, some viruses (such as those causing swine vesicular disease and foot-and-mouth disease) are relatively stable on inanimate objects and can be spread to remote animals on contaminated people, clothes, equipment etc. Viruses that can be spread by such contact will require the most comprehensive decontamination programs.

Personal decontamination

The aim of personal decontamination is to safely remove any contamination from the body or clothing. The process minimises the risk of cross-contamination, so that people can confidently move out of the contaminated environment with no or minimal risk of dissemination of the disease agent. Personal decontamination procedures *must* be rigorously applied. Having a personal kit in the vehicle at all times will enable correct disinfection.

Heavy personal contamination may occur while personnel are working on IPs or dangerous contact premises (DCPs) and when active disease is found by diagnostic and surveillance teams.

The heaviest contamination will occur:

- when living infected animals are physically inspected;
- when slaughtered animals are physically inspected and diagnostic samples taken;
- at the slaughter site on an IP or DCP;
- at the site of carcase disposal; and

- when removing manure, bedding and detritus from buildings that housed infected stock.

Efficient and effective premises decontamination will only result from:

- a presumptive identification of the suspected key notifiable animal disease agent;
- assessment and recording of contaminated areas, animals and articles;
- the selection of the most suitable decontamination techniques for each item and area, while complying with legislative requirements;
- the acquisition of necessary equipment and materials and recruitment of personnel to undertake the tasks; and
- the adoption of an appropriate strategy.

Every consideration should be given to utilising farm owners and staff on IPs and DCPs. Their knowledge of operations on the premises is crucial, especially on intensive industry premises.

In carrying out premises decontamination, realistic goals should be set. It is not possible to achieve 100% decontamination over the entire premises, including equipment and vehicles. The type, quantity and susceptibility of the key notifiable animal disease agent involved should be considered. Ambient temperature, UV radiation and time are excellent tools to use if organic material has been removed from heavily contaminated areas.

The following regime is recommended.

1. Inspect the IP or DCP and prepare a map of the premises.
2. Start a logbook to record all events and recordings.
3. Indicate areas not requiring decontamination action.
4. Indicate areas or sites requiring specific decontamination action (consult the officers in charge of slaughter, disposal and epidemiology).
5. List the actions needed in each area, in chronological order.
6. Estimate a timeframe for the decontamination program.
7. Seek approval from the State Veterinarian for the proposed program.
8. Implement the agreed decontamination plan, maintaining liaison with the Chief Veterinarian and submitting a daily progress report.

A typical premises decontamination program comprises:

- presumptive identification of the key notifiable animal disease agent
- premises assessment
- preliminary disinfection
- cleanup
- first disinfection
- first inspection
- second disinfection
- final inspection
- a proposed timeline.

Continuous close liaison with the owner/manager is essential to achieve an effective program.

Premises assessment

The initial premises assessment must be detailed thoroughly, as it will be used throughout the decontamination process. Relevant details should be marked on the premises map.

Overhead high-tension electricity power poles and lines, underground cables, telephone lines, electricity fuse boxes, power points and meters should be identified. Where applicable, the appropriate authority should take meter readings of power, gas and water for compensation at a later date. Where necessary, underground water pipes should be identified.

All drains and their run-off should be located and marked. Any drains that run free must be blocked with hessian or plastic bags and only allowed to run when the effluent has been thoroughly mixed with disinfectant. If effluent is running freely into creeks or other watercourses, a pit or dam should be dug across the drainage line. Where possible, water authority drainage maps should be checked to determine the subsequent flow of effluent. If drainage is to a septic tank, the tank should be examined, and its spare capacity estimated and noted down. If the tank is full, the drains should be blocked.

The decontamination site should be examined. If a temporary one has been set up, it may need to be moved because of the potential increase in traffic or effluent overflow. The site must be delineated and disinfected.

An unloading area should be detailed outside the decontamination area, where materials and equipment can be unloaded without having to decontaminate vehicles.

An area where the workforce will eat or have tea breaks should also be detailed. This area should have provision for heating water and preferably cover or shade.

If there is a residence on the premises, the degree of contamination in the residence and its immediate surrounds should be estimated. Disposal operations, cleaning or both to be done in the house to remove all sources of contamination should be detailed, with special attention to verandas and the office. If it is possible, and without compromising disease control, a decontamination procedure to allow household members to safely move off and onto the premises should be arranged. This will depend on the siting of the house and the possibility of disinfecting to a point outside the designated contaminated area. 'INFECTED PREMISES' notices are to be posted at the entrance to the premises.

On intensive piggeries and poultry farms, all extractor fans should be turned off. This is particularly important for disease agents that are easily dispersed as aerosols, such as foot-and-mouth disease virus and Newcastle disease virus.

The amount of animal effluent to be removed for disposal is to be assessed, as is the amount of food that will be needed for the animals. To ensure the animals' welfare, it may be necessary to arrange delivery of more food before disposal of the stock is completed. Decontamination tasks can be minimised by restricting access of personnel and vehicles to the premises, for example by only using vehicles already present on the property and by transferring materials at the entrance of the property only.

The premises assessment should detail structures and articles that cannot be decontaminated effectively, such as wooden buildings, floors, doors and linings, roof insulation and timber cattle yards. The degree of contamination of non-animal areas — machinery sheds, workshops, grain and food stores — should be assessed. Assessments should be made of the likely contamination of animal feed, open sacks of food, loose grain stores, hay and straw stacks, especially if they are underrun by animal effluent.

The assessment should note specialist electrical and electronic equipment requiring decontamination with advice from electrical contractors. On extensive properties, an area at the airstrip should be designated as a small decontamination site for pilots and essential visitors. This can be a scaled-down version of the PDS on the IP or DCP.

The assessment must include consideration of the impact of the decontamination process on any identified environmentally sensitive areas on, or contiguous to, the premises, such as conservation areas.

Preliminary disinfection

The aim of preliminary disinfection is to rapidly reduce the amount and distribution of the key notifiable animal disease agent on the IP or DCP, pending thorough disinfection after slaughter and disposal are completed.

Preliminary disinfection begins as soon as possible after the presence of an key notifiable animal disease on the premises is confirmed. Any area known to be contaminated should be sprayed with disinfectant solution to reduce the chance of inadvertent spread of the infective agent. If the disease agent is capable of airborne spread, the importance of pre-slaughter spraying cannot be overemphasised. Decontamination is continued area by area until the first cleanup operation starts. Particular attention should be paid to the roadway used for vehicle entrance and exit, overflows of animal effluent onto roadways or tracks, and the areas around dwellings.

Killing site The killing site should be disinfected at every long break — probably five times a day. This should include buildings and pens housing animals and, as the animals are removed for killing, the area they occupied.

Disposal site The disposal site must be decontaminated thoroughly, but only when disposal has been completed, as wetting some soils makes traction difficult.

All heavy machinery should be allowed to return to a central point on the IP. Heavy machinery not required on the premises after carcase disposal must be carefully disinfected. Personnel should spray along the track to the disposal site and follow with a heavy spray where carcases have been slashed open. Where carcases are burned, the spraying will have to wait until the fire has died down.

When all the animals have been destroyed, wood used for temporary slaughter pens must be buried or burned. All metal gates and panels at the slaughter site are to be scrubbed down with disinfectant and stacked for complete disinfection. The slaughter site can then be thoroughly decontaminated.

Rodent control While the preliminary disinfection is being carried out, the IP site supervisor will arrange with the State Veterinarian for the laying of baits for rodent control, if this is thought necessary to limit the spread of disease. This must be done before food stores are moved or disinfected.

Cleanup

The aim of the cleanup process is to remove all manure, dirt and debris and contaminated articles that cannot be disinfected. The surfaces of all buildings, pens, fittings and equipment must be exposed, ready for the first disinfection. This is the most important phase in the decontamination procedure, because the presence of organic material reduces the effectiveness of disinfectant. Encrusted dung, dirt and grease shield the underlying permanent surfaces from the disinfectant.

Large accumulations of faeces, litter and bedding should be removed. The use of water or disinfectants should be avoided at this stage to minimise the volume and weight of material to be handled. This material will have been lightly disinfected at the preliminary disinfection. The easiest method of disposal of solid and semi-solid faecal material is burial or composting. When animal houses have been cleared of dung, cleaning each building starts from the roof, working downwards.

Personnel should remove all old insulation materials (polystyrene, fibreglass and press boards) for burial or burning, unless the materials have sound, impervious surfaces that can be decontaminated effectively. All unsound, rotten or underrun wooden fittings and flooring and other structures that cannot be disinfected effectively should be removed for burning or burial. All material destroyed must first be valued.

All fixtures and fittings should be dismantled and stacked for cleaning and disinfection. All delicate electronic equipment must be protected for later specialist treatment.

Earthen floors in buildings may need to be broken up and soaked in disinfectant.

Concretions and encrustations of material on permanent surfaces are to be removed. This is most easily achieved by low-pressure spraying with water or water and detergent, using steam cleaners, or scraping with hand tools, and with

particular attention to corners and wall–floor junctions. The surfaces are then washed down using a high-pressure system and plain water. All permanent surfaces must be free of visible contamination.

All feedstuff considered contaminated must be removed and buried after valuation. Feeding and water troughs are to be emptied and cleaned out.

Any effluent arising from the cleaning process needs to be contained and treated.

First full disinfection

The aim of the first full disinfection is to inactivate the disease agent using physical and chemical agents. The necessity for any disinfection depends on the disease agent involved and the passage of time may be sufficient to inactivate some disease agents. This process must be carried out systematically to ensure that areas that have been disinfected are not recontaminated by people or machinery. A recommended order of cleaning is: roof — wall — floor, and this should be adopted in each building. Each building or area should be cordoned off with marking tape when its disinfection is completed. Once an area is dry, it will not be obvious where the disinfected area starts and finishes.

The disposal site should be inspected periodically. Burial pits will emit large quantities of noxious gas and fluid. Once emissions have stopped, the ground around the site should be broken up and liberally soaked with disinfectant. Cremation sites are to be treated the same way. Care must be taken to disinfect personnel, machinery and vehicles close to the site and not allow recontamination of previously disinfected areas near buildings.

Excessive application of chemicals may harm the environment and may be unwarranted, given the disease agent involved, ambient temperatures, UV radiation, and the time that will elapse before the premises is restocked.

First inspection

The aim of the first inspection is to ensure that all tasks detailed on the premises assessment have been performed. The premises is to be inspected by the IP site supervisor or delegate from the State Veterinarian. Depending on the disease agent involved, the first inspection may be the only inspection.

The inspection should determine whether:

- all contaminated woodwork not able to be cleaned and disinfected has been completely disposed of;
- all fixtures and fittings have been dismantled, where appropriate, so that no organic material is left behind them;
- there are no observable encrustations on any exposed surface;
- all contaminated feedstuff has been destroyed, and remaining material made safe;
- all grossly contaminated sites (slaughter and disposal) have been properly sealed and effectively cleaned and disinfected;
- all fluid that has been disinfected has been released into drains or a septic tank; and
- the conditions of quarantine, especially at exit/entry points, and warning notices are being maintained.

Preparation for second disinfection

There can be a potential residue of contamination, particularly under old, cracked concrete and under rundown buildings. An assessment of the need for a second disinfection should take into account the disease agent involved, the likelihood of its survival after the first disinfection, and the time factor.

Areas of underrun or loose concrete should be examined carefully, and a cost assessment should be made to determine whether they are to be re-rendered, repaired or destroyed. Earthen pathways and walls of animal houses that are constructed of porous brickwork or ‘breeze block’ should be similarly inspected and assessed.

If repair or re-rendering work is to be done, a written agreement with the owner on the work must be obtained before the work begins. The work must be finished or so nearly finished that it does not hinder the second disinfection.

Second full disinfection

The second disinfection is a repeat of the first. It can be started approximately 14 days after the first disinfection, depending on the disease agent involved and provided no rendering work remains to be done.

Final inspection

The final inspection is carried out in the same way as the first inspection. The premises must be meticulously inspected, preferably by an experienced officer not involved in an earlier inspection. If there are any doubts, disinfection work must be repeated.

If the final inspection is satisfactory, all equipment and personnel are disinfected at the decontamination site before leaving the premises. Reconstruction work can be carried out and the premises made re-habitable for stock.

Decontamination of vehicles and machinery

Contaminated cars, vehicles used to haul livestock, animal feed or products, and their drivers pose a disease dissemination risk. In an EAD incident, the first priority is to ensure that no vehicle leaves an IP or DCP without thorough decontamination. The second priority is to urgently trace vehicles that have been in contact with the disease agent, to take them off the road and decontaminate them thoroughly. The State Veterinarian should make inquiries about the origin and occupation of the cars' occupants and any contact they may have had with livestock.

Most vehicles should remain off IPs or DCPs. If the number of vehicles warrants it, a local area with a hard standing, drainage and a good water supply should be designated as a local vehicle disinfection station. A carwash is ideal for decontamination of surveillance vehicles if one is conveniently located. A carwash can do the job quickly and more effectively than a team of people, and can wash under vehicles more easily. Although this cleaning may be unnecessary from an epidemiological point of view, it is very effective public relations to have clean vehicles visiting suspect private premises.

Vehicles can be divided into four broad categories:

- those that do not need cleaning and disinfection;
- those that need only the wheels cleaned;
- those that need only the outside cleaned; and
- those that need both outside and inside cleaned.

Cars

Where cars are to be decontaminated, rubber floor mats should be removed for scrubbing with appropriate disinfectant. The dashboard, steering wheel, handbrake, gearstick and driver's seat should be wiped liberally with disinfectant. If the boot is considered contaminated, the contents must be removed and the interior wiped with disinfectant. The contents of the boot must be treated similarly before being replaced. The wheels, wheel arches, undercarriage and bodywork of the car should be sprayed with noncorrosive disinfectant, not plain water. Caustic soda should not be used on paintwork.

Plain water is not to be used with power hoses, because the process will release contaminated aerosols of the pathogen. A mixture of disinfectant and water should always be used with power hoses. However, using disinfectant or soap and water with brushing to dislodge encrusted dirt and organic matter is preferable to washing with strong water streams.

Heavily contaminated vehicles should only be cleaned on the IP or DCP, because most cleaning processes, including power hoses, spread the infectious agent.

Livestock vehicles

In addition to trucks and semitrailers used to haul production stock, livestock vehicles include horse boxes, vehicles used to carry stud and show stock, and racing pigeon carriers. For any vehicle known to have carried stock susceptible to the EAD agent, the principles of vehicle and trailer decontamination are the same.

All solid debris, faecal matter and bedding must be removed. All water, feedstuff and litter carried in the vehicle must be disinfected and burned or buried. The vehicle should then be soaked in disinfectant using a detergent, and scrubbed down to bare metal or wood.

All fixtures and fittings must be dismantled to ensure that infected material has been removed. All surfaces must be cleaned down to metal and then disinfected. Wooden surfaces must be cleaned and disinfected, where appropriate, or valued before removal and destruction. The wheels, wheel arches, bodywork and undercarriage must be cleaned of detritus and disinfected. The driver's cabin and sleeping compartment, if fitted, also need to be cleaned and disinfected.

When the crate structure of a trailer has been decontaminated, the stock crate should be lifted free from the body. The underside of the stock crate and the parts of the trailer on which it rests should be decontaminated. The vehicle must be closely inspected to determine if there is a double layer. If this is so, the top layer of metal tread plate or wood must be removed to reach areas where contaminated material could be trapped. Any metal flooring that appears solid must be weight tested to ensure that welds are not cracked and that there is no rubbish under the flooring. Some trailers may carry extra equipment under the body; if so, this must be treated.

The outside dual wheels and spare wheels must be removed to ensure adequate decontamination of the wheel hubs and to allow inspection of the spare wheel hangers, which can be hollow and therefore could hold contaminated material.

The driver should be asked to identify the clothing and boots they were wearing when in contact with suspect stock. Those articles must be decontaminated and arrangements made for drycleaning, where applicable (see Section 4.2.2).

It is common practice for specialised vehicles to be self-contained with water, food and litter supplies for the animals. If the vehicle is known to have carried diseased or suspect stock, and such materials were removed before departmental officers identified the vehicle as being contaminated, every effort should be made to locate the discarded material. Once identified, the material must be disinfected and disposed of by burial or burning.

Animal feed delivery vehicles

The visits of feed delivery vehicles to an IP or DCP will be identified from the epidemiology report. The path of the vehicle through the premises must be traced, and the degree of contamination of vehicle and driver ascertained. If the vehicle has visited another premises, the path of the vehicle and driver and the area of possible contamination and contact with susceptible animals must be traced.

When a suspect vehicle has been detained, it should be decontaminated in the same way as a livestock vehicle (see Section 4.4.2). If an epidemiology report identifies contaminated bulk or bagged food (eg meat and bonemeal) that has been carried by the vehicle, residual material in the vehicle must be sprayed with disinfectant and removed for disposal. The insides of bulk trailers must be decontaminated with approved disinfectant.

If it is necessary on animal welfare grounds or in a mixed animal enterprise to allow a feed vehicle onto an IP or DCP, the driver's route within the premises should be specified to minimise contamination of the vehicle. The vehicle and driver must be thoroughly decontaminated before being allowed to move off.

Wherever practical, animal feed should be delivered to the outer boundary of the premises and then transferred to the animals without the vehicle or driver becoming contaminated.

Vehicles at alternative disposal sites

Under extraordinary circumstances, carcases, offal and other contaminated material may have to be moved off the IP or DCP for disposal elsewhere. For example, this may be necessary if space on the premises is limited, the topography is unsuitable, or environmental factors preclude the use of normal disposal methods. The alternative disposal site will be as close as possible to the IP or DCP, and the access route will be chosen to minimise danger to susceptible stock. The site will be designated as a quarantined area.

The transport vehicle's container will have to be leak-proof, and preferably have a rear opening, be capable of tipping, and be capable of being sealed at the top. If the vehicle cannot tip, there must be a crane at the disposal site for lifting carcases out.

The vehicle will be loaded using a suitable 'lift' crane/cargo net or front–end loader. Once the vehicle is loaded, the carcases or contaminated material will be sprayed with disinfectant. The driver and the vehicle's body, wheels and undercarriage must be decontaminated thoroughly before departure. The cover of the container must be strapped down tightly and decontaminated.

At the disposal site, there must be sufficient equipment, water supply, drainage and materials to decontaminate the expected number of vehicles. These facilities should be arranged at a specific decontamination site. Each driver and vehicle must be decontaminated before leaving the disposal site. On completion of disposal:

- all vehicles and equipment will be decontaminated off the site
- the area of disposal will be soaked in disinfectant
- the area will be securely fenced
- after 21 days, the burial site will be revisited and the mound and surrounds disinfected again under the supervision of a departmental officer; and
- quarantine will remain in force for a period to be determined by the State Veterinarian.

Aircraft decontamination

Aircraft construction prohibits the use of a strong alkaline disinfectant, such as caustic soda, because of severe corrosion problems with metals such as aluminium. A mild alkaline disinfectant suitable for use on aircraft is 4% sodium carbonate with 0.1% sodium silicate. Care is required with specialised equipment within the aircraft.

Note: Helicopters should not be used near IPs or DCPs where aerosol disease spread is suspected (for example, with foot-and-mouth disease virus).

Other machinery and vehicles

Heavy machinery used on an IP or DCP will be grossly contaminated. This includes:

- mechanised diggers for burial pits
- bulldozers for pushing carcases
- front-end loaders, tractors and trailers for carrying carcases and faecal and other material
- cranes for carcase lifting; and
- chains, hooks and cargo nets.

Such equipment must remain on the IP until needed elsewhere.

Once carcase disposal has been completed, drivers and machinery must be decontaminated. Vehicles should be moved to the decontamination site for thorough decontamination. When the vehicle is moved again, the cab must not be recontaminated by the driver. All ancillary equipment will be treated similarly.

Where low-loader vehicle transporters are required, they should not be allowed onto the IP. Vehicles leaving the IP should be loaded outside the IP boundary.

Issues needing special consideration

Animal effluent

The disposal of treated effluent should be undertaken in consultation with environmental protection agencies.

Slurry

Where animal effluent is collected in a slurry tank, the amount of spare space in the tank will govern the course of action. Areas where previous loads of slurry have been spread or disposed of, and the associated disease risk, should be identified. If the slurry tank is almost full, a pit into which slurry can be pumped for treatment can be dug (and lined with plastic sheeting if necessary).

Slurry pits may be underfloor tanks within buildings, or tanks in the farmyard. Any covers should be removed, the capacity of the tanks estimated, and chemicals used to modify the pH to <2or >11 (pH should be tested using universal indicators). The slurry should be mixed using a slurry tanker pump or agitator and kept at the required pH for seven days, after which it should be spread on ungrazed agricultural land.

The disposal of effluent from enclosed tanks or pits can be dangerous, and it is recommended that private contractors carry out the disposal. Safety considerations include:

- Agitation of effluent slurry can release a mixture of carbon monoxide, carbon dioxide, hydrogen sulphide, ammonia and methane.
- Safety aspects should be explained to workers, and only as many workers as necessary used.
- No-one should ever work alone in a tank.
- If work is indoors, as much ventilation as possible should be provided.
- If necessary, respirators, safety harnesses and lifelines should be worn.
- Slurry level should never be less than 30 cm from the top of the tank.
- The ‘crust’ on top of a tank should never be trusted to take weight.

Often it is not feasible to liquefy semisolid material in slurry tanks, and most of this material will be noninfective. Caustic soda 2% should be added to the surface and the material allowed to stand. Further additions of material to the tank must be treated. The tank should be quarantined for up to 3 months, depending on the disease agent involved.

Manure

If the volume of manure is small, the manure should be sprayed with an acid disinfectant, because manure tends to acid pH and this can be enhanced by acid treatments. Note that hypochlorite has limited effectiveness in the presence of high organic loads. Treated manure should be removed and buried in a pit.

Dairy equipment and milk storage tanks

There may be milk in bulk tanks on the IP or DCP. How the milk is to be treated depends on the disease.

If the milk must be disposed of, it must be made safe with a disinfectant, which is added to the milk and agitated. The milk is then held for one hour and released into a pit — not into the slurry tank.

Milk from properties in a restricted or control area may be removed from the properties provided that drivers and vehicles are disinfected on leaving contaminated areas and the milk is subjected to appropriate treatment for the disease.

Milking machines need to be stripped to their components and then boiled or scrubbed with disinfectant. All instruments and gauges should be removed from the milk lines and disinfected. The apertures are ‘stopped’ and all lines filled with nontainting disinfectant, which is left in contact for one hour. The joints of the pipeline are then loosened to allow seepage, after which the lines are run through with plain water and then with chlorine dairy detergent. Special attention needs to be given to rubber parts, which should be disposed of if cracked or worn.

Animal feed

When an IP/DCP contains animal feed, some may be unaffected, some may be safely decontaminated, and some may have to be destroyed. The destruction of large quantities of feed is expensive, but the labour cost of treating the feed may outweigh the benefits of keeping it. Depending on the disease agent involved, keeping the feed or treating it may be judged too great a risk. However, most key notifiable animal disease viruses inactivate spontaneously with time and certain temperature and humidity conditions, so in some cases feed can be quarantined for a period determined by epidemiology, and then used again with confidence.

Hay and straw stacks

The length of time the disease has been present on the premises will be determined from the epidemiology report. If hay or straw is in a new stack, it may have been contaminated by the footwear of the workers who stacked it.

Given the amount of time and labour required to treat and restack hay or straw, it may be more economical to destroy the whole stack and compensate the owner. The contaminated bales can be used by the disposal team, if appropriate. If the disease affects only one species of animal in a mixed enterprise, the stack may be used for bedding or feed until the time of the second disinfection.

If the material is to be disinfected, a new stack area should be designated and disinfected, and the material disinfected as it is restacked. As the new stack is built, it should be sprayed with 2% caustic soda. The stack is then left for 30 days, restacked and retreated, and again left for 30 days. The material can then be spread on arable land. If possible, it should be buried.

Grain stores

There may be many tonnes of grain on a mixed farm enterprise. The owner/manager must be carefully questioned about the likely degree of contamination on the floor before the grain 'went down', and epidemiological advice should be sought about the length of time the disease agent has been present.

If no underlying contamination exists, approximately 7 cm of the top of the grain mass should be removed, and the new surface sprayed with disinfectant. The removed grain and scrapings should be buried or burned. Grain may sprout after this treatment or go mouldy, and this must be taken into account.

Where binned grain has been incorporated into home-mixed rations, the floor of the bin can easily be contaminated by farm workers auguring out the last grain before refilling the bin. If this is found to be the case, the grain should be removed and destroyed.

Silos

Silos can hold many tonnes of grain or prepared feed. If it can be determined that there has been no disease contamination, approximately 25 kg of the contents should be removed through the chute, and the inside and outside of the chute wiped with disinfectant. The chute mouth is then enclosed with a plastic bag and secured. When the first disinfection is complete, the outside of the silo is sprayed with disinfectant and two 25-kg sacks of a desiccating agent (calcium chloride, 'quicklime') are placed in the top of the silo to preserve the contents.

However, if epidemiological investigations suggest that a food supply is contaminated, the silo must be emptied completely, the contents buried, and the inside and outside of the silo disinfected.

A risk assessment should be carried out, considering the attributes of the disease agent, temperature, the dry environment of a silo, and the interval until the feed will be used. It may be feasible to use formaldehyde gas for disinfection, depending on the construction of the silo outlet and whether the silo can be sealed completely.

Advice may also be obtained from the grain storage industry to determine the best and most efficient method to disinfect large quantities of grain.

Feed in sacks

Depending on the nature of the disease agent, opened sacks of feed or feed in closed hessian sacks may be deemed contaminated and destroyed after valuation.

Porous sacks of feed for susceptible animals should always be destroyed if the disease agent is easily transmissible or resistant. Unopened paper bags can be wiped with disinfectant and restacked in an area that has been disinfected.

Silage clamps

Well-made grass silage should reach a pH of 3–4 and thus deactivate most disease agents, but above-ground silage clamps are usually close to stock animals and are therefore likely to be contaminated.

Silage clamps should be left until the first disinfection. If the face and top are not covered with plastic sheeting, the top 30 cm should be removed and buried. The newly exposed surface should be sprayed with disinfectant, ensuring that cross- contamination by the workers doing the spraying does not occur. If the surface is covered with a sheet, possible contamination at the sheet's edges should be estimated. Where there are gaps, the exposed area should be scraped, the cover removed from the edges, and the area sprayed with disinfectant.

When feed is being dealt with, it should not be policy to destroy everything. Considerable quantities of feed can be safely decontaminated. Decisions about treatment or destruction must be taken in consultation with the State Veterinarian.

Specialised equipment

Some properties contain equipment such as control panels, electronic gear, electric motors and computerised equipment that could be damaged by some of the direct methods of decontamination discussed in this manual. If there is doubt about the effect of procedures on specialised equipment, a qualified contractor (egan electrical contractor) should be consulted.

Electric motors and switchboards

It is unlikely that covered electrical equipment will be heavily contaminated, so decontamination of such equipment is best considered at the end of the decontamination process when specialists can be more readily consulted.

The most practical method of decontamination is to make an airtight 'tent' of plastic sheeting around the equipment. Alternatively, if the equipment can be easily dismantled, the separate parts can be placed in a small enclosed space for fumigation. Airtight items can be safely decontaminated by wiping down with disinfectant.

The only other method is to use formaldehyde gas. However, serious consideration must be given to the practical and safety aspects of this procedure.

Because most key notifiable animal disease viruses will inactivate spontaneously with time, exposure to sunlight may be a good option for complex equipment.

Radios, tape recorders and cameras

Hand-held radios, tape recorders and cameras are useful in IP/DCP operations for communication and for recording epidemiology and valuation data. All can be used while secured inside plastic bags to avoid contamination. Inexpensive waterproof cameras can be used to record lesions and symptoms. If such equipment is to be removed from the IP/DCP, the following procedure must be carried out at the decontamination site:

- Wipe over the plastic bag and then discard the bag
- Wipe over the body of the instrument with disinfectant
- Replace the instrument in a watertight plastic bag for removal after the bag has again been disinfected.

Because there is a small residual risk of contamination, during the key notifiable animal disease outbreak these items of equipment should only be used on specific IPs or DCPs.

Captive-bolt pistols and firearms

Weapons used to destroy stock will be grossly contaminated but their mechanisms prohibit the use of many disinfectants. After completion of slaughter, they should be cleaned with a non-corrosive disinfectant and thoroughly lubricated with liquid and aerosol lubricants, especially their internal mechanisms. The woodwork should not be immersed in disinfectant as this may lead to warping or splitting. If a weapon requires servicing, it should be taken to

a gunsmith in a disinfected plastic bag. The gunsmith should be made aware that the mechanism needs disinfection. The weapon can be stripped down, the parts disinfected, and the weapon serviced and re-oiled.

If the key notifiable animal disease incident includes a number of premises, weapons can be enclosed in disinfected plastic bags after disinfection for delivery to the next IP or DCP.

Water tanks and dams

Depending on the disease agent, various decontamination procedures are available for water tanks. In some cases, a change in pH could be effective. Calcium hypochlorite could be added in a similar way as for swimming pools. However, chlorine-based disinfectants lose effectiveness quickly in the presence of organic material and so are not recommended for earth dams.

Proof of decontamination

This manual covers only decontamination in field situations, and includes no procedures for 'proof of decontamination'. The relevant disease contingency plan should be referred to for recovery procedures, including conditions for restocking or alternative farm uses.

It is rare that 100% decontamination can be attained or proved in field situations, and infectivity testing for key notifiable animal disease agents must be done at an approved laboratory. In many cases, gross contamination can be removed effectively, but the final phase will involve time and the natural elements of heat, dryness and solar radiation to achieve the desired goal.

The conservative decontamination procedures recommended here are likely to be matched by the conservative approach of relevant authorities when considering restocking.

Decontamination - Properties of disease agents

Properties of the emergency animal disease agents

Eliminating key notifiable animal disease agents from premises, clothing, vehicles, tools, carcases or the environment requires a good understanding of the general properties of each disease agent and the subtle ways each may persist in the environment and infect other animals. Many key notifiable animal disease agents are viruses. Three categories of viruses can be distinguished, based on particle size and the presence or absence of lipid (Klein and DeForest 1981), which determines the viruses' susceptibility to disinfectants:

- **Category A** viruses (intermediate to large size, contain lipid) — very susceptible to detergents, soaps and all the disinfectants listed in Section 3; susceptible to dehydration and often do not persist long unless the environment is moist and cool.
- **Category B** viruses (smaller, no lipid, more hydrophilic; eg picornaviruses and parvoviruses) — relatively resistant to lipophilic disinfectants such as detergents. Although Category B viruses are sensitive to all the other disinfectants listed in Section 3, they are less susceptible than viruses in Category A. Classical bactericides, such as quaternary ammonium compounds and phenolics, are not effective against these viruses.
- **Category C** viruses (intermediate in size, no lipid; e.g. adenoviruses and reoviruses) — intermediate between Categories A and B in sensitivity to the best antiviral disinfectants, such as hypochlorites, alkalis, oxidising agents (eg Virkon®) and aldehydes.

Other disease agents include:

- bacteria
- mycoplasmas
- rickettsias

- prions
- parasites of various types.

The characteristics of the disease agents, main modes of transmission and other epidemiological factors influence the need for decontamination and govern the extent of procedures to remove the key notifiable animal disease agent. Some disease agents may be affected by severe environmental conditions (e.g. direct, hot sunlight and low humidity), and the scale of decontamination procedures may therefore be reduced.

Decontamination - Disinfectants and chemicals

Disinfectants/chemicals for the inactivation of emergency animal disease agents

Introduction

A relatively small number of disinfectants is effective against broad groups of viruses and bacteria. Ultimately, the choice of disinfectant depends on the disease agent, availability of the disinfectant, how the disinfectant is to be applied and how an adequate wet contact time is to be maintained.

Using registered chemicals

Any chemicals or products to be used on agricultural premises for disinfecting buildings, yards, equipment, vehicles etc. should be registered with the Namibia Medicines Regulatory Council (NMRC). Lists of registered products, active chemicals and manufacturers/sponsors are available on the NMRC website (http://www.nmrc.com.na).

Preparatory cleaning

Simple cleaning of surfaces by brushing with a detergent solution is effective in removing contaminating viruses and bacteria and is fundamental for achieving effective chemical decontamination.

Preliminary cleaning work is invariably needed before any chemical disinfectants are used. Most disinfectants have reduced effectiveness in the presence of fat, grease and organic material. Every effort should be made to remove such material from all surfaces to be decontaminated. Hot water and steam are effective for cleaning cracks and crevices where pathogens are likely to linger. The inside of pipework can be cleaned effectively by steam applied long enough to bring the surface temperature close to 100°C or with a ‘clean-in-place’ system with an appropriate disinfectant product, as is often used in dairy factories.

Natural disinfection

The natural processes of time, dehydration, warmth and sunlight will greatly assist the decontamination operation and should be considered in planning. A hot, dry, sunny day will cause rapid natural inactivation of an agent such as Newcastle disease virus, whereas cold, damp, overcast conditions will help it persist. It follows that the natural effects of solar heat, dehydration and UV radiation will quickly decontaminate fencing and rails in the open, but that disease agents are likely to persist longer on a cold, damp floor inside a shed.

The destocking of a contaminated property for a long period after a disease outbreak is based on the same principle.

Classes of disinfectants

Disinfectants can be grouped into the following classes:

- soaps and detergents
- oxidising agents
- alkalis
- acids
- aldehydes
- insecticides.
- other chemical agents (for example biguanides, iodophores, quaternary ammonium compounds, phenolics).

These classes of disinfectants are discussed in this section.

There are also nonchemical methods of disinfection (see Section 3.6).

Chemical names are used in this manual rather than brand names because they are easily understood by all personnel with basic technical knowledge. Brands and trade names are generally avoided because commercial products are subject to change or restriction in their distribution.

Soaps and detergents

Soaps and detergents are usually not considered good disinfectants, but they are essential for the cleaning needed before many of the decontamination procedures described below can be applied. In most cases, the primary aim is the removal of organic material, dirt or grease from surfaces to be decontaminated. Most industrial and domestic brands of soaps and detergents are satisfactory. Hot water, brushing and scrubbing enhance the cleaning action. Sellers (1968) states that the addition of soap or detergent to acids and alkalis had minimal effect on the virucidal efficacy of the chemical. Soaps and anionic detergents should not be used for cleaning if a cationic detergent is to follow as the decontaminating agent, because they may effectively neutralise the agent. They also neutralise chlorhexidine and quaternary ammonium compounds.

Soaps and detergents are not consistently effective against bacteria, but are effective disinfectants in their own right for almost all Category A viruses because of their effect on the outer lipid envelope.

Many commonly used disinfectants in hospitals, surgeries, dairies and food-processing areas involve soapy combinations of phenolics or quaternary ammonium compounds. These agents are specifically antibacterial and are also effective against Category A viruses, but have limited activity against Category C viruses and, in many cases, no activity against Category B viruses. Therefore, although they may be useful for preparatory cleaning during an EAD outbreak, they are not recommended in this manual where more effective viral decontaminants are available.

Oxidising agents

Oxidising agents are the recommended disinfectants for most applications. Chlorine, a powerful oxidising agent effective in killing all virus groups (Dychdala 1991) and all bacteria, is released from hypochlorite solutions (either sodium or calcium). In test conditions, Scott (1980) found that 0.175% sodium hypochlorite was the most effective and practical broad-spectrum disinfectant of 22 products tested against a range of viruses. However, it can be difficult to accurately define active concentrations for disinfectants that release free chlorine (such as hypochlorite), so higher concentrations are recommended for non-laboratory situations.

The effectiveness of hypochlorite is highest in the pH range 6–9 and decreases markedly in the presence of organic material. Hypochlorite powders are available as swimming pool disinfectants or household bleaches, and can be diluted for use on site. Hypochlorite solutions are not chemically stable and decompose rapidly as temperatures rise above 15°C.

Virkon (a registered product of Dupont International) is a modern disinfectant with outstanding virucidal and antibacterial properties. It is reported to have low toxicity and to be effective against all viruses tested (including

members of all known viral families affecting animals), but it has not been approved for use on skin. The concentrate powder can be irritant and cause skin burns. Virkon's activity is based on a buffered synergised acid peroxygen system containing a high percentage of surfactant. It is relatively safe to use and comes in a powdered form ideal for dilution at the site of an EAD outbreak. It can be sprinkled as powder over wet or boggy areas, but the concentration of disinfectant achieved in this way cannot be accurately controlled.

Virkon is corrosive and when prolonged contact with metal surfaces is expected the surfaces should be rinsed with clean water.

A major concern with Virkon in a large decontamination exercise would be its expense.

Alkalis

Alkalis have long been used as effective disinfectants against a wide range of pathogens. Both sodium hydroxide (caustic soda) and sodium carbonate (washing soda) are widely available in large quantities at low cost, and both have a natural saponifying (soap making) action on fats and other types of organic matter, which assists the cleaning process. Because they are virucidal and antibacterial under heavy burdens of organic material, they are ideal agents for decontaminating animal housing, yards, drains, effluent waste pits and sewage collection areas.

Sodium hydroxide is corrosive to aluminium and derived alloys and therefore must be avoided in some circumstances. Sodium carbonate is useful against foot and mouth disease virus, and may be used at a 4% concentration in some situations where sodium hydroxide cannot (e.g. in aircraft).

Sellers (1968) states that the addition of soap or detergent to alkalis and acids had minimal affect on the virucidal efficacy of the chemical, provided that the pH is maintained.

Acids

Acids are generally highly virucidal. A correctly chosen acid or acid mixture can be used for widely varying tasks, from dealing with liquid effluent to personal decontamination. Many products have acid, such as phosphoric acid and sulfamic acid, as the principal active chemical. Some also contain a detergent that has minimal effect on the virucidal efficacy of the chemical, provided that the pH is maintained. The key criterion for virucidal efficacy of acids is the pH achieved in the ready-to-use disinfectant solution.

Hydrochloric acid is a strong acid and is less toxic than other strong acids. Citric acid, a milder acid, is active against acid-sensitive viruses and can be used safely for personnel and clothing decontamination. It is particularly useful when added to detergents for the inactivation of foot-and-mouth disease virus. Citric acid is not recommended for bacteria.

The United States Environmental Protection Agency has approved a peroxyacetic acid ('peracid') product for FMD virus.

Common sense must be applied when even weak acids are used. For example, galvanised containers must be avoided, and some acid solutions should not be applied to concrete surfaces.

Aldehydes

Glutaraldehyde

Glutaraldehyde, a very effective disinfectant (Scott and Gorman 1991), is active against all virus families and other microorganisms, such as bacteria, in concentrations of 1–2%. It remains effective in moderate concentrations of organic material, is chemically stable and is only mildly corrosive of metals. However, for large-scale decontamination the cost is likely to be high.

Formalin

Formalin is an aqueous solution of formaldehyde. When diluted with water it is an active disinfectant against all viruses and bacteria, and can be used to disinfect soil.

It is not effective against prions (the disease agents that cause scrapie and bovine spongiform encephalopathy).

Gaseous formaldehyde

Gaseous formaldehyde can be used to decontaminate airspaces and equipment that must be kept dry (such as electronic devices), and the insides of motor vehicle cabins. However, the gas concentration, temperature, humidity, time of contact and even distribution must be carefully controlled. Under emergency conditions on an infected premises (IP), it is unlikely that all parameters could be controlled adequately. In addition, the space to be decontaminated must be completely sealed to prevent gas escape, because the most effective 'dwell' period for the inactivation is overnight (Quinn 1991). Other problems include the toxicity of the gas; the dangerous nature of its generation in nonlaboratory conditions (potassium permanganate reacts violently with formalin); the environmental protection guidelines that prevent the release of formaldehyde gas to the atmosphere; and the difficulty of completely purging residual gas from confined spaces.

Formaldehyde gas has been used for the effective disinfection of hatching eggs and hatchery equipment, as it has proved to be a very effective means of destroying microorganisms on eggshells, egg cases, chick boxes, hatching machines and other hatchery equipment, provided these items have been subjected to preliminary cleaning. The use of formaldehyde gas on rural properties is generally not recommended. Unfortunately, no satisfactory alternative to formaldehyde for gaseous decontamination is available. Use of ethylene oxide or hydrogen peroxide for gaseous decontamination must be restricted to carefully controlled laboratory environments.

No clear-cut recommendation can be made for decontaminating vehicle cabins and electronic equipment on farms, and a methodical and systematic approach based on first principles is recommended. Cleaned vehicles and other machinery left in quarantine for a week in bright sunshine are likely to decontaminate naturally for most pathogens (but not bacterial spores or prion particles). Because the parameters for effective formaldehyde decontamination of an IP are so difficult to establish, formaldehyde gas is unlikely to produce an absolute result or to be significantly more effective than thorough cleaning. Where gaseous decontamination of equipment or machinery is considered essential, specialist advice should be sought and experienced operators used, and the contaminated equipment kept in quarantine until that time.

Other chemical disinfectants

Biguanidines

Of the many biguanides available, chlorhexidine is probably one of the most commonly used. Chlorhexidine is a chlorophenol biguanidine. Chlorhexidine compounds are generally active against gram-positive and gram-negative vegetative bacteria and lipophilic (Category A) viruses. Acid-fast bacteria are generally inhibited but not killed (bacteriostatic). Bacterial spores are not killed, but germination is inhibited while spores are in contact with chlorhexidine. It is not effective against mycobacteria and non-enveloped viruses (Categories B and C). Some species of *Pseudomonas* are resistant to chlorhexidine.

Chlorhexidine has low toxicity for humans and a strong affinity for binding to skin. It also displays rapid bactericidal activity. Contact time should exceed five minutes. This makes it particularly useful as a personal decontaminating agent for susceptible organisms.

Hard or alkaline water and soaps, anionic detergents and other anionic compounds are incompatible with chlorhexidine, forming low-solubility salts that may precipitate the active ingredients.

Chlorhexidine will maintain activity in the presence of some organic matter, but prior cleaning of surfaces and skin is recommended.

Iodophors

Iodophors are organically bound iodine. They display broad activity against gram-positive and gram-negative vegetative bacteria, mycobacteria (tuberculosis) and all virus classes (Categories A, B and C). They have poor activity against bacterial spores.

Iodophores display low toxicity for humans. However, they tend to stain skin, plastics, fabrics and other synthetic materials and are corrosive to metals. For personal use, they are probably best used as hand disinfectants.

They have a rapid biocidal activity that can be increased by using them in warm, acidic water. However, such solutions are less stable. Iodophors have an inbuilt indicator — if solutions are brown or yellow, they are still active. Contact times should exceed 10 minutes.

Organic matter inactivates iodophors, especially if excessive amounts of protein are present. They show poor residual activity, necessitating repeated application if exposure continues. Solutions also need to be prepared daily.

It is difficult to define active concentrations for iodophores with certainty in all circumstances, so they are not recommended in this manual for the inactivation of viruses. Disinfectants that release free chlorine (such as hypochlorite) share this problem to a lesser degree, so higher concentrations are recommended for nonlaboratory situations.

Quaternary ammonium compounds

Quaternary ammonium compounds (QUATs) are cationic detergents with strong surface activity. They are generally active against gram-positive bacteria and Category A viruses, are less active against gram-negative bacteria, and have negligible activity against Category B and C viruses and bacterial spores. Except for some of the later generation QUATs, they have poor activity against acid-fast organisms like the tuberculosis disease agent. QUATs are a very diverse group of disinfectants. More recent generations tend to have a broader spectrum of activity. Therefore, it is advisable to consider the specific QUATs and formulations when selecting a chemical for a particular organism. Contact time should exceed 10 minutes.

QUATs generally display low toxicity for humans. Normal use dilutions are usually non-irritating to skin, but prolonged skin or eye exposure should be avoided. However, the concentrate can be highly irritating to eyes, so safety glasses and personal protective equipment (PPE) must be worn when handling concentrates. Earlier generations of QUATs were easily inactivated by anionic soaps and detergents, organic matter and hard water. Later generations are much less susceptible to inactivation by these means.

Effectiveness is generally enhanced in alkaline pH conditions, and QUATs can be used at temperatures up to 100°C.

Phenols

Phenolic compounds are effective against gram-positive and gram-negative bacteria, Category A viruses, and mycobacteria. They are less effective against Category B and C viruses and spores and are not recommended for that purpose. They are frequently used for the decontamination of surfaces and are relatively resistant to the presence of organic matter. They are also relatively noncorrosive. Contact times should exceed 10 minutes. However, because they are absorbed by rubber and some plastics, phenolic compounds are not suitable for all surfaces.

Phenols have an unpleasant odour, are relatively toxic and can cause skin and eye irritation. They may also be absorbed through skin. Concentrates should be handled with care, and safety glasses and other appropriate **PPE** must be worn.

Disposing of phenolic compounds while avoiding environmental contamination also poses problems.

Recommended concentrations and contact times

The following table shows disinfectants that may be used to inactivate EAD agents and the required dilution or concentration.

Recommended disinfectants and concentrations for the inactivation of EAD agents

Disinfectant	Usual form supplied	Recommended working strength	"	Contact time for inactivation	Applications
		Usual dilution	Final conc		
Soaps and detergents					
	solids or liquids	as appropriate		10 min	Thorough cleaning is an integral part of effective decontamination. Should not be considered as disinfectants except for Category A viruses.
Oxidising agents					
Sodium hypochlorite NaOCl	conc. liquid (50 000 ppm available chlorine)	1:10	5000 ppm available chlorine	10–30 min	Use for virus categories A, B and C and all bacteria. Effective for most applications, except when in the presence of organic material. Less stable in warm, sunny conditions above 15°C.
Calcium hypochlorite Ca(OCl)2	solid	7 g/L	5000 ppm available chlorine	10–30 min	NaOCl effective against prion proteins at 2% with contact time of 1 hour followed by rinsing with copious quantities of water.
Virkon	powder	20 g/L	2% (w/v)	10 min	Excellent disinfectant active against all viruses and bacteria.
Alkalis					
Sodium hydroxide	pellets	10 g/L	1% (w/v)	10 min	Very effective against virus Categories A, B and C and all bacteria. Do not use in the presence of aluminium and derived alloys.
Sodium carbonate – anhydrous (Na2CO3)	powder	40 g/L	4% (w/v)	20 min	Recommended for use in the presence of high concentrations of organic material.
– washing soda (Na2CO3.10H20)	crystals	100 g/L	10% (w/v)	20 min	Efficacy is enhanced by addition of detergent.
Useful against foot-and-mouth disease virus. Better disinfectants are usually available for both viruses and bacteria. "					
Acids					
Hydrochloric acid	concentrated acid (10 molar)	1:50	2% (v/v)	10 min	Used only when better disinfectants not available. Corrosive for many metals and concrete.

Citric acid	powder	2 g/L	0.2% (w/v)	15 min	Safe for clothes and body decontamination. Especially useful for foot-and-mouth disease virus decontamination.
Not recommended for bacteria."					
Aldehydes					
Glutaraldehyde	concentrated solution	as appropriate	2% (w/v)	10–30 min	Excellent disinfectant effective against all viruses and bacteria.
Formalin	40% formaldehyde	1:12	8% (v/v)	10–30 min	Disinfectant releases irritating, toxic gas. Effective against all viruses and bacteria.
Formaldehyde gas	Special generation required.			15–24 hours	Toxic gas, recommended only if other methods of decontamination cannot be used.
Other chemical agents					
Biguanidines	Dilute according to manufacturer's instructions.			>5min	Gram-positive and gram-negative vegetative bacteria and Category A viruses.
Iodophors	Dilute according to manufacturer's instructions.			>10min	Gram-positive and gram-negative vegetative bacteria, mycobacteria and Category A viruses.
Phenolic disinfectants`	Dilute according to manufacturer's instructions.			10 min	Bacteria and Category A viruses.
Quaternary ammonium compounds	Dilute according to manufacturer's instructions. Have natural detergent properties.			10 min	Bacteria only. Less effective against some gram-negative bacteria.

w/v = weight/volume (eg 2 g/100 mL)

Notes: The advice in this table about concentrations and times is conservative and is intended to cover as many different emergency situations as possible. Temperature, the presence of organic materials, the nature of surfaces and other factors affect decontamination rates. Workers in the field are expected to apply these recommendations with common sense and professional judgment of the particular environment, agent, surface etc.

Commonly used general disinfectants, such as phenolics and quaternary ammonium compounds, are very effective antibacterials, but have limited effectiveness against Category B and C viruses. A wide variety of effective antibacterial disinfectants is commercially available, but it should be noted that bacterial spores are much more resistant than vegetative cells, so special decontamination procedures must be used for diseases caused by spore-forming bacteria.

Products effective for decontamination of viruses on the hands and the skin are limited. Virkon is reported to have low toxicity and to be effective against members of all virus families affecting animals, but it has not been approved for use on skin. Alternatively, citric acid or sodium carbonate may be added to washing water to induce antiviral conditions by lowering or raising the pH as appropriate for the agent to be inactivated.

Estimation of quantities required

The amount of decontaminating agent necessary for particular jobs varies considerably. For a polished, nonporous floor, 100 mL of disinfectant/chemical applied per square metre is probably sufficient. However, for porous surfaces such as concrete or wood, the volume may need to be doubled or tripled. Generalisations are not useful, because the application of liquids to ceilings or vertical surfaces cannot be controlled well.

After adequate cleaning of the contaminated surface, the most critical factor is the time the disinfectant is in contact with the surface. For most applications, disinfectant must flood the surface and keep it thoroughly wet for at least 10 minutes.

In any large-scale decontamination of an IP, the cost of disinfectants will be relatively minor. Because labour and other operational costs will be high, using disinfectants at less than the recommended concentrations would be a false economy. If disinfectants are watered down, they invariably lose effectiveness.

Insecticides

Insecticides are used for control of insect vectors that carry or cause EADs.

Nonchemical methods

Steam improves the cleaning and decontamination process by raising the temperature and by penetrating crevices. However, steam by itself can only be used as a decontaminant if the temperature of the surface can be raised to a sufficiently high temperature and held there long enough to inactivate the disease agent. Because of uncertainties about temperatures and times of contact, steam is recommended in this manual as an adjunct to chemical decontamination, for example through aiding the penetration of some disinfectants.

Flame guns may be useful supplements for drying decontaminated surfaces, but they are dangerous, and the risk of fire and injury must always be considered. Flame guns are not recommended as a primary means of decontamination.

Safety precautions

Chemicals usually kill microorganisms by toxic reactions, and effective disinfectants are often also toxic to animal (including human) tissues. Virtually all disinfectants have to be used with care to avoid occupational injuries or health problems.

If using steam or flame for decontamination purposes, safety precautions must be adhered to in order to reduce the risk of burns.

General safety precautions

First aid boxes must be available on every IP or dangerous contact premises (DCP) or where hazardous chemicals are being used. Such boxes must contain a supply of antidotes and treatments for the chemicals to be used. It is essential to brief workers and the property owner on safety aspects before commencing operations, including the potentially harmful effects of chemicals on animals, humans and the environment.

The use of any chemical or equipment should conform to the manufacturer's instructions and safety standards. All officers and workers must carry out their duties in accordance with current health and safety legislation. All accidents, however small, that require medical attention must be logged and their details reported back to the local disease control centre (LDCC).

When diluting concentrated chemicals, the concentrate should always be added to water, never water to concentrate. Contact with concentrates on exposed skin will cause severe burning. All workers engaged in mixing or applying disinfectants must wear boots, overalls, goggles and head covering for protection. A full face guard should be used

when applying the diluted chemical. The danger of inhalation can be avoided by not applying a mist spray.

If skin contact occurs:

- wash with copious amounts of water immediately;
- apply vinegar to caustic alkali burns or apply bicarbonate of soda to acid burns; and
- refer for hospital treatment if necessary.

If eye contact occurs, the eyes should be irrigated copiously with eyewash solution and the person referred to a hospital.

Concentrate containers should be stored in one place on the property away from the main area of work in order to remove the danger of containers being ruptured inadvertently. The containers should be checked each day for spillage of concentrate.

Material safety data sheets (MSDSs) should be held where chemicals are stored or used. MSDSs are supplied by the manufacturer and contain information on the identity, physical characteristics, health hazards and precautions to be taken for safe storage, use and disposal of the chemical. These are a prime source of safety information and should be consulted before personnel use cleaning materials and disinfectants. This may involve the use of PPE, because many of these substances (or vapours from them) are irritant or harmful to people. MSDSs should always be available to laboratory staff.

Acids and alkalis

Acid and alkali disinfectants must not be mixed. Apart from the resulting chemical reaction, the effectiveness of both chemicals would be nullified.

Aldehydes — formalin, glutaraldehyde and formaldehyde gas

Aldehyde disinfectants should be used only when no alternatives exist, and then only by experienced personnel with appropriate safety equipment. Gaseous formaldehyde is applicable to:

- enclosed spaces that can be made airtight (for example, grain bins, electrical fuse boxes covered in plastic);
- such spaces, containing electronic or electrical machinery;
- delicate equipment that can be enclosed in a plastic `tent' and fumigated;
- some heavy vehicle cabins; and
- poultry incubator rooms and egg rooms.

The safety of the operator is of greatest importance, and the method of use of formaldehyde is based on the safety aspects. These substances can kill operators, and even small amounts can have a detrimental effect on living tissue. If the chemical enters the eye, a wound or an abrasion, it is extremely painful. The fumes damage all mucous membranes. A protective face guard must be worn when mixing.

This method should only be used when it is impossible to use other products/procedures. Warning notices should be fixed to the entrance of the area being fumigated. There should be two people involved in the operation — both equipped with full face respirators effective against formaldehyde gas.

Hand and skin care

Hands and skin can be washed safely in a wide variety of commercially available disinfectants, but there are relatively few approved products with antiviral activity. Virkon is reported to have low toxicity and to be effective against members of all families of animal viruses, but it has not been approved for use on skin. Antiviral conditions may be achieved by altering the pH as appropriate for the agent by adding citric acid or sodium carbonate to washing water. Foot-and-mouth disease virus is typically inactivated by such pH adjustments.

Some people have demonstrated sensitivity to skin contact with disinfectants. Reactions tend to occur with repeated exposure or where skin has been affected by pH modifiers such as citric acid.

Environmental considerations

Although selection of the disinfection method will be undertaken primarily on the basis of effectiveness against the target EAD agent, disinfectants used in disease control programs are potentially noxious substances and may have adverse impacts on the environment. The planning process needs to consider in advance the potential environmental impact from decontamination procedures and assess whether methods for containment or neutralisation are viable and acceptable.

Activities should not have significant detrimental impact on the natural environment. Care must be taken to ensure the discharge of chemicals, silt, organic matter or carcases into natural waterways or other environments does not occur. It is essential that authorities are consulted when the decontamination process is being designed and that appropriate disposal of waste materials is undertaken.

The volumes of water requiring disposal will need to be considered during planning. In some cases, it may be possible to release water into waterways following treatment to neutralise chemical disinfectants (for example, treatment of oxidising disinfectants with thiosulphate) or following a prescribed period of time that allows chemicals to dissipate to acceptable levels (for example, hypochlorite and chlorine dioxide). Other options could include discharge onto approved wasteland sites.

Thorough cleaning before disinfection, use of protective clothing and equipment, use of temporary drains to trap and divert waste, and use of lined ponds or tanks for temporary storage are all options to reduce the adverse effects of decontamination activities on the environment.

Destruction of animals - Introduction

The following information is contained in the Food and Agriculture Organization of the United Nations (FAO) Manual on procedure for disease eradication by stamping out - Part 1: Destruction of Animals.

This manual can be found on the website of the FAO: http://www.fao.org/home/en/

Introduction

If an outbreak of a transboundary animal disease or other serious disease occurs and a stamping-out policy is adopted for its control and eradication, it may be necessary to destroy a large number of animals. It is essential that these animals are speedily and humanely slaughtered and are indeed dead before disposal of carcasses commences. Speed is of the essence once the disease has been confirmed because, in most situations, the live animals will continue to produce and possibly disseminate the disease pathogen. An experienced veterinarian should be present during destruction. There is likely to be considerable public interest, at least initially, in the destruction of animals. Positive media coverage concerning animal welfare will reflect favourably on staff and increase community support for the eradication campaign.

The destruction of large animals poses the biggest concern in this regard. They may have to be destroyed individually in public view with firearms, humane killers (captive-bolt pistols) or other means.

Officers in charge must be aware of the impact that animal destruction will have on all personnel involved. They must quickly acquaint themselves with the skills and experience of all assistants and brief and train them accordingly. Furthermore, they must be aware that some people will be unable to handle the mentally and physically stressful environment likely to be encountered.

Where possible, the livestock owner and his or her family should not be present during the slaughter process, as they may experience considerable distress. Counselling and welfare should be made available if needed.

The policy regarding compensation for destroyed animals should be communicated clearly to owners before destruction is attempted. Destruction of animals without adequate compensation of owners is likely to meet with

serious opposition and at worst result in large-scale illegal movement of animals and/or their products. Payment of compensation at market-related prices is the only way to ensure owner cooperation and the success of the eradication campaign.

What animals should be slaughtered will depend on the disease in question and the epidemiological circumstances. In some non-emergency diseases, e.g. bovine tuberculosis, slaughter of individual infected animals only may be necessary.

For emergency diseases, one of two options is usually selected:

- If animals in the infected zone are not well controlled and there is a serious risk of further rapid spread of the disease or spillover to feral or wild animals or if inadequate resources are available for surveillance and imposition of quarantine and movement controls, it may be expedient to slaughter all animals in the infected zone or in specific areas of the zone.
- If animals are well contained on farms and resources are available for surveillance and imposition of quarantine and movement controls, the best decision would probably be to slaughter only animals on known infected farms and dangerous-contact premises.

This decision will depend on the mode of disease transmission; it will be different for diseases capable of airborne dissemination over distances and those requiring direct contact.

Destruction of animals - Organisation

Action Plan

Planning is essential to ensure that the task of destruction is carried out efficiently and not impeded by lack of resources. An action plan should be drawn up in consultation with owners or agents and appropriate officials. The procedures below should be followed.

The veterinary officer should undertake the tasks listed below.

- Discuss the situation with affected farmers and village leaders, briefing them on what is going to happen, including the method of compensation.
- Consult with the farm owner/manager and/or village leaders to establish:
  - farm layout, facilities and equipment;
  - the number, species and location of animals to be destroyed;
  - the destruction technique to be used;
  - the time-frame for commencement and completion of animal destruction.
- Decide on the methods and facilities needed for safe, humane and efficient destruction of the animals.
- Advise the team leader of immediate resources needed to move and secure animals in preparation for destruction.
- Consult with the officer in charge (OIC) of the disposal team if different from the destruction team, determine the disposal method and site; if necessary, identify centrally located carcass disposal sites as close as practicable to the site of destruction.
- Draw up a concise written plan for approval, including:
  - destruction method(s);
  - destruction site(s);
  - order of destruction;
  - personnel required;
  - facilities and equipment needed.

- Make a diagram of the infected property (IP) or dangerous-contact premises (DCP), including details of the destruction operation.
- Make sure that there is a complete inventory of animals to be destroyed on the property, not delaying destruction because there has been no agreement on valuation; where possible, all animals should be valued before destruction; where there is no prior agreement on valuation, provide close supervision to ensure that all the animals are available for destruction.
- Seek authority to destroy in terms of the law(s) pertaining to control of animal diseases when there is a delay in reaching agreement on valuation with the owner or his/her agent; delay may endanger the success of the operation and result in negative perceptions of animal disease control activities.
- Request livestock owners to assemble, confine and restrain their animals the day before the destruction team starts operations.
- Ensure that animals not to be destroyed, including domestic pets, are confined well away from the destruction site.
- Send a team into the surrounding countryside to assess the presence of free-roaming or unrestrained susceptible animals.
- Arrange for teams to be sent to round up, shoot or poison such animals where they are; helicopter shooting by trained marksmen may be the only option, in which case proper disposal of carcasses is essential, as the animals may already be infected.
- Arrange for any necessary support services, such as police and army personnel, to be made available.

Before commencing destruction, the team leader should carry out the tasks below.

- Move animals to the centre of the IP or to areas most remote from other susceptible animals, including wild animals.
- Brief the destruction teams, then supervise and coordinate their activities.
- Ensure that:
  - destruction takes place away from public view if possible;
  - destruction facilities, methods and working conditions are consistent with personal safety;
  - destruction is humane and that no animal is removed for disposal until it is dead;
  - destruction teams receive adequate rest and meal breaks.
- Make every effort to avoid damage to property; damage must be drawn to the attention of the owner/manager, recorded and reported promptly.
- Check all destruction against the authorized inventory, to ensure that all variations are accounted for (e.g. births and natural deaths) and that all animals scheduled for destruction have in fact been destroyed.
- Provide a situation report for the team leader at the end of each day.
- Advise the team leader of resource requirements for the next 48 hours.
- Advise the appropriate officer/s immediately destruction has been completed, so that other tasks, such as disinfection, can be started without delay; carcasses and the destruction area should be sprayed with disinfectant as soon as destruction is complete.

Selection of destruction site

The factors that need to be considered in selecting a destruction site are:

- facilities available on site;
- additional facilities and equipment required;
- animal security;
- proximity of the disposal site and ease of access;
- safety of personnel;
- acceptability to the owner/manager;
- safe and secure means of transporting carcasses to the destruction site;
- likelihood of damage to property and services;
- protection from public view.

Order of destruction

The order of destruction will be determined by the veterinary officer in charge of the operation. Normally the order will be:

- affected animals;
- their direct contacts;
- other susceptible animals in order of epidemiological importance.

In foot-and-mouth disease, pigs should be destroyed before other species.

Fractious and potentially dangerous animals, such as bulls, sows with litters and boars should be destroyed first.

Destruction of animals - Methods

Methods of destruction

Methods of destruction of animals are set out below. Rabid or suspect rabid animals should be shot in the heart with a firearm to preserve the brain, which is the best diagnostic specimen, and to avoid contamination of personnel with potentially infective brain or saliva. Animals with bovine spongiform encephalopathy (BSE) or scrapie should not be shot through the head, as brain tissue is required for diagnostic testing.

Firearms (rifles and guns)

Ensure compliance with any firearm licensing requirements, including the use of trained and approved operators for rifles and guns.

Part of the preparation process for an emergency disease outbreak is to ensure that firearms operators experienced in shooting livestock can be contacted at short notice. The following aspects of firearms safety should be considered:

- All firearms are potentially hazardous.
- When shooting at short range in stockyards, relatively low-velocity hollow/soft-point ammunition should be used. Solid-point ammunition should be avoided, because the projectiles can leave the target at high velocity, which is dangerous to personnel in the area. Hollow point ammunition disintegrates when entering the target, more effectively destroying brain tissue. (For details see relevant species in Chapter 4.) When paddock shooting, use high velocity, hollow/soft-point ammunition.
- Persons other than the shooters and assistants should be cleared from the area or should stand well behind the shooters. The line of fire must be chosen to prevent accidents or injury from stray bullets or ricochets.

- To provide maximum impact and the least possibility of misdirection, the range should be as short as circumstances permit.
- Although the humane killer pistol and captive-bolt pistol are designed to be pressed firmly on the head before being discharged, it is not safe to do this with a standard rifle or pistol.
- Always notify police before using firearms near populated areas.

Advantages of using firearms

The advantages of firearms are:

- clean kills in the hands of experienced operators;
- handling individual animals is not necessary;
- destruction of animals from a distance;
- firearms and ammunition are readily available;
- many people are proficient in their use.

Disadvantages of using firearms

The disadvantages of firearms are:

- they are potentially dangerous;
- they are unsuitable for use close to populated areas.

Captive-bolt pistols

Captive-bolt pistols are an acceptable alternative to firearms where animals are sufficiently restrained, provided that the team understands that animals may be stunned rather than killed. They must be competent to know when an animal is only stunned and trained and equipped to kill such an animal immediately after stunning.

Provided that animals are properly restrained and that the slaughter team is aware that animals may be stunned but not killed, the captive-bolt pistol is an alternative to firearms.

Blank cartridges for the captive-bolt pistol are colour coded according to the amount of charge they contain. It is essential that manufactures' recommendations should be followed regarding blank cartridges for different farm animals. The most widely used is the “Cash Special”, a single shot .22 calibre captive bolt similar to a revolver. It uses three different loads:

- pink: 1 grains (weaners);
- purple: 2 grains (sheep);
- green: 3 grains (cattle, boars).

Regular maintenance of the captive-bolt pistol is essential for efficient stunning.

When using a captive-bolt pistol, more than one operator can work in the same area with safety. Spare weapons and parts should be on hand.

Advantages of captive-bolt pistols

The advantages of captive-bolt pistols are:

- operator safety, as there is no free projectile;
- both pistols and ammunition are readily obtainable;
- ease of use;
- operators do not need to be expert shooters; they must, however, be trained in correct placement of the pistol against the head in the different species.

Disadvantages of captive-bolt pistols

The disadvantages of captive-bolt pistols are:

- they usually only stun larger animals such as cattle over one-year old, sows, boars, billy goats and rams, which must then be pithed or bled (see Pithing, below) to ensure death;
- some animals have to be individually restrained;
- they are relatively slow, especially when destroying large numbers of animals.

Humane killers that work on the same principle as the captive bolt but destroy a larger amount of tissue are a better option.

Pithing

Pithing is the process of destroying nervous tissue in the region of the brain stem to ensure the death of the animal. It is usually done by inserting a rod through the hole made by the captive-bolt in the head or by severing the spinal cord between the atlas and axis, the first and second bones of the neck.

Pithing unstunned animals is not an acceptable method of destruction as it is inhumane. It is essential on animals that have been stunned only, for example when captive-bolts are used on larger animals.

Pithing is also a safety measure to prevent workers being struck by the involuntary movements of a stunned animal.

Pithing is preferable to exsanguination, or bleeding out, which could release infectious material and make working conditions slippery and dangerous.

Other physical methods

Dislocation of the neck

This may be suitable for poultry and smaller laboratory animals. Suitable methods are by burdizzo, bone cutters, secateurs or manually. Burdizzos are particularly useful when large numbers of poultry with strong necks, such as geese and duck, are to be destroyed.

Electrocution

Electrocution is used widely in abattoirs but is not suitable for field use.

Decompression

This method is now regarded as unacceptable.

Exsanguination

Exsanguination combined with stunning or neck dislocation is a humane method of destruction of sheep and goats when performed by an experienced operator. It is undesirable, however, because released infectious material makes the destruction site slippery and dangerous.

Gaseous agents

Carbon dioxide

Carbon dioxide is the method of choice for destroying most poultry species when large numbers are involved and for many laboratory animals.

Animals must be exposed to an atmosphere of at least 30 percent carbon dioxide to ensure loss of consciousness and then at least 70 percent carbon dioxide to ensure death.

To achieve this, animals may be placed in an air-filled container into which carbon dioxide is allowed to flow so that concentration rises to a minimum of 70 percent for at least 3 minutes. An optimum flow rate is one that will displace 20 percent of the chamber volume per minute. Animals may be left in the container until rigor mortis ensues or they may be removed once unconscious and killed by cervical dislocation or exsanguination. Exposure of up to 20 minutes may be necessary to ensure death; this will be even longer in neonatal or juvenile animals, which are tolerant of carbon dioxide. They may require 30 minutes exposure or longer.

Alternatively, the container may be filled with the carbon dioxide/air mixture before animals are placed in it, in which case anaesthesia is said to occur more rapidly (20 seconds to unconsciousness, compared to 70 seconds). Some workers have suggested, however, that this technique is more stressful.

If cylinders of carbon dioxide are not available, dry ice may be used. This is placed in the bottom of a deep container under a gauze floor, in such a way that there is no direct contact with the dry ice. Animals are then placed in the container and left there until unconsciousness or death ensues.

The use of a 70 percent carbon dioxide/30 percent oxygen mixture is said to decrease the discomfort of hypoxia before the onset of anaesthesia and narcosis. This will complicate the procedures, however, by requiring additional cylinders of oxygen and reducing valves.

Carbon dioxide is safe and easy to use as long as it is used in a well ventilated area.

Gaseous anaesthetic agents

These agents, which include halothane, enflurane and isoflurane, can be used to produce anaesthesia and death. Halothane at concentrations greater than 4 percent can produce anaesthesia and cardiac arrest in 90 seconds. These agents can be used in exactly the same way as carbon dioxide, piped into a container with a carrier gas such as oxygen or poured onto cotton wool and placed under gauze at the bottom of a deep container. There should be no direct contact between the animal and the liquid anaesthetic.

The major disadvantages are that these agents are expensive and should only be used in a well ventilated room or, preferably, in a fume cupboard. Prolonged exposure, even at low concentrations, may be detrimental to the health of personnel. As with carbon dioxide, animals may be left in the anaesthetic chamber until dead or may be removed once unconscious and killed by one of the physical methods or by injection of an overdose of barbiturate as detailed below.

Ether is not recommended. Induction of anaesthesia is slow and stressful, as the high concentrations of the vapour necessary to produce unconsciousness are irritant to skin and mucous membranes. Ether is also hazardous to personnel because of its explosive properties during use and when disposing of carcasses.

Hydrogen cyanide gas

Hydrogen cyanide gas is a highly effective method of destroying poultry. Human safety considerations restrict its use, however, and it is not recommended.

Carbon monoxide

Carbon monoxide can be used to destroy poultry. It is readily available from car exhaust but unleaded petrol produces less than super petrol and the fumes must be cooled. Human safety considerations restrict its use.

Methyl bromide

Methyl bromide is effective at killing poultry but operator safety requirements restrict its use, and it should only be used by people suitably trained. It is also virucidal. Environmental concerns are now restricting its use.

Injectable agents

An overdose of any of the barbiturates can be used for euthanasia, ideally by the intravenous route in large animals; the intracardiac or intraperitoneal route may be preferable in smaller animals. Destruction of cats, rabbits and some birds by intraperitoneal sodium pentobarbitone may be accompanied by an excitement phase. Animals should be confined and handled with extreme care. Specific euthanasia solutions are available (sodium pentobarbitone 325 mg/kg). This should not be used by the intrathoracic, subcutaneous or intramuscular route as at this concentration it is extremely irritant to tissues. Pentobarbitone at concentrations normally employed for anaesthesia may also be used but larger volumes will be required.

If the animals are excitable or vicious, other drugs can be administered to calm them. These drugs, such as tranquillizers, analgesics or depressants such as ketamine, opioids or xylazine, can be given by the subcutaneous or intramuscular route. An overdose of barbiturate can then be given intravenously to kill the animal.

These agents are restricted by law and must only be used by a veterinarian or under veterinary supervision.

Destruction of animals - Various species

Destruction of various species

The preferred methods of destruction of various domestic species and the factors that determine the selection are set out below.

Cattle and buffalo

Under most circumstances, cattle and domesticated (water) buffalo will be mustered into yards and shot. In extensive areas where 100 percent musters cannot be achieved, unmustered animals will be paddock shot, after first mustering as many as possible.

Captive-bolt pistols are most suitable when animals can be adequately restrained (see Captive-bolt pistols). Injectable agents may be most suitable for small numbers of calves.

Frontal method

The firearm should be directed at the point of intersection of lines taken from the base of each horn (or equivalent position in polled animals) to the opposite eye, aiming at the spine (Point 'a'). For bulls or older animals, the bullet should enter about 1 cm to the left or right of this point and hard point/jacketed ammunition may be necessary. Small calves may be shot just behind the nuchal crest (poll) in the mid-line, aiming directly at the muzzle (Point 'c'). Alternatively, a captive-bolt pistol using cartridges may be used.

Humane destruction of cattle: (a) recommended position for frontal method (suitable for firearm or captive-bolt pistol); (b) recommended position for temporal method (only suitable for firearms); (c) recommended position for small calves.

Temporal method

This is only suitable for firearms. The animal is shot from the side so that the bullet enters the skull midway between the eye and the base of the ear. The bullet should be directed horizontally (Point 'b').

Shooting in yards

Ideally, only personnel who have had previous experience in this type of work should undertake the task. If such personnel are not available, the task may be allocated to police or army marksmen. They should be fully briefed on humanitarian and safety aspects of destruction before commencing yard shooting. Only hollow/soft point ammunition should be used. The minimum calibre should be .22 magnum; maximum calibre should be. 44 magnum

(240 grain) or .375 (250 grain).

Operate from a top rail, preferably in a small yard. It is not practical to shoot in a crush unless dealing with very small numbers and the crush is equipped with a side opening gate, in which case a captive-bolt pistol should be considered.

Paddock/extensive area destruction

Shooting from helicopters is usually the most effective method of destroying unmusterable cattle. Appropriate civil aviation authority approval may be needed before rifles may be used from helicopters. This should be carried out only by experienced, trained personnel with current proficiency in this type of operation. Untrained personnel should undergo a training course and pass a practical and written test at its conclusion before shooting from a helicopter. Minimum recommended calibre is .308 soft point with semi-automatic rifles such as the M14, SLR or MIA.

Shots aimed to destroy the brain are preferred but for practical reasons this is not generally possible with helicopter shooting, in which case heart/lung shots can be used.

The problem of rapid destruction of large numbers of cattle on intensive feedlots is not easy to resolve. The possibility of using a lethal oral agent in water or feed should be considered.

Technique for domesticated (Asian) buffaloes

As for cattle except:

- hard point/jacketed ammunition is preferable for large animals;
- for small numbers, when use of semi-automatic rifles is not critical, use heavier calibre or magnum rifles;
- frontal shooting: check the angle of impact, as a buffalo will often raise its nose.

Sheep

The preferred method of destruction is by .22 rifles or captive-bolt pistols.

Hornless sheep

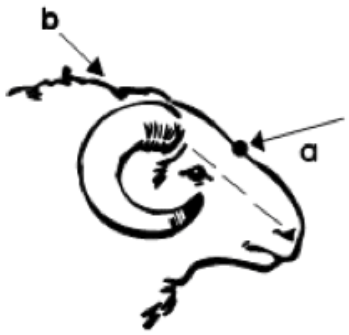
The top of the head (centre of upper forehead) is a suitable position, with the firearm or captive-bolt being aimed towards the animal's gullet. Alternatively, the weapon may be placed just behind the poll and aimed in the direction of the animal's muzzle. Both methods are illustrated below.

Humane destruction of hornless sheep: recommended positions and direction of fire for captive-bolt pistol or firearm.

Horned sheep

If using a captive-bolt pistol, the top-of-the-head position used for hornless sheep may not be suitable, in which case the weapon may be placed behind the poll and aimed in the direction of the animal's muzzle (Point 'a'). If using a firearm, shoot at a point in the middle of the face just above the level of the eyes, aiming towards the spine (Point 'b').

- Rams: it may be easier to use .22 magnum rifle, depending on facilities. If captive-bolt is more practical, heavy duty cartridges should be used (see Captive-bolt pistols).
- Wethers/ewes: sheep must be packed tightly as destruction proceeds. This can be achieved using light portable panels or mesh.
- Newborn lambs: these should be separated and given sodium pentobarbitone (intraperitoneal, 3–5 ml through automatic syringes).



Humane destruction of horned sheep: recommended position and direction of fire for (a) captive-bolt pistol or (b) firearm.

Pigs

Pigs are particularly difficult to destroy. Captive-bolt pistols or heavy-calibre humane killers should be used for housed pigs to avoid the danger of ricochets. Housed pigs may be moved outside and destroyed with firearms. Sows with litters are particularly fractious and difficult to handle. Pigs in paddocks can be shot using firearms.

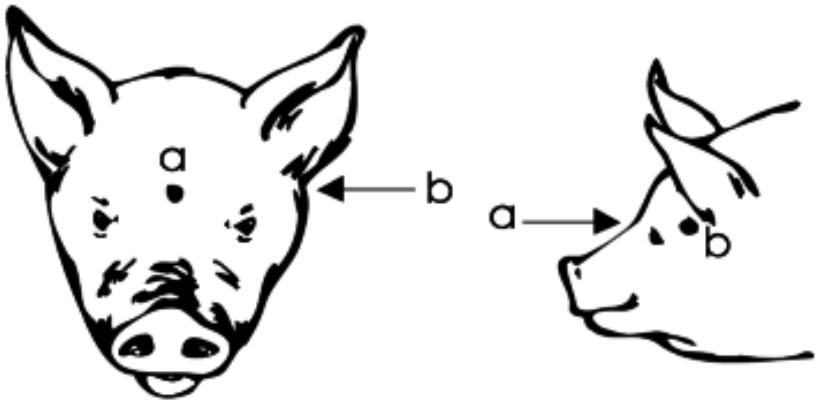
Use sodium pentobarbitone on unweaned pigs. Intraperitoneal injections of 3–5 ml of a suitable product using automatic syringes is satisfactory.

Frontal method

The captive-bolt pistol or firearm should be directed at a point about midway across the forehead and, for adult pigs, about 2 cm above the level of the eyes (Point 'a').

Temporal method

This is only suitable for firearms. The pig is shot from the side so that the bullet enters the skull at a point midway between the eye and the base of the ear. The bullet should be directed horizontally into the skull (Point 'b'). This method is preferred for adult pigs because of the heavier bone structure of the front of the skull.



Humane destruction of pigs: recommended position and direction of fire for (a) frontal method (suitable for captive-bolt pistol or firearm) or (b) temporal method (suitable for firearm only).

Feed one-third of the normal ration before commencement of destruction. Pigs will stay calmer and therefore be easier to handle. If slaughter is likely to be delayed, ensure sufficient feed is on hand.

- Growers: pack in tight; work round perimeter of yard, then climb in to finish balance of group. Pigs usually quieten as destruction progresses.
- Sows: do not yard too tightly, as they become upset if jammed and will start climbing on rails; work steadily; do not hurry. Use heavy duty cartridges in captive-bolt pistols (see Captive-bolt pistols).
- Boars: use heavy-duty cartridges in captive-bolt (see Captive-bolt pistols); if this is too difficult, use a .22 magnum rifle.
- Small pigs: use standard captive-bolt cartridges (see Captive-bolt pistols). It is preferable to have small pigs caught and held over the rail of the yard while destroyed. A wheelbarrow can then be a useful means of conveyance to the front-end loader.

Goats

Using either a captive-bolt pistol or firearm, aim the weapon to the skull behind the horns as shown below. Aim in line with the animal's mouth.

Kids may also be shot from the front, as for cattle. This method is not suitable for mature goats, as the brain is located well back in the skull compared to other livestock. Sodium pentobarbitone is also appropriate.

Humane destruction of goats: recommended position and direction of fire (captive-bolt pistol or firearm).

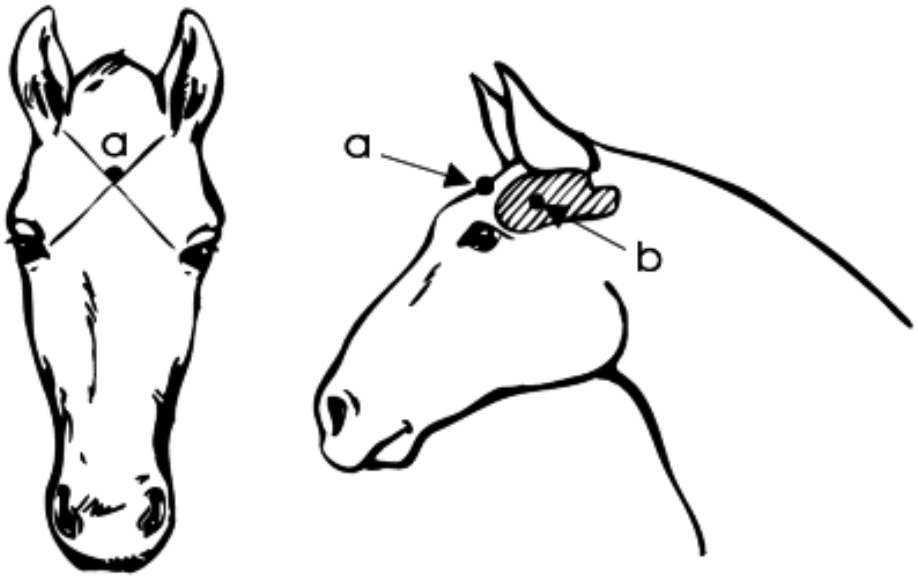
Newborn kids should be separated and given sodium pentobarbitone (intraperitoneal, 3–5 ml of a suitable product).

Horses, donkeys and mules

These animals can be destroyed either by intravenous injections of euthanasing drug or shooting, as detailed below.

Frontal method

The firearm should be directed at the point of intersection of diagonal lines taken from the base of each ear to the opposite eye, aiming at the spine (Point 'a').



Humane destruction of horses: recommended position and direction of fire for (a) frontal method or (b) temporal method.

Temporal method

The horse is shot from the side so that the bullet enters the skull midway between the eye and the base of the ear (Point 'b'). The bullet should be directed horizontally.

Recommended rifles for horses are .22 magnum (hollow point) or .44 magnum. Captive-bolt pistols are not recommended for horses, because some horses rear before the operator can withdraw the bolt or move out of danger. Horses in the public view can be exsanguinated humanely by severing the abdominal aorta per rectum.

Paddock/extensive area destruction

As for cattle and buffalo (see Cattle and buffalo).

Deer

A firearm or captive-bolt pistol should be directed at the forehead where lines taken from the base of each ear to the opposite eye intersect (Point 'a'). The firearm should be fired horizontally into the forehead. If using a captive-bolt on adult bucks, heavy duty cartridges are necessary.

If the deer are disturbed when approached from the front, an equally effective method is to fire the instrument through the skull just behind the base of the antlers. The weapon should be aimed in line with the animal's muzzle (Point 'b').

Humane destruction of deer: recommended position and direction of fire for (a) firearm or captive-bolt pistol or (b) alternative position for disturbed deer.

Birds

For small numbers of birds, for example fancy breeds or pigeons, the preferred methods are dislocation of the neck using burdizzos, bone cutters, secateurs or bare hands or intracardiac or intraperitoneal injection of sodium pentobarbitone.

For large numbers of birds in commercial poultry units, the preferred method is gassing with carbon dioxide. This method involves lining large garbage waste bins (skips) with plastic sheeting that forms a canopy over the top of the bin.

Birds can be caught using teams of 10–15 labourers. Experienced catching teams may be available. Chicks are easily caught under heaters and are transferred to skips in plastic garbage bins. Broilers on the ground are driven with a movable hessian wall to the catching area, where they are caught and placed directly into skips.

Caged birds are more difficult and progress is slower. Each catcher removes three or four birds from cages and carries them by the legs to skips.

Layers on perches are best caught at night or during low light, when they are quiet.

Carbon dioxide is transferred to the bottom of the skips through garden hose fitted to the top of the cylinders. The carbon dioxide should be decanted in bursts of 30–45 seconds. It is essential not to decant too quickly or the bottles will freeze when about half empty.

On average, half a 45 kg cylinder of carbon dioxide is needed for the 3 m3 skips and three or more cylinders for the 20 m3 skips. Carbon dioxide should be added at a rate sufficient to ensure that birds succumb before others are placed on top of them. Skips should be three-quarters filled with birds, sealed and transported to the disposal site. Care must be taken to ensure that no bird is still alive when dropped into the burial pit. Should this happen, birds must be immediately caught and humanely killed.

For humane destruction of farmed ostriches, birds should be restrained firmly and dispatched by captive bolt or injection of sodium pentabarbitone into the jugular vein.

Dogs

Injectable agents are the best method for destroying dogs that can be handled. Intravenous sodium pentobarbitone (40 mg/kg) is the ideal method. Intracardiac injections are favoured for puppies and small dogs. Other drugs given subcutaneously or intravenously may be used initially, for example xylazine (2 mg/kg) or ketamine (20 mg/kg), if necessary using a tranquillizer gun. Once the dog is sedated, intravenous barbiturates can be used to kill the animal.

If a tranquillizer gun is not available, injection by any route will be too dangerous for some totally unmanageable dogs and for rapid or suspect rabid dogs. A lasso on a pole may be useful to help catch and control these dogs. Including a sedative (e.g. sodium pentobarbitone) in the food may be an appropriate preliminary to an injectable agent. Dogs may have to be restrained with muzzles or tape before destruction.

Some dogs will have to be shot through the heart.

Cats

Injectable agents are the best method for destroying cats. Intravenous or intracardiac sodium pentobarbitone (40 mg/kg) is the preferred drug. Alphaxalone (Saffan®) may be used as a preliminary. Intraperitoneal injections can cause excitation before death. Tranquillizer guns are not suitable for cats, because cats are small, fast-moving targets.

Animals that are not easy to handle may have to be put in a hessian bag, injected through the bag and left in a cage until dead. Alternatively, they can be placed in a plastic bag or box into which anaesthetic gases (including carbon dioxide) are piped, using oxygen as the carrier gas. Anaesthesia is usually quick and quiet but death may take some time - at least 20 minutes with carbon dioxide but less with some of the other anaesthetic gases. Once the animal is unconscious, it may be removed and killed with an overdose of barbiturate.

Rates, mice, guinea pigs

Any of the physical or chemical methods described above can be used in a laboratory. The method of choice, however, is carbon dioxide. Newborns are resistant to carbon dioxide and need prolonged exposure or a combination of carbon dioxide and cervical dislocation. If pentobarbitone is used, it should be given by the intraperitoneal route (rats and mice 100 mg/kg, guinea pigs 90 mg/kg).

Rabbits

Physical methods such as cervical dislocation should only be used by skilled personnel and only on rabbits less than 1 kg in weight. The preferred method for laboratory rabbits is intraperitoneal pentobarbitone 60 mg/kg. Intravenous barbiturate injections of the very concentrated barbiturate euthanasia solution into the ear vein are often painful and may be distressing. Standard anaesthetic solutions should therefore be used. Rabbits should be restrained, since an excitement phase may occur, especially if the intraperitoneal or intravenous injection is incorrectly administered.

Induction of anaesthesia with carbon dioxide, as described for birds and cats, is slow and animals appear to become apprehensive before unconsciousness supervenes. The method is therefore not recommended. Overdosing with other inhaled anaesthetic agents may be used.

Primates

Chemical restraint by means of ketamine (20 mg/kg intramuscularly) followed by an overdose of barbiturate given by the intravenous or intracardiac route (50 mg/kg) is recommended for laboratory primates.

Fish

A sharp blow to the head followed by destruction of the brain has been recommended as a physical method of euthanasia. If chemical methods are preferred, an overdose of anaesthetic such as MS222 (tricaine methane sulphonate) can be used or carbon dioxide can be bubbled into the water. This should be followed by destruction of the brain.

Circus and zoo animals

The assistance of a veterinarian with experience of handling and destroying circus and zoo animals should be sought. If none is available, the methods outlined above should be extrapolated to the various species.

Glossary

Ammunition

- **Hard point**: hard metal ammunition that passes through tissues cleanly but can leave the target at high velocity, causing danger to other people/animals in the area;
- **Soft/hollow point**: ammunition made of softer metal or with a hollow point that flattens on impact, causing greater damage to tissues; does not exit the target unless it fails to encounter bone or solid muscle.

Burdizzo: castrating pincers.

Captive-bolt pistol: humane animal killer; takes either a blank cartridge that delivers a knockout blow to the skull or a penetrating bolt that is driven a short distance into the brain; the operator does not have to be a marksman as the instrument is pressed firmly against the animal's skull before firing.

Movement restriction: movement into and out of infected premises must be rigorously checked by quarantine and/or road barriers.

Disinfectant: an agent used to destroy micro-organisms outside a living animal.

Disposal: sanitary removal of animal carcasses and other infected material by burial, burning or some other process, so as to prevent the spread of disease.

Exsanguination: severe loss of blood.

Firearm: small arms weapon (gun or rifle).

Infected premises: a defined area, which may be all or part of a property, in which an exotic disease or its infective agent exists or is believed to exist; an infected premises is subject to quarantine and to eradication or control procedures.

Infected premises operations team: team appointed by the local disease control centre (LDCC) controller to coordinate/supervise operations at the infected premises.

Injection sites

- intracardiac: into the heart;
- intraperitoneal: into the peritoneal (abdominal) cavity;
- intramuscular: into muscle (the needle is passed deeply into the substance of a muscle before the fluid is injected);
- intrathoracic: into the thoracic (chest) cavity;
- intravenous: into a vein;
- subcutaneous: under the skin (hypodermic).

Nuchal crest: transverse bony ridge across the back margin of the roof of the vertebrate skull.

Poll: crown of the head.

Quarantine: legal restrictions limiting movement imposed on a place, animal, vehicle or other things.

Susceptible animals: animals that can be infected with the disease.

Disposal of animals - Introduction

The primary objective of disposal of carcasses, animal products, materials and wastes is to prevent the dissemination of infection. This process is therefore part of an emergency animal disease eradication programme, particularly when a stamping-out policy is followed. It is important from an aesthetic point of view. Disposal should be completed as soon as possible after destruction, to minimize opportunities for infectious material to disperse. Carcasses are much easier to handle before decomposition has set in.

This manual outlines disposal methods appropriate for the emergency animal diseases most readily transmitted by fomites e.g. foot-and-mouth disease, Newcastle disease, African swine fever and avian influenza - and zoonotic diseases. Less rigorous disposal methods may be appropriate for less readily transmitted diseases and non-zoonotic diseases. Carcasses and other items awaiting disposal should be guarded to prevent unauthorized access and to prevent domestic pets, wild animals and birds from removing potentially infectious material. Control of insects should be considered if there is a risk of passive transmission by insects to nearby susceptible species. If disposal is delayed, carcasses should be thoroughly sprayed with an approved disinfectant.

Disposal of carcasses *The basic requirements of disposal: simple equipment and human resources.*

Organizing stamping out *Among the activities is verification of numbers and ownership of animals. This may involve whole communities and is necessary to streamline the compensation process*.

Before disposal work starts, personnel should be fully briefed. The nature of the disease and any hygiene requirements associated with zoonotic diseases should be explained on site.

Respirators should be supplied to personnel when there is any risk to humans from the organism involved or if large amounts of dust are generated.

Disposal of animals - Method and site

It is crucial to select a site which is well-protected from people and scavenging animals. On some occasions it may be necessary to mount a guard at the site for the first few days.

Disposal on the infected premises (or dangerous-contact premises)

Depending on local circumstances, burial may be the preferred method of disposal because it is quicker, cheaper, environmentally cleaner and easier to organize because there are fewer outside resources required (see Burial).

General factors to be considered are:

- nature and amount of material for disposal;
- availability of sites suitable for burial or cremation adjacent to the destruction site;
- accessibility to disposal site by heavy transport vehicles;
- nature of soil/rock formation in the available area;
- level of watertable;
- proximity to water catchment areas, bores and wells;
- presence of services such as water, gas, electricity, telephone lines, drainage, sewerage and other improvements or structures, including aerial lines;
- proximity to built-up areas and dwellings, particularly in the case of cremation;
- fire restrictions and hazards in the case of cremation;
- weather conditions, including prevailing winds; it may be easier to cremate in excessively wet conditions;
- availability of plant for burial;
- availability of supplies of suitable fuel for cremation;
- presence of overhead structures such as power lines; these must be avoided when selecting burial and cremation sites;
- quantities of carcasses and other material for disposal;
- subsequent plans for the use of the area; for example, the soil may be unstable where burial pits are placed.

Disposal of animal carcasses and other infectious material may involve some adverse environmental consequences. It is important for the environmental aspects of proposed disposal activities to be properly considered, with advice from environmental agencies where possible, so as to ensure that the impact of such consequences be minimized. Consultation with relevant authorities, e.g. environmental protection agencies, will be necessary to obtain specific information on a number of these factors.

Disposal off the infected premises (or dangerous-contact premises)

Where burial, cremation or rendering are not considered practical or difficult to carry out on the infected or dangerous-contact premises, consideration could be given to transferral of carcasses and/or infectious material to another site for disposal by burial, cremation or rendering. This may be necessary when considering the disposal of materials from laboratories and in situations where site limitations, such as available space or watertable, effectively prevent on-site disposal. Furthermore, in some circumstances, such as with large volumes of material from feedlots, it may be preferable to dispose of carcasses by rendering if suitable facilities are available locally or can be transported to the site.

If infectious and dangerous-contact premises are adjacent or in close proximity, a common disposal site may be used.

Disposal of carcasses: *Trucks are an essential and quick means of moving carcasses to the disposal sites.*

Transport should be in a leak-proof container, such as a large skip, covered with tough polyethylene covers and sealed at the top. It should not be overloaded - half a metre or more (depending on distance to be travelled and temperature) should be left clear for expansion of carcasses. Carcasses should not be slashed before loading. Vehicles should travel slowly to avoid splashing of contaminated material. Staff should carry a supply of an approved disinfectant and basic equipment to deal with minor spills during a journey. All vehicles must be cleaned and disinfected before leaving the premises and after unloading.

Disposal of animals - Methods

Burial

Site selection

Important considerations for selecting burial sites include:

- access for equipment to dig the burial pit and for the delivery of livestock, carcasses or other materials to be buried;
- environmental aspects, such as:
  - the distance to watercourses, bores and wells
  - height of the watertable
  - proximity to buildings, especially houses
  - proximity to neighbours or public lands including roads
  - slope of the land and drainage to and from the pit
  - permeability of soil
  - space for temporary storage of overburden
  - direction of prevailing wind (odour);
- construction considerations:
  - avoid rocky areas, which slow digging and increase costs
  - select stable soils that can take the weight of equipment used to construct and fill the pits
  - prevent surface runoff from entering the pit by constructing of diversion banks
  - construct similar banks to prevent liquids escaping from the burial site
  - fencing may be necessary to exclude animals until the site is safe for use.

Earthmoving equipment

The preferred equipment for digging burial pits is an excavator, which is the most efficient for the construction of long, deep pits with vertical sides. Advantages include the ability to store topsoil separate from subsoil. The equipment can be used to fill the pit with carcasses or other materials and close it without disturbing the carcasses.

Loaders, bulldozers, road graders and backhoes - or manual labour for small jobs - may be used if excavators are unavailable. With the exception of backhoes, all other equipment requires continual movement of the machine over the site while the pit is being dug. Excavators and backhoes remain in a fixed position, so they move soil faster, with less cost and less damage to the area around the pit. Most excavators have an attachable hammer for excavating rock.

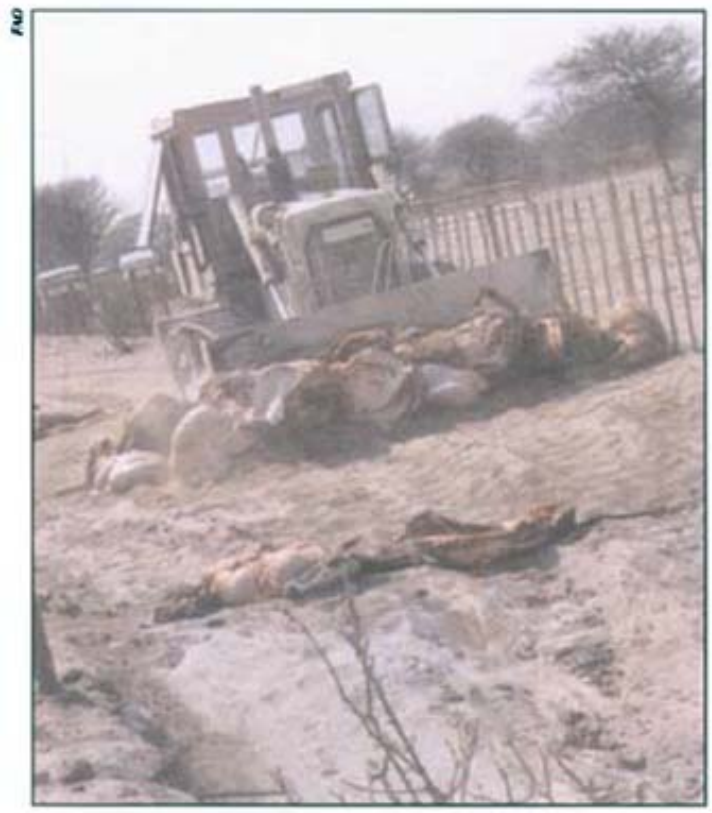
Burial pit construction

The dimensions of the burial pit will depend on the equipment used, site considerations and the volume of material to be buried. Pits should be as deep as possible, with vertical sides; reach of machinery, soil type and watertable level are the usual constraints. The pit should of a width such that the equipment can fill it evenly with the material to be buried. If a bulldozer is used, for example, the pit should be no more than one blade width, about 3 metres, because it may be difficult to push carcasses in from one side and fill the pit evenly. The aim should be to avoid having to move carcasses once they are in the pit. The length of the pit will be determined by the volume of material to be buried.

Pit dimensions

In deciding the dimensions of the pit, consideration needs to be given to the method of filling the pit with carcasses or other material. Carcasses will generally be unloaded from tipper trucks or pushed into the pit by a loader or bulldozer from one of the long sides. Excavators may be used to fill pits with carcasses placed close by; this is useful if soil stability does not permit trucks or other heavy equipment to operate close to the pit edge.

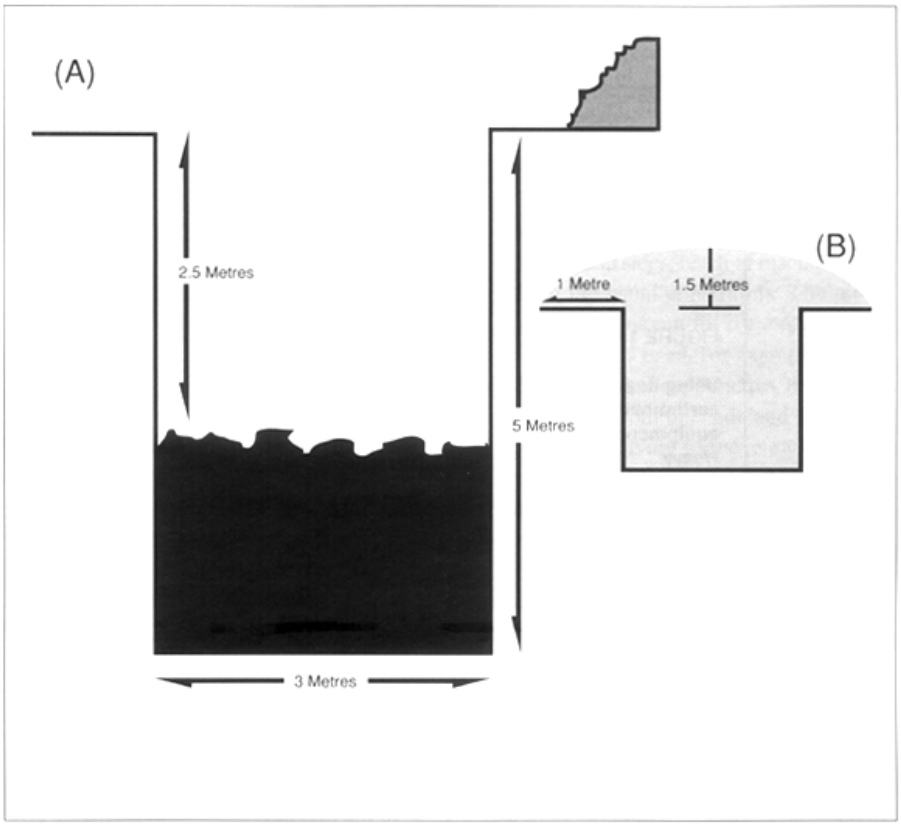
Even if an epidemic clears an animal population, it will be necessary to dispose of carcasses by the proper means.



Using heavy earthmoving equipment: *Heavy earthmoving equipment is essential for digging disposal pits and moving carcasses.*

The following guidelines may be of assistance in determining the pit volume required. The base of the pit must be at least 1 m above the watertable. Allow a fill capacity of about 1.5 m3 for each adult beast or 5 adult sheep. At least 2 m depth of soil is required to cover carcasses to ground level. For example, a pit 3 m wide and 5 m deep filled with carcasses to within 2.5 m of ground level will accommodate 5 adult cattle per linear metre (3 × 2.5 × 1 = 7.5 m3; 7.5/1.5 = 5 cattle or 25 sheep).

When closing the pit, surplus soil should be heaped over it as overfill. The weight of soil prevents carcasses from rising out of the pit because of gas entrapment, prevents scavengers digging up carcasses, helps filter out odours and assists in absorbing the fluids of decomposition. After pit subsidence, it will be necessary to replace any topsoil not utilized during pit closure.



Disposal of carcasses by burial; (A) open pit, (B) freshly closed pit.

Poultry to be destroyed will normally be in a container such as a skip or body of a truck and the dimensions of these containers should be used as a guide to the volume of the pit required.

Other considerations

Gas production

Gas produced by decomposition within unopened carcasses may result in considerable expansion of the buried material, to the extent that the surface of the closed pit may rise and carcasses may be expelled. It is recommended that large animal carcasses, including pigs, be opened by slashing the rumen (cattle) or the caeca (horses) to permit the escape of gas. Pigs should have their abdomens and stomachs slashed to allow gas to escape. There appears to be little benefit in opening small animal carcasses. If carcasses are to be opened, it should be done at the side of the pit. Under no circumstances should personnel enter the pit during filling.

Lime should be added to pits, to prevent earthworms from bringing contaminated material to the surface after pit closure. Cover the carcasses with soil, 400 mm is suggested, and add an unbroken layer of slaked lime - Ca (OH)2 - before filling is completed.

Lime should not be placed directly on carcasses, because in wet conditions it slows and may prevent decomposition.

Site inspection

Inspection of the burial site after closure is recommended so that appropriate action can be taken in the event of seepage or other problems. The objective is that the site should return to its original condition. Before restocking is permitted, the burial site should be inspected again to ensure that there is no possible biological or physical danger to stock. This would normally be several months after pit closure.

Safety considerations

Safety of personnel is an overriding consideration. Aspects to consider include: hygiene of personnel working on the site, availability of rescue equipment if a person falls into the pit or if the pit wall collapses and protection against dust. Operations should be controlled by the site supervisor/team leader; staff must be briefed before operations begin.

Cremation

Cremation should be considered only when burial is not possible. The exception is during an anthrax outbreak, where cremation is the preferred method of disposal. When it is carried out properly, cremation can prevent the formation of spores.

In countries where earthmoving equipment may not be available for deep burial, where putrefaction is not a deterrent and/or poverty dictates that eating habits should not be fastidious, cremation is preferred. Available methods include funeral pyres, incinerators and pit burning.

Pyres

The principle is to place carcasses on top of sufficient combustible material, making sure that the arrangement of fuel and carcasses allows adequate air flow to enter the pyre from below, so as to achieve the hottest fire and the most complete combustion in the shortest time.

Site selection

Important considerations are:

- location: consider the possible effects of heat, smoke and odour on nearby structures, underground and aerial utilities, roads and residential areas;
- access: for equipment to construct and maintain the fire and for delivery of fuel, livestock, carcasses or other materials to be burnt;
- environment: ensure that there is an adequate fire break around the pyre; consult local fire brigades or residents for advice, obtain permits for fire appliances to be on site during the burn;
- fuel: pyres require considerable amounts of fuel to achieve complete cremation; the amount and type of available fuel will vary considerably; all required fuel should be on site before the burn is commenced.

Preparation of firebed

The fireline should be sited at right angles to the direction of the prevailing wind to maximize ventilation. Space for air can be provided by digging trenches under the pyre and/or elevating the firebed. Fuel supplies should be stacked upwind and the fire built from that side; carcasses should be loaded from the opposite side. The width of the firebed is governed by the size of carcasses to be burnt; for adult cattle allow 2.5 m. To determine the length, allow 1 m per adult beast.

If the firebed is to be built on the ground, dig trenches of 30 × 30 cm to act as air vents. These should lie in the direction of the prevailing wind at 1 m intervals under the length of the proposed firebed. If the firebed is to be elevating, lay rows of baled straw and heavy timbers parallel to the prevailing wind and then another layer of timbers

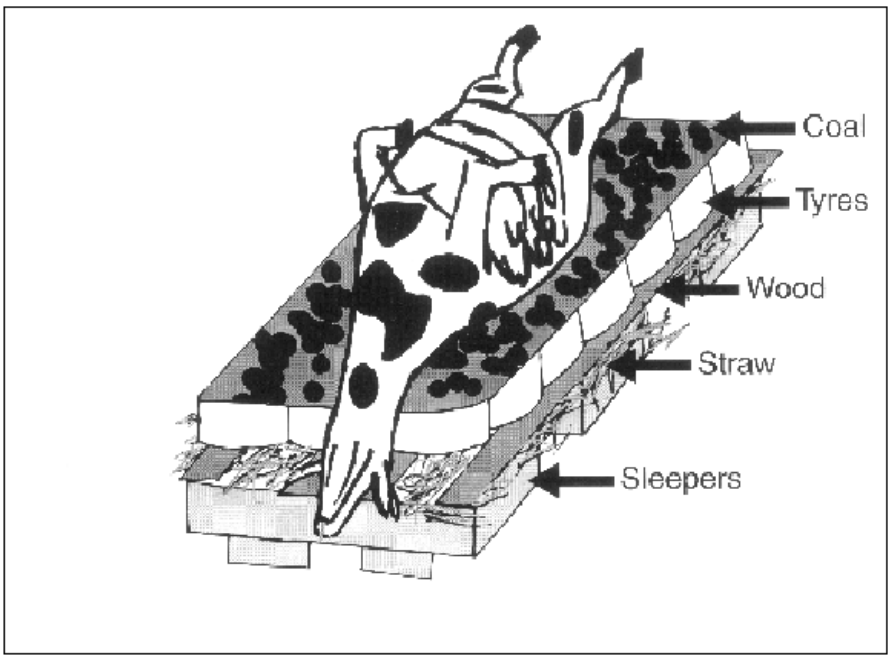
crossing the bottom layer, leaving a gap of about 20 cm between timbers. Then lay other fuel, such as lighter timber or straw bales, over this timber support.

Burning: *Burning is a common method of disposing of carcasses. It is discouraged because of the large amount of fuel it requires.*

Stack carcasses across the firebed with larger carcasses on the bottom and smaller carcasses on top (Figure 18), preferably with the carcasses on their backs and alternating head to tail. Excavators or front-end loaders are best but lifting jibs, tractor forklifts or cranes and chains can be used. After carcasses have been placed on the firebed, the extensor tendons may be cut to prevent legs being extended during burning.

When the carcasses have been loaded and weather conditions suitable, saturate the firebed and carcasses with diesel or heating oil - **do not use petrol** - and prepare ignition points at 10 m intervals along the length of the firebed. These can be made of rags soaked in kerosene.

Remove all vehicles, personnel and other equipment well away from the firebed. Start the fire by walking into the wind and lighting the ignition points along the way.



Disposal of carcasses by cremation.

The fire must be attended at all times and be refuelled as necessary. Use a tractor with a front-mounted blade or a front-loader. Ensure that any carcasses or parts of carcasses that fall off the fire are put back on. A well constructed fire will burn all carcasses within 48 hours. The ashes should be buried and the site restored as fully as possible.

Fuel requirements

Local availability will govern the type and amount of fuels. The following can be used as a guide per adult beast:

- heavy timber: 3 pieces, 2.5 m × 100 mm × 75 mm;
- straw: 1 bale;
- small timber: 35 kg;
- coal: 200 kg;
- liquid fuel: 5 litres.

Fuel requirements may be estimated on the basis that one adult cattle carcass is equivalent to four adult pigs or shorn sheep or three adult woolly sheep.

Incinerators

Biological incinerators are an efficient carcass-disposal system, achieving safe and complete disposal with minimal pollution. The cost of establishment and operation, however, and lack of portability mean that incinerators may not be readily available. Incinerators are usually only suited to disposal of small amounts of material. Special procedures must be followed for transportation of infected material from infected premises to the incinerators and disinfection of containers and vehicles.

Pit burning

Pit burning, also known as air-curtain incineration, is a technique for burning material in a pit, using fan-forced air. Pit burners are used by some local authorities to burn vegetable matter with a high moisture content. The equipment consists of a large capacity-fan, usually driven by a diesel engine, and ducts to deliver the air, which may be preheated, into the long side of a trench. The angle of the airflow creates a curtain of air that acts as a top for the incinerator and provides oxygen that induces high combustion temperatures. Hot air recirculates in the pit, achieving complete combustion. Additional fuel is required to initiate combustion; once the fire is burning, however, the fuel requirement is reduced. Pit burners would be suitable for continuous operation on a relatively small scale and have the advantage of being transportable. They appear to be especially suited to pigs and fat sheep.

In countries where mechanical equipment is difficult to obtain and the above methods appear sophisticated, a combination of burning and burial has been used successfully to dispose of pig carcasses and would be suitable for small ruminants and possibly small numbers of cattle as well. After the trench had been dug, it was lined with old motor tyres, on which the carcasses were placed. The carcasses were soaked with diesel and ignited with a small amount of petrol. Fires were watched until the carcasses were burnt and then the trench was covered over.

Rendering

Rendering may be an option for the disposal of carcasses if suitable Oplants are available. Only rendering plants using a high-temperature batch-rendering process should be used. A satisfactory rendering process would involve grinding of the raw product, solvent extraction of lipids at about 100°C for one hour and high temperature (160°C) treatment of both carcass meal and tallow for at least a further 40 minutes.

The end product of rendering must pass relevant microbiological tests before release.

Composting

Composting is a natural process whereby beneficial microorganisms decompose and transform organic materials into a useful and biologically stable end product that is safe for the environment. The process, if carefully implemented and monitored, generates sufficient heat to destroy most pathogenic organisms. Composting has been successfully used to dispose of animal waste and carcasses as an alternative to burial or burning. Composting should be done in a secure area not accessible to susceptible animals.

Disposal of animals - Special consideration

All contaminated and potentially contaminated carcasses, animal products, materials and wastes should be disposed of by one of the methods outlined in **Methods of disposal**. Specific disposal considerations apply to the materials listed below.

Milk and dairy products

The disposal of milk products presents particular difficulties, because large volumes are often involved. It is essential that milk should be treated to inactivate any virus before disposal. Following inactivation, disposal options must be considered. Milk held on-farm is usually in small quantities and can be disposed of in the burial pit. On properties where carcasses are cremated, milk should be disposed of in the effluent pit.

Where there are large volumes of contaminated milk at dairy factories or in tankers, the milk should always be inactivated and then pumped into a shallow, fenced pit, which must be covered over when the milk has evaporated or seeped into the surrounding soil.

Effluent from washing at dairy factories presents special problems because of the sheer volume. Chemical treatment of large volumes of effluent may render it unacceptable to a sewage disposal unit but 0.2 percent citric acid should cause no problems. The danger from effluent is greatly reduced by dilution; above-normal quantities of water freely used in the usual cleaning processes will further reduce the danger.

Where effluent is normally irrigated over pastures, they should not be grazed for two weeks after treatment. Rennet, casein, whey or other wastes must not be sprayed over pastures, discharged into drains or fed to animals, unless treated with disinfectant.

Hatching eggs and hatchery waste

Before disposing of hatching eggs and hatchery waste in burial pits, all material should be macerated to ensure extinction of life. Assistance of the poultry industry should be sought for supply of suitable equipment and guidance on its use.

Effluent

Small amounts of solid manure may be disposed of by burial or cremation.

Wool and mohair

If required, these byproducts should always be buried because they do not burn well.

Valuation and compensation

The **Animal Health Act, Act No. 1 of 2013**, provides that an owner may, under certain circumstances, be entitled to compensation for the destruction of any animal, animal product, restricted material or other thing that is destroyed by or at the direction of a veterinary official for the purpose of controlling a disease.

Details of eligibility, limitations and procedures for valuation and payment of compensation are set out in the Act and in contingency plans for specific diseases.

Livestock management and welfare

Although disease control and eradication is the major objective in any emergency animal disease (EAD) response, the maintenance of acceptable animal welfare standards should be an integral part of that goal.

Whatever the circumstances, animal welfare should always be regarded as a high priority. All livestock (including those intended for euthanasia) have basic welfare needs, such as:

- adequate feed and water;
- adequate space;
- freedom from pain, injury, disease and obvious discomfort;
- freedom from unnecessary fear and distress; and
- the ability to express normal patterns of behaviour.

During an EAD outbreak, difficulties can arise through movement restrictions and feed availability. Animals can quickly become overcrowded, impacting on animal welfare standards.

It is important to pre-empt any animal welfare problems before they are allowed to develop. Decisions need to be based on sensible management strategies, relevant information about each property, rigorous risk assessment, and a timely, transparent and auditable decision-making process.

The aim is to ensure:

- destruction of the minimum number of non-infected animals or suspects during the EAD response;
- maintenance of acceptable animal welfare standards for all livestock species, without compromising disease control and eradication efforts;
- effective management of animals within restricted areas and elsewhere, based on sound risk assessment, to avoid later welfare problems; and
- best use of available resources (personnel, infrastructure, feed and water).

Animal welfare is a shared responsibility of everyone involved. However, as in other emergencies such as flood, fire or drought, the owner, manager or custodian of the animals involved has primary responsibility (duty of care).

Designated animal welfare personnel should be based at appropriate locations to provide advice and coordinate actions aimed at avoiding welfare problems.

It is also imperative that everyone involved in the EAD response is aware of the importance of animal welfare and the need for accurate, reliable information on which to base decisions. All field operatives should report any concerns about existing or potential animal welfare problems to an animal welfare officer (AWO).

Animal welfare and ethics in an EAD response

It is important that animal welfare is taken into consideration during an EAD response. The fate of disease-free animals, should be based on scientific evidence and social, economic and ethical considerations.

Whilst a lower standard (compared to the normal standard) of welfare may be tolerated during an emergency, no animals should be subjected to inhumane or crowded conditions for an extended period. Contingency plans designed for the the survival of the greatest number of animals should be documented, with the appropiate personnel aware of these plans.

The incursion of an EAD will result in three types of emergency:

- disease control and eradication, focused primarily on infected and high-risk properties;
- general financial emergency (market collapse) affecting all sectors of the production chain, but especially producers;
- welfare problems as a consequence of movement restrictions and inability to dispose of growing stock or obtain normal feed supplies.

In emergencies, animal welfare is at greater risk than usual. The speed of events can place great pressure on everyone, especially owners or custodians of animals that might be at risk. This pressure can be increased if there is a rapid deterioration in market conditions, which can lead to animals and animal products losing value overnight.

The risk will be greatest in intensive production systems.

Despite the considerable stress imposed on owners and managers during an animal disease emergency, every effort should be made to ensure that all animals receive a reasonable level of care and attention. It may be necessary to defer some routine husbandry procedures or veterinary treatments.

Emergency Response - Stand down phase

The Stand-down Phase occurs when the threat from a key notifiable animal disease is no longer present and/or most key notifiable animal disease investigation and operational activities cease.

When a key notifiable animal disease is not confirmed

When investigations do not confirm the presence of a key notifiable animal disease, the CVO will need to ensure that those people and agencies contacted during the **Alert Phase** are notified that the disease has not been confirmed and that the emergency no longer exists. A debriefing should be conducted within 30 days of stand-down. All records should be filed as a `negative emergency disease alert' for reporting.

When an key notifiable animal disease is confirmed

Towards the end of the **Operational Phase**, activities on IPs or dangerous contact premises (DCPs) and in the field, requiring fewer resources. Managers at all operational levels need to ensure that resources (staff and physical) match operational requirements. In this process:

- a written plan must be developed;
- there must be a systematic approach to winding-down operations;
- the wind-down must be official and managed by a Chief Veterinarian and a Control Animal Health Technician;
- the wind-down should occur as soon as operational objectives are being achieved, rather than afterwards;
- all records relating to the incident must be collected and filed;
- personnel should be involved in a debriefing;
- a final operational and financial report must be prepared; and
- outstanding tasks must be handed over to staff in normal operational positions.

Checklist - Chief Veterinary Officer

Investigation Phase

- Initiate procedures to confirm the incident.
- With DVS Management Team, Chief Veterinarian and State Veterinarian, develop a strategy for the disease investigation.
- Arrange for the collection and submission of samples by a diagnostic team or Chief Veterinarian to the relevant veterinary laboratory for diagnosis.
- Meet with senior staff to:
  - define the incident and confirm the investigation response; and
  - assess the incident to determine appropriate resource allocation.
- Consider a confidential brief to other CVOs and those industries potentially affected. This will need to be done before releasing information to the public.
- If appropriate, brief:
  - Permanent Secretary;
  - Minister;
  - the CVL and regional reference laboratories.
- Maintain a suitable response until the incident is fully defined and categorised.

If a negative diagnosis is established, the CVO's notes and any other reports should be filed as a 'negative emergency disease alert' for reporting in the format agreed by the National Animal Health Information System.

Alert Phase

- Confirm availability of members of the RDEC and place them on stand-by.
- Convene a meeting of the NDEC.
- Request a meeting of the appropriate control committees.
- Direct the DVS management team to begin preparation of the emergency disease response plan.
- Appoint an interim media spokesperson within DVS who will liaise with MAWF media liaison officer.
- Direct the DVS management, and both the Chief Veterinarian and the State Veterinarian to assess personnel and resources required should the response be elevated to the Operational Phase.

If a negative diagnosis is established, the CVO's notes, and any other reports, should be filed as a 'negative emergency disease alert' for reporting in the agreed format.

Operational Phase

If the presence of an EAD is confirmed or otherwise determined, the CVO will direct that the Operational Phase be implemented.

The CVO needs to notify the NDEC within 24 hours.

The key actions to be carried out by the CVO in the Operational Phase (unless already completed) are as follows:

- Advise the relevant minister's office and department's executive management.
- Arrange all necessary legislative matters to initiate the EAD response, including:
  - necessary proclamations to declare the existence of the EAD in the jurisdiction;
  - the implementation of a movement restrictions and
  - initiation of necessary funding arrangements.
- Approve the emergency animal disease response plan and submit it to control committee.

- Delegate responsibility for the management of normal animal health programs in nonaffected areas.
- Conduct ongoing activities as detailed in the CVO role description.

Stand-down Phase

The CVO should consult with the NDEC to ensure that a debriefing of all staff who worked in the EAD response is conducted. Participants should include senior departmental managers and RDEC members and DVS staff.

Checklist - Chief Veterinarian

Checklist for Chief Veterinarian

Investigation Phase

- Analyse and seek clarification of information provided by the State Veterinarian. Analyse and evaluate initial details reported by the State Veterinarian.
- If necessary, notify the CVO of the suspicious disease incident and actions being taken.
- Provide support and resources to the State Veterinarian as required.
- If required, take steps to limit the spread of disease by instructing the State Veterinarian to do some or all of the following:
  - stop stock and product movements into and out of suspect premises or suspect areas by the imposition of quarantine;
  - allow the movement of people such as the owner or veterinarians into or out of the suspect premises or areas subject to specified conditions;
  - identify urgent trace-forwards and trace-backs; and
  - identify risk establishments that may be important in disease spread.
- Maintain a diary of events.

Alert Phase

When the CVO declares an Alert Phase, the Chief Veterinarian must refer to the appropriate contingency plan for specific actions, and then proceed as follows:

- Analyse and evaluate the information collected by the Chief Veterinarian and notify the CVO as quickly as possible.
- Take appropriate action on traces and risk establishments to limit the spread of the suspected EAD.
- Prepare recommendations for the declaration of restricted and control areas for submission to the CVO in line with procedures set out in the relevant contingency plan.
- Develop proposals for personnel and other resource requirements for:
  - RDEC operations; and
  - the remainder of the region.
- When requested by the CVO, advise the following people in the affected districts:
  - State Veterinarians;
  - local departmental personnel/management;
  - private veterinary practitioners;
  - key industry contacts;
  - local government;
  - police (emergency management) coordinator; and

- the relevant emergency management communications contact officer.

- The Chief Veterinarian should inform the people listed above:
  - that the situation is in the Alert Phase;
  - of the nature of the suspected EAD;
  - of the locations of the suspect premises; and
  - of any actions required of them.

Operational Phase

If an EAD is confirmed, the roles and responsibilities of the Chief Veterinarian will be taken over by the CVO, who will be responsible for ongoing communication with those people and agencies listed above. There should be a formal handover to the CVO after the declaration of the Operational Phase.

Stand-down Phase

If the presence of an EAD is not confirmed, those people and agencies previously notified must be advised by the Chief Veterinarian that the EAD has not been confirmed and that no further action is required.

Checklist - State Veterinarian

Investigation Phase

Where there are grounds for suspicion of an EAD, the State Veterinarian should notify a Chief Veterinarian, or if one is not available the CVO, of the details of the premises and suspected disease. The State Veterinarian should then do the following:

- Check to ensure that adequate supplies are carried in their vehicle (including protective clothing, disinfectant, equipment for collecting samples, appropriate forms, and the required contingency plan or this manual).
- Where possible, notify office staff of intended actions and request that the investigation be kept confidential.
- Go to the suspect premises.
- Leave vehicles outside the premises (where it is practical to do so). Leave a set of street clothes in the vehicle.
- Put on overalls (disposable) and clean waterproof protective clothing. Wash boots and waterproof protective clothing with disinfectant before entering the premises (see the **Decontamination** section).
- Take appropriate history.
- Examine affected and at-risk animals.
- If an EAD cannot be excluded, but is still considered a remote or low probability, collect appropriate samples in collaboration with relevant laboratory staff.
- If uncertain whether an EAD is involved and if further assistance is required, contact the Chief Veterinarian/CVO, who may arrange assistance from a diagnostic team after reviewing the case.
- To promote owner cooperation, discuss with the owner details of the disease suspected and the actions that will be taken.
- Notify the Chief Veterinarian or the CVO of the outcome of the investigation and provide details verbally, followed by submission of the following:
  - the owner's name, address, telephone number;
  - the nature of the disease suspected;
  - the exact location of the suspected case(s); findings from the examination of affected animals;
  - numbers and descriptions of affected and at-risk animals;
  - any need for quarantine;

  - any urgent tracings;
  - whether assistance is needed — for example, to muster stock;
  - decontamination that may need to be arranged for people, produce or objects that have left the property recently; and
  - the property NamLITS number(unique property identifier or GPS coordinates).
- Collect other information relating to the property to assist potential operations (eg electricity, access).

On leaving the property, the State Veterinarian (and the diagnostic team if one is appointed) should do the following:

- Give the owner departmental contact telephone numbers.
- Wash down and clean protective clothing and boots with a recommended disinfectant.
- Wash hands and exposed skin, and clean fingernails, with a recommended disinfectant.
- Supervise the same procedures for other people.
- Remove protective clothing, place it in a large plastic bag or garbage bin, and thoroughly soak it in a recommended disinfectant (see the **Decontamination** section).
- Avoid contact with any other susceptible species until cleared by the Chief Veterinarian.
- Maintain a written diary of events.

Alert Phase

If the CVO declares an Alert Phase based on the State Veterinarian/Chief Veterinarian report, in addition to the actions listed above, the State Veterinarian should do the following:

- Report to the Chief Veterinarian or CVO to fully describe the situation.
- Serve the owner or person in charge a notice of quarantine (if this has not already been done).
- Collect relevant history.
- Restrict the movement of people and animals within the premises.
- Restrict entry or departure of people, animals, produce and other things, appropriate to the specific disease and contingency plan.
- Arrange for the boundaries to be secured, wiring up or locking gates so that only one gate, which can be controlled, is left as an entrance to the premises.
- Identify susceptible wild (feral) animals on the premises and in the area.
- Present the diagnostic team (if one is appointed) with animals showing the full range of clinical signs.
- Where possible, move animals away from boundary fences to a central location, preferably to a site that will make any required destruction, disposal and disinfection easier.
- Ensure that a telephone (or other suitable communication device) is constantly attended.
- Before leaving the suspect premises, ensure that risk-based procedures are in place to allow personal/family movement on and off the property for essential purposes.
- When leaving the property, ensure that full decontamination procedures are followed.

Operational Phase

At the infected premises (IP), the State Veterinarian or their delegate must proceed as follows:

- Act as a site supervisor until relieved.
- Consult and liaise with the owner to plan IP activities, ensuring owner involvement to assist in recovery. This may include:
  - reinforcing the provisions of quarantine and ensuring adequate property security; and
  - implementing appropriate disinfection procedures (see the **Decontamination** section).
- Provide advice to the Regional Disease Emergency Committee (RDEC) (or the National Disease Emergency Committee (NDEC) if necessary) on the resource requirements for preliminary, but urgent, destruction and disposal of infected and at-risk stock and contaminated materials (where this is part of the contingency plan).

- Where possible and if not already done, confine all roaming stock.
- Make a preliminary assessment of suitable destruction procedures and locations (see **Destruction of animals**).
- Assess suitable sites for disposal of animals and contaminated materials.
- If necessary and possible, muster stock, beginning with the groups most at risk, to a central location that has been identified as suitable for destruction and disposal.
- Maintain records of any stock that die and compile an accurate inventory of remaining stock, including descriptions of animals for valuation purposes.
- Assess occupational health and safety risks for on-site operations.
- Ensure that a telephone or other means of communication is constantly attended, and that communications from the RDEC are delivered.
- Advise the RDEC (or the NDEC if necessary) of further urgent tracings and priority neighbouring premises that should be visited (e.g. downwind, downstream).
- Provide for the welfare of the personnel on the property by ensuring that their short-term needs for food and other requirements are met.

Checklist - Diagnostic Team

Information

The CVO will oversee the formation of the diagnostic team. The team should be briefed on:

- the name of the suspect premises (SP)
- the location of the SP (and directions to it)
- the details of the disease suspected and preliminary findings
- specific actions required of them
- quarantine and disinfection requirements for entry to and departure from the SP (see the **Decontamination** section)
- arrangements for the dispatch of samples for laboratory examination; and
- communications arrangements.

Equipment

The diagnostic team should ensure that they have available a clean vehicle and the following equipment:

- adequate protective clothing, overalls, rubber boots, hats and appropriate decontamination kit (see the **Decontamination** section)
- a previously prepared emergency disease diagnostic kit, including specimen advice forms, and photographic equipment with marine camera housing or a waterproof disposable camera;
- mobile communications equipment, if appropriate
- the relevant Disease Contingency Plan, if a particular disease is suspected
- appropriate containers and forms for International Air Transport Association (IATA) packaging of biological specimens; and
- appropriate maps.

Arriving at a property

On arrival at the SP, the team should:

- leave the vehicle outside the property if it is practical to do so
- change into clean overalls (disposable) and clean waterproof protective clothing, leaving street clothes in the car
- disinfect boots and waterproof protective clothing before entering the premises
- conduct examinations as required, and collect samples and additional information
- ensure that representative animals from each species are examined and sampled
- report the detection of clinical and pathological signs and significant epidemiological information immediately to the CVO or veterinary case manager
- collect detailed epidemiological information and provide a tentative assessment of the source of the infection and the probability of spread of the disease, including possible wild animal and risk enterprise involvement
- consistent with IATA requirements, pack samples into sealed containers that can be effectively disinfected off the premises
- decontaminate themselves and equipment thoroughly off the premises
- place protective clothing in sealed bags for further decontamination (the outside of the bags is to be subjected to appropriate decontamination)
- dispatch samples to the appropriate diagnostic laboratory approved by the CVO, in accordance with submission protocols and with a completed specimen advice form; and
- report to the CVO the findings of their investigations, including an assessment of the probability of an EAD and possible differential diagnoses.

Leaving a property

On leaving the property, the diagnostic team should:

- give the owner departmental contact telephone numbers
- wash down and clean protective clothing and boots with a recommended disinfectant
- wash hands and exposed skin, and clean fingernails, with a recommended disinfectant
- supervise the same procedures for other people
- remove protective clothing, place it in a large plastic bag or garbage bin, and thoroughly soak it in a recommended disinfectant (see the **Decontamination** section)
- avoid contact with any other susceptible species until cleared by the SVO
- maintain a written diary of events.

Checklist - DCHQ Director

Investigation Phase

The CVO may appoint an assistant in the Investigation Phase, such as a veterinary case manager. The advantage of this is that the case manager is fully informed and can quickly become a part of the response in the Alert Phase, in a position such as the DCHQ director.

Alert Phase

- Activate DCHQ section managers and, where required, seek their assistance to complete the tasks below.
- Instruct the SVO to advise stakeholders in affected areas as detailed in the Checklist for senior veterinary officer.
- Analyse and evaluate the information collected by the FVO.
- Begin preparing an initial report for submission by the CVO to control committee, and begin development of the EADRP.
- Develop proposals for personnel and other resource requirements for LDCC operations.
- After consultation, consider the boundaries of any RAs or CAs that may need to be proclaimed if the diagnosis proves positive, and prepare proformas for proclamation in conjunction with the department's senior legal officer.
- Investigate the status of urgent tracings and ensure that they are investigated appropriately.
- Consider the imposition of a standstill order.
- As required, help the LDCC controller and emergency services to select a suitable site for the LDCC.

Operational Phase

- Activate any emergency management arrangements and ask authorities to appoint liaison officers.
- Notify all stakeholders that the incident status has changed from Alert Phase to Operational Phase.
- Expand the management of the DCHQ and appoint personnel to key positions.
- Instruct the LDCC controller to establish the LDCC and take charge of operations in the RA.
- Advise key department staff of the EAD situation; the controls and restrictions on animals, animal products and animal-related movements; and the potential need to provide staff to the LDCC and DCHQ.
- Ensure that media releases are prepared, including technical information, and initiate press conferences (see Communication).
- Inform DCHQ management:
  - of the nature of the EAD that has been declared and that the response is in the Operational Phase;
  - of the location of the IP;
  - of the location and contact telephone and fax numbers of the LDCC and DCHQ;
  - of the boundaries of the RA and CA and conditions that apply therein;
  - of the need for departmental officers not involved in disease control activities to cease further visits to properties with susceptible species in the RA (depending on the specific threat);
  - that urgent property visits may be carried out in the CA subject to full decontamination procedures on entering and leaving properties (depending on the specific threat);
  - of the need to report suspicions of disease and provide information as required;
  - of any actions required of them; and
  - of the names of media contacts and key spokespersons.
- Arrange for the appointment (gazettal) of interstate and other appropriate personnel as inspectors under the relevant legislation.
- Arrange for approved valuers to be appointed under the relevant legislation if appropriate.
- Arrange for all urgent tracings outside the RA to be followed up appropriately.

- Oversee the implementation of a standstill order.
- Conduct ongoing activities detailed in the role description for the DCHQ director.

Stand-down Phase

- Close the DCHQ:

As operations wind down, the DCHQ will require fewer staff and will eventually be stood down on the direction of the CVO.

Records

The DCHQ director must ensure that all records relating to the EAD response are held securely so they are available for future retrieval.

Debriefing

The DCHQ director, after consultation with the CVO, should arrange for a debriefing of all staff who worked in the DCHQ. Depending on the scale of the response, this may include senior department managers and/or LDCC operations staff.

Checklist - LDCC controller

Alert Phase

- The LDCC controller is appointed and activated by the CVO early in the Alert Phase.
- The controller identifies likely LDCC sites and determines personnel requirements. Personnel are put on stand-by and the LDCC is scaled up to a level commensurate with suspicion of an EAD.

Operational Phase

The LDCC controller should do the following:

- Coordinate the establishment of an LDCC (See Section 3.2 and Appendix 12).
- Ensure that an incident action plan is developed for field operations — both short term (one shift) and longer term (eg one week).
- Ensure that the DCHQ is kept up to date on field operations.
- Ensure that the following people and agencies within the RA are informed of the details of the incident action plan and of a time and place for an initial briefing:
  - local departmental managers;
  - local government;
  - police (emergency management) coordinator for the district or region;
  - regional emergency services officer (who should also be given a preliminary list of resources required);
  - appropriate industry contacts; and
  - risk enterprise managers.
- Ensure that private veterinary practitioners, district departmental staff and other key industry contacts in the affected area are advised:
  - that the contingency plan is in the Operational Phase;
  - of the nature of the disease that has been confirmed;
  - of the location of the IP;

    - of the boundaries of the RA and CA and conditions that apply in these areas;
    - of details of stock standstill arrangements;
    - of the location, telephone and fax numbers, and email addresses of the LDCC;
    - that no visits are to be made to properties with susceptible species within the RA unless a written permit has been issued by the LDCC RAMS unit;
    - that any suspicions of disease must be reported immediately to the LDCC and the person reporting must remain on the premises until the LDCC controller, operations manager or veterinary investigations manager gives them permission to leave; and
    - of the contacts for all media enquiries.
- Confirm the following particulars with the DCHQ:
    - the declaration of the RA and CA and the conditions, including stock standstill arrangements, that apply in these areas;
    - the location, telephone and fax numbers, and email addresses of the LDCC and DCHQ;
    - resource requirements and supply (personnel and equipment); and
    - any urgent tracings on or off the IP that need to be referred to the DCHQ.
- Ensure that personnel involved in the EAD response are aware of their duties and powers by activation of job cards. Inform them how long they are likely to be required and what they should bring with them (extra clothing, money, protective gear, postmortem kits, state/territory action plans, job cards and so on).

Stand-down Phase

- **Close the LDCC**: As operations wind down, the LDCC will require fewer staff and will eventually be stood down on the direction of the CVO.
- **Records**: The LDCC controller must ensure that all records relating to the EAD response are held securely so they are available for future retrieval.
- **Debriefing**: The LDCC controller, after consultation with the CVO, should arrange for a debriefing of all staff who worked in the LDCC. Depending on the scale of the response, this may include senior department managers and/or DCHQ operations staff.

Movement Controls

NamLITS

Namibia Livestock Identification and Traceability System

[Information from **DVS Annual Report 2011**]

The Namibia Livestock Identification and Traceability System (NamLITS) was implemented in all farming areas south of the veterinary cordon fence from 1st of February 2006.

Ownership Identification

The Stock Brands Act 24 of 1995 requires owners of livestock (cattle, sheep and goats) to register stock brand symbols with which they imprint on the animals or on eartags to identify ownership. In cattle, the stock brand symbols are marked on the bodies of the animals using hot irons. Identification of ownership in sheep and goats is done using approved ear tags bearing the owner's stock brand symbols or, alternatively, the symbols are tattooed inside the pinnae of the ears. This identification system is mandatory from the age of six months in cattle and three months in sheep and goats. However, if a producer intends to remove livestock from any holding before they reach the prescribed age for marking, it is mandatory to mark with the owner's registered stock brand symbols before the intended removal. This identification is also currently used to verify the herd or flock of origin.

Individual Identification of Cattle

All Namibian-born cattle moving from their herd of origin are individually identified using officially-approved tamper-resistant and tamper-evident yellow plastic ear tags bearing a unique set of numbers comprised of the owner's registered stock brand code and a unique serial number laser-printed in black. All imported cattle are individually identified by means of an official green plastic tag bearing the DVS logo and a unique serial number laser-printed in black.

Individual Identification of Small Stock

The sheep and goats in Namibia are largely identified by means of a group identification system based on the owner's registered stock brands as described above. However, imported sheep and goats, and Namibian-born ones being moved from the FMD buffer zone are required to be individually identified. Individual identification in small stock is done by means of a brass tag bearing a unique set of numbers.

Holding registers and animal movement documents

Holdings Database

The computerized NamLITS® database has an extensive database of all holdings where livestock can possibly be kept either on a permanent or a temporary basis. The database includes holdings where animals are kept such as farms, communal areas, feedlots and transit locations such as auctions, exhibition grounds, slaughter and export collection centres, cordon entry points, border posts, quarantine camps, auctions, abattoirs and other slaughtering facilities.

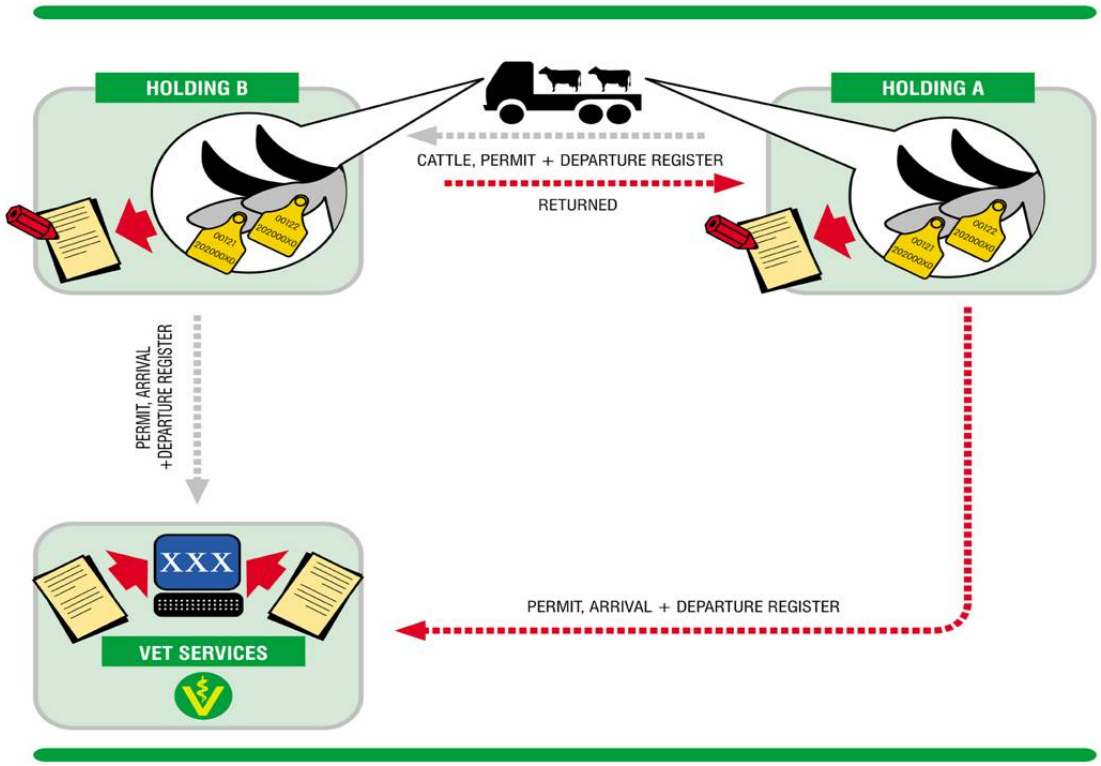
Basic information about all these holdings includes name, location number, GPS readings, a unique NamLITS® property code, owner/manager, contact details, the veterinary office carrying out routine inspections, state veterinary

district, magisterial district and the political region. These details ensure that the holding is located within a short time when a need arises. All livestock owners are linked in the NamLITS® system to the holding or holdings where they keep livestock. This ensures accountability for all animal health reports and movement transactions.

Animal Movement Control Documentation

All animals leaving any holding are required by law to be accompanied by a valid and properly-endorsed veterinary movement permit. The permits are obtained from any DVS office or from any authorised DVS official. The permit is strictly valid for a period of 14 days from the date of issue. All cattle leaving any holding must be accompanied by a **Departure Register**, a declaration on which the ear tag numbers of all the cattle being moved are correctly recorded by the producer. Upon arrival at any holding, ear tag numbers of all the cattle arriving on this consignment must be correctly recorded in an **Arrival Register** by the producer. The livestock movement permit, along with the original copies of the Departure and Arrival Registers must be submitted to the destination DVS office within 28 days from the date of issue. The period within which to notify the database of animal movements is likely to be reduced to 21 days.

Generic Flowchart of Animal Movements and Reporting Requirements



Livestock Gatherings

INTRODUCTION

Regulations 7, 8, 9 and 10 under the Animal Identification Regulations that were gazetted in March 2009, under section 27 of the Animal Diseases and Parasites Act 13 of 1956, empower the Directorate of Veterinary Services (DVS) to regulate all animal gatherings events. This circular is the updated version of The Auction Protocol and it outlines the veterinary requirements at all livestock gathering events, including auctions, hereinafter referred to as ***events***. It supersedes Circular V3/2008 dated the 8th February 2008 and should be read in conjunction with the following circulars:

- **V12/2005**: *Traceability Requirements for Livestock Auctions and other Public Livestock Sales*.
- **V7/2010**: *The use of Red Cross permits and handling animal disease exceptions in the field, abattoirs, farms, quarantine camps, border posts and auctions or scaled permits*.

The transportation and mixing of livestock from different sources can potentially result in the spreading of animal diseases. Any potential infectious agents can effectively be concentrated at auction pens and be redistributed around the country to premises buying livestock from auctions. The role of DVS at livestock auctions is to monitor animal health and to mitigate the risk of spreading animal diseases.

This Auction Protocol has been prepared by DVS and it stipulates the veterinary requirements under which livestock auctions are to be conducted in Namibia. It also covers the roles and responsibilities of key parties involved in livestock auctioneering. The protocol largely applies to livestock auctions and any other livestock gathering events like scale permit days, livestock shows, ox competitions and breed assessments.

All stakeholders are kindly urged to read and understand this protocol, which sets conditions for approval of livestock auctions and any other animal gathering events. All parties must take note of their responsibilities in meeting the requirements spelt out in this protocol and to take all reasonable steps to ensure that all conditions outlined in this protocol are met and adhered to by all those attending approved livestock gathering events. Therefore stakeholder cooperation with the attending veterinary official and support to his/her efforts in discharging his/her responsibilities without undue interference is of paramount importance.

from draft **Standard Operating Procedures for Livestock Gatherings**, dated 24 November 2010.

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Livestock Gatherings General

General conditions under which approval shall be granted to hold livestock auctions, and wherever applicable, scale permit days, livestock shows, ox competitions, breed assessments or any other livestock gathering events, include the following:

1. Only the establishments that are licensed by the Chief Veterinary Officer can be used for animal gathering events. The application for such a licence must be lodged with the nearest State Veterinarian where the establishment is located.
2. The organiser of an animal gathering event, hereinafter referred to as the 'organiser', shall appoint a person to monitor compliance with veterinary requirements and serve as the contact person to liaise with the attending DVS official;
3. The organiser shall take all reasonable steps to prevent the spreading of animal diseases onto, within and out of the auction pens or any other land on which animal gathering events are held;
4. The organiser shall take all reasonable steps to ensure that all people attending the auction comply with all veterinary requirements;
5. The organiser shall take all reasonable steps, including taking action such as warning anyone violating veterinary requirements to ensure that animal owners, buyers, stockpersons, and visitors comply with the conditions of each animal gathering event; and
6. The organiser shall ensure that all staff members handling livestock are clearly identified and their contact details are kept.

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Livestock Gatherings South of VCF

General Instructions for livestock gatherings in the commercial area south of the VCF

1. All animals brought in for the livestock gathering event may only be allowed to do so under the cover of a valid veterinary movement permit, together with a fully completed Departure Register (DR) in case of cattle, applied for with the permission of the organiser. Animals brought in for auction may only be sold through the auction system.
2. All cattle must be transported under the cover of a valid and fully endorsed movement permit and identified using official ear-tags in addition to a **legible registered stock brand (or tattoo in case of stud auctions)** before being transported. All cattle ear-tag numbers must be recorded on movement registers.
3. Small stock must be transported under the cover of a valid and fully endorsed movement permit and be identified using approved ear-tags or legible tattoos applied in the prescribed manner. Movement registers do not apply for small stock (sheep & goats) movements.
4. For **stud animals**, which are at a **stud auction**, and are to be **sold solely for stud purposes**, the use of tattoos that are registered with both an officially recognised breeders' association and according to the Stock Brands Act is a permissible replacement for a hot iron brand mark. Therefore, under these circumstances the branding of stud animals is **not** required. However, the cattle would still be required to be identified with official ear-tags.
5. Stud animals that are to be sold for commercial purposes should be treated like any other cattle.
6. Ear tagging, branding or tattooing of auction animals at the auction pens is strictly prohibited.
7. The use of movement registers and official ear tags does not apply in the case of game animals, although they must be transported under the cover of a valid and fully endorsed veterinary movement permit.
8. Livestock at auction pens can only be given permits out of the auction pens to the destination indicated by the auction-buyers or back to the farm of origin (for auction-disqualified livestock or animals whose bid-price the

owners rejected).

9. Private sale of disqualified livestock at auction pens after or during the auction before they are taken back to the farm of origin is not permissible.

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Livestock Gatherings Auctions

APPROVAL OF AUCTION PROGRAMS

All public livestock sales must be attended to by a DVS official. In order to facilitate planning, anyone intending to hold a livestock auction or any other animal gathering event must submit a proposed program for approval as follows:

1. Those intending to hold at least two or more livestock auctions per year must apply to DVS by submitting a proposed Annual Auction Program to the local State Veterinarian on or before the **30th November** of the preceding year, indicating the intended date, time and venue for each auction.
2. Persons holding ad hoc auctions or other animal gathering events (no more than once per year) must apply in writing for approval to hold such event from the local State Veterinarian, at least **two weeks** before the intended date.
3. The auctioneers must confirm each auction date in each Annual Auction Program, in writing, at least **two weeks** before the intended auction date.
4. If it is foreseeable that an auction or other animal gathering event will fail to materialise, the state veterinary office must be informed at least **two working days** in advance.
5. In the event that the auction or any other animal gathering event fails to materialise without prior notice to the state veterinary office, the applicant may be required to cover costs incurred by the state in facilitating the presence of the attending DVS official at the auction or event.

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Livestock Gatherings Veterinary Inspections

Veterinary inspection of livestock at auctions is part of the national animal disease surveillance strategy and it is a service to producers meant to reduce the risk of spreading animal diseases. These inspections also help to protect producers from buying infected or sick animals, or contaminating the auction pens.

1. In order to facilitate proper veterinary inspections, all animals must be delivered to the auction pens by 18:00hrs or before sunset on the day before the auction or event. In exceptional instances, specifically authorised by the state veterinarian, animals may be offloaded and penned no less than 3 hours before the auction commences.
2. All animals must be physically inspected by a DVS official for signs of any notifiable disease or heavy infestations with external parasites immediately after unloading.
3. Any sick animal or any animal exhibiting signs of any notifiable disease or other infectious and contagious diseases must be isolated from other livestock and receive prompt veterinary attention. The state veterinarian must be immediately notified for further action.
4. All animals must be inspected to check for injuries and fitness for further transportation.
5. The organiser must ensure that livestock found to be infected with or suspected to be infected with or showing signs of any notifiable or other infectious and contagious diseases are removed from close proximity with other animals and taken to a separate pen reserved for that purpose. This has to be done prior to commencement of the event
6. The organisers must ensure that all necessary assistance is provided for the physical inspection of livestock by the DVS official.
7. All animals disqualified from the event by the attending DVS official must be handled as follows:
    1. The animals should be moved to a separate pen before the commencement of the event.
    2. After the event, the animals must then be consigned back to their farm of origin under the cover of a Red Cross permit.
    3. The State Veterinarian of destination must be notified accordingly.
8. Any cattle found dead on arrival which are at least two years old should be sampled for BSE according to the BSE surveillance Programme (see **Circular V11/2006**). The rest of the carcass should be disposed of under DVS supervision by burning or burying.

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Livestock Gatherings Traceability

In order to allow for the rapid and accurate tracking and tracing of livestock in the event of a suspect or confirmed notifiable or other infectious and contagious diseases disease outbreak, traceability requirements must be met as described below.

Animal Identification

In addition to physically inspecting brands in order to verify ownership prior to the animal being offered for sale, the organiser must check for compliance with the identification requirements for traceability.

1. The organisers must not receive or cause the reception of sheep or goats without clear registered brand marks that are tattooed in their ears or imprinted on approved ear tags
2. The organisers must not receive or cause the reception of cattle of any age without individual identification by means of approved ear tags.
3. In addition to bearing approved ear tags, all cattle must have clear registered brand marks imprinted in a prescribed manner.
4. **The registered owner of brand marks on the animals should correspond with the owner of the animals presented for the event.**
5. In the case of pedigree animals, the brand marks may be imprinted as prescribed by a breeding society recognized by the Registrar of Stockbrands.
6. The attending DVS official will physically check animals for compliance with all identification requirements. Animals not identified in accordance with the current requirements will be declared not eligible for sale.
7. All disqualified animals must be handled as outlined in Veterinary Inspections, paragraph 7.

Documentation

1. The organisers must verify that all permits are valid and properly endorsed when receiving all consignments of animals.
2. In the case of individually identified animals such as cattle and imported small stock, the permits must be accompanied by completed movement registers.
3. The organisers must verify the ear tag numbers of individually identified animals and confirm the movement register (prepare an **Arrival Register**) and prepare an **Auction Roll**.
4. All relevant documents must be presented to the attending DVS official before livestock inspections.
5. Producers must be notified of any discrepancies between **Departure Registers** and actual animals received to enable them to update their farm records.
6. The attending DVS official will physically check animals against the **Auction Roll**, permits and movement registers to ensure compliance. Incomplete movement documents may result in the animals being disqualified.
7. In all cases, the organisers must furnish anyone removing individually identified animals (cattle and imported sheep) from auction pens with a movement (departure) register for each consignment.
8. No person shall transport or cause the transportation of livestock from a gathering without a valid movement permit and a departure register.

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Livestock Gatherings Facilities and Welfare

Any facility intended to be used for the purposes of holding a livestock auction or other animal gathering event and all operations at the event must meet the following basic requirements and welfare considerations:

1. Handling facilities, pens and passageways must be free of sharp edges or projections and arranged such that injury to animals is avoided.
2. Loading bays must be designed to prevent injury to animals, ease of movement of stock and have non-slip ramps with side protection where appropriate.
3. There must be necessary handling facilities for veterinary inspection and treatment of livestock including an isolation pen for unfit animals.
4. Any animal not deemed fit to be sold should be notified by the auction management to the attending DVS official who will take appropriate action.
5. Any sick or injured animals must be treated appropriately, or placed in an isolation pen, in order to avoid unnecessary pain or distress.
6. All livestock must be loaded, unloaded, and handled with great care ensuring that animals are handled calmly and systematically in an unhurried manner.
7. Pens must be of a suitable size for the animals it contains and must not be overcrowded.
8. All penned livestock must have access to water at all times.

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Livestock Gatherings Biosecurity

The transportation and mixing of livestock from different sources at auctions or other animal gathering event can potentially result in the spreading of diseases. Below is a list of measures that must be put in place to prevent the spreading of diseases:

1. All reasonable steps must be taken to ensure that no livestock infected with or suspected to be infected with or showing signs of any notifiable or other infectious and contagious diseases may knowingly be offered for sale at an auction.
2. Any sick animal must be isolated from other livestock and receive prompt veterinary attention.
3. All reasonable steps must be taken to ensure that no person handles animals or enters pens unless the person is the owner of stock, employed by the auction operator or is a veterinary official.
4. Persons attending auctions are a potential risk for transmission of animal diseases. Therefore the auction management must not allow visitors to enter pens or touch animals unnecessarily.
5. The auction management must ensure that facilities are kept reasonably clean.
6. Transporters must make effort to clean their trucks after moving livestock to and from the markets.
7. The auction management must provide decontamination facilities for use in the event that a notifiable disease is detected at the animal gathering event.

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Livestock Gatherings Beforehand

Controls before the livestock gathering event

Responsibilities of the organiser of a livestock gathering

1. To explain to all their clients the requirements for livestock to qualify for the event as outlined in this document before permits are obtained.
2. Inspect all livestock and movement documents at off-loading to ensure that they are covered by fully and correctly endorsed movement permits, movement registers (**Departure Registers**), bear legible hot iron brand-marks or approved tattoos in case of stud cattle at a stud auction, and have official ear-tags (cattle). All small stock must be marked with legible ear-tattoos or approved metal ear-tags bearing the owner's brand mark.
3. Confirm the movement register. Compile the **Arrival Register (AR)** for each incoming cattle consignment.
4. Disqualify all livestock without a complete set of movement documents or incomplete or partially complete movement documents or with illegible brand-marks. Disqualified animals must be moved to separate holding pens reserved for such animals.
5. Reserve specific holding pens for disqualified animals and present these animals to the veterinary official for inspection.
6. Ensure that all animals intended for auction are off-loaded by the **evening of the day before the auction**. In areas where this may not be logistically feasible, prior arrangements can be made with the local State Veterinarian, but no animals shall be off-loaded less than 3 hours before the scheduled commencement of auction.
7. Inform auction-disqualified livestock owners of the disqualification and report the disqualifications and reasons thereto to the veterinary official presiding over the auction,
8. Compile and hand-over an **Auction Roll**, all permits and movement registers to the presiding veterinary official **at least two hours** before the commencement of the auction.
9. Issue movement registers (Complete **Departure Registers**) for disqualified cattle before the event commences.
10. Ensure that all animals intended for auction have been processed (marked with Lot numbers etc.) and are ready for inspection by the veterinary official, at least two hours before the commencement of the auction.
11. Ensure that owners of disqualified livestock obtain movement permits and Movement (Departure) Registers back to their farms of origin as well as to inform them that their livestock may under no circumstances be sold to third parties.

Responsibilities of veterinary officials

1. Arrange **regular** spot-checks or roadblocks a day before the auction to ensure that movement permits collected by auctioneers, on behalf of their clients, actually accompany the animals destined for the auction. If necessary, the assistance of the police should be arranged beforehand.
2. Receive the Auction Roll and all permits with attached movement registers from the auctioneer **at least two hours** before the start of the auction,
3. Inspect all livestock in auction pens for notifiable diseases, heavy tick infestation, growth hormone implants, illegible brand marks, ear-tags, injuries, missing ear-tags and any other problems before taking appropriate action.
4. **Mouthing** of some of the animals should be part of any routine auction inspection.
5. Ensure that all animals are fit for sale and transportation,
6. Ensure that all disqualified livestock are removed from the auction pens to the holding-pens reserved for that purpose and are issued with Red Cross permits, back to their respective farms of origin, **before the commencement of the auction**.
7. Verify and ensure that disqualified animals are loaded and transported back to their farms of origin at the end of the auction.

8. A record of any disqualifications, including reasons thereof, should be kept. Inform the state Veterinarian at destination of this movement, so that he / she may take the appropriate action according to **circular V 7/2010**.
9. Check all documents received from the auctioneer. Complete the Auction Register into the auction “permits-in” and reconcile with the Auction Roll,
10. Authorise auction process to commence after verifying and reconciling all documents.

Responsibilities of the farmers

1. Understand and adhere to the conditions regarding livestock auctions as prescribed in The Auction Protocol.
2. Obtain movement permits for their livestock to be auctioned, from the State Veterinary Office, independent of the auctioneer, if no prior arrangements had been made with the auctioneer to obtain the permit.
3. Fully endorse movement permits and complete movement (Departure) registers for animals leaving the farm for auctioning,
4. Apply for and obtain movement permits from the veterinary official for animals disqualified from the auction, back to their farms of origin.
5. Farmers should ensure that all animals leaving their farms are clearly branded and ear-tagged.

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Livestock Gatherings During

Responsibilities of the organiser of a livestock gathering event

1. Handle the animals humanely.
2. The organiser should ensure that each lot offered for sale does enter the auction pen as per details indicated on **Auction Roll**.
3. Record all data for animals sold, not sold, and disqualified.
4. Prevent offloading and entry of animals into the auction facilities while the event is in progress.

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Livestock Gatherings After

Controls after the livestock gathering event

Responsibilities of the organiser of a livestock gathering

1. Issue movement (Departure) Registers and the movement permits where applicable for all sold and unsold cattle to their respective destinations,
2. Submit the **Auction Summary Report** to the presiding veterinary official immediately after the auction.

Responsibilities of veterinary officials

1. Issue permits to livestock buyers or sign those issued by auctioneers -which ever is applicable and ensure that the appropriate movement (Departure) Registers are completed before a movement permit is issued.
2. Ensure that each buyer endorses the brand marks of livestock bought and their quantities onto the permits.
3. Ensure that all condemned animals are transported back to their farms of origin under cover of a Red Cross permit.
4. Complete and reconcile the Auction Register for all “permits-into” and all “permits-out” of the auction at the end of the auction, and finally reconcile this with the Auction Roll. Complete Auction Register within 48 hours after the end of the auction.
5. File the **Auction Roll**, the **Auction Summary Report** and the **Items Summary List** into the Auction File V13/13/2/1/5/3 within 72 hours after the end of the auction.
6. Submit the completed Auction Permit Register to CAHT for verification of correctness and endorsement.
7. Capture all movements onto the NamLITS and reconcile them **within three working days** after the auction.
8. Complete the DVS Auction Report within **one working day after the auction**.
9. Report NamLITS movement exceptions to the state veterinarian immediately for all non-reconciled movements into auction pens for resolution.
10. The State Veterinarian or a delegate must resolve or attempt to resolve all movement exceptions for each animal gathering event before the next event date. Assistance to do this should be sort from the NamLITS office when needed

Responsibilities of the buyers

1. Obtain movement permits, and movement (Departure) Registers (cattle) for all livestock bought at the auction from the veterinary official supervising the auction and the auctioneer respectively,
2. Fully endorse all permits before loading and transporting livestock from Auction Pens.

Responsibilities of the farmers

1. Apply for and obtain movement permits from the presiding veterinary official and movement (Departure) Registers (cattle) from auctioneer for their unsold animals back to their farms of origin, at the end of the auction.

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Livestock Gatherings Notification to NamLITS

The mixing of livestock from different sources can potentially result in the spreading of diseases around the country to farms buying livestock from auctions. In order to allow for the rapid tracking and tracing of livestock in the event of a suspect or confirmed notifiable or other infectious and contagious diseases disease outbreak, the NamLITS database must be notified of all movement transactions through auctions and other animal gathering events in a timely manner.

1. The organisers of a livestock gathering must ensure that the movement (arrival) registers are confirmed for all cattle received at and movement (departure) registers for all cattle removed from the event are forwarded electronically to the NamLITS database in the prescribed format within **three working days** of the end of the auction
2. The attending DVS official must ensure that all movement registers of consignments to and from an event are uploaded onto NamLITS by the auctioneers (captured) within **two working days**
3. The organisers of a livestock gathering, producers and buyers must be notified of any discrepancies and exception reports on movement registers in order to get confirmation of actual animals moved.

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Livestock Gatherings Final Remarks

1. The same basic principles outlined in this protocol also apply to game auctions, but only as far as it is practical.
2. Under regulation 10 of the Animal Identification Regulations of the Animal Diseases and Parasites Act 13 of 1956, the state veterinarian is empowered, for the purposes of animal disease control, to prohibit or impose restrictions on the holding of animal gatherings on a licensed establishment. It is noted that this Act has been replaced by the Animal Health Act, 2011. Further information can be obtained under the **Acts and Regulations** section.
3. Transporters should not load animals in their trucks without movement (Departure) registers and permits that have been properly endorsed by the farmer. Offices must ensure that such a declaration by the transporter is signed when transporters are registered.
4. Offices should ensure that stakeholders, especially auctioneers, sign a declaration acknowledging that they have read and understood this Auction Protocol and make an undertaking to comply with it.

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Border Posts Imports

1. The veterinary official shall verify all documents for compliance with import requirements by checking whether it is an original import permit (original pink stamp on the permit and health certificate), all pages are completed and signed by state veterinarian from country of origin.
2. Check also the name, species and number of animals, and animal products on the permit and consignment.
3. Ensure that consignments with incomplete documents or copies of import permits are not allowed entry.
4. With regard to products requiring refrigeration, the thermographs of refrigerated containers must be checked for compliance with import permit requirements. If this is not the case, this should immediately be reported to your supervisor.
5. Check whether the vehicle registration number and seals on the vehicle/cooling unit or consignment correspond with those endorsed on the permit.
6. Inspect live animals to ensure that they are not visibly sick or infested with external parasites. Report cases of sick and dead animals on the truck to your supervisor immediately.
7. In case of feed, check import documents and take a 50gram sample of the feed for laboratory analysis. Be sure to record the name of the manufacturer and all the details of the importer.
8. Vaccinate all imported cattle against CBPP and FMD. Record all vaccinations in the **vaccine register**.
9. All vaccines should be handled properly according to laid down procedures. For details, please see **Annex: Handling of vaccines**.
10. Brand all imported cattle with an [A] brand mark (if imported from Angola) on the left hand side of the neck.
11. Issue animal movement permits for the imported animals. A permit register has to be kept for all permits issued. See **Livestock Movements Permits Register (Exported Animals/Products)** and **Livestock Movements Permits Register (Imported Animals/Products)**.

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Border Posts Exports

1. Check whether the **export health certificate** on the import permit of the country of destination was completed and signed by a Namibian state veterinarian and in the case of livestock that they bear appropriate ear tags/brands. Any animals that do not bear an officially recognized stock brand should not be issued with a permit.
2. Checks that the vehicle/container transporting animals is clean (no wires or petrol drums loaded with the animals – animal welfare issues), disinfected and sealed. The seal numbers on the vehicle/container must correspond to the seal numbers endorsed on the permit. The driver should be in possession of a Certificate of Disinfection as proof. If that is not the case, then do advise and warn him if it is the first time. Record the case and allow him to proceed. However, if this happens for the second time, then insist on full compliance before he proceeds.
3. Collect the veterinary movement permits and also ensure that the export documentation complies with the import conditions of country of destination.
4. Animal products/feed/plants and plant products must be accompanied by an Original import permit. Verify all required conditions for compliance with the import requirements.

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Border Posts General

1. All consignments which do not comply with import permit requirements must be refused entry and sent back to country of origin or detained and confiscated.
2. Records of all transgressions must be kept and copies of reports of all incidents must be sent to your supervisor. A transgression register must be maintained for this purpose. See the **Transgression Register**
3. Maintain a record of all imported/exported animals and animal products in a register, and keep the registers clean, comprehensive, and in a safe place. The registers must be available on request for inspections when supervisors visit your offices. See **Livestock Movements Permits Register (Exported Animals/Products)** and **Livestock Movements Permits Register (Imported Animals/Products)**.
4. Vaccinate dogs against Rabies and keep a vaccination register. See **vaccine register**.
5. Compile a monthly report which should be ready by the 25th of every month in time for the monthly staff meeting. See **Monthly Activity Report: Northern Border Posts** for the format of the monthly report.
6. A copy of this SOP should be kept filed and be easily accessible at all times for easy reference.
7. Dress smartly (clean ironed uniforms) at all times with your Veterinary Services epaulettes and official identity card visibly pinned on.

Ensure that you always conduct yourself with respect and courtesy when dealing with members of the public.

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Border Posts Handling Vaccines

- Always keep vaccines and their diluents in cold temperatures (ice in cooler boxes or in refrigerators)
- Do not expose vaccines to sun rays especially when drawing them into syringes.
- Make sure you draw vaccines whilst in the shade
- Your body temperature may sometimes rise thus covering the syringe's barrel with your hand for a fairly long period may cause adverse effect on the vaccine.
- It is always recommended to use sterile needles when drawing vaccines into syringes. Therefore always change needles in this case.
- Use one needle only for one full crush then replace or after every 6-10 animals.
- Lift and pull the skin of the animal and at an angle of not more than 450 degrees or flat against the body and push in the needle next to your thumb before administer a vaccine. Make sure the needle does not protrude from the skin on the other side and is not into the muscle.
- Recommended sites for subcutaneous injection are the **dewlap, neck, shoulder, and the chest**. *But in the case of CBPP it is strongly recommended to inject behind the shoulder of the left forelimb*.

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Export of animals to neighbouring countries and from south to north of VCF

From Circular V17 of 2012: Conditions for exports of livestock from Namibia to neighbouring countries and movement of animals across the Veterinary Cordon Fence

Measures to be implemented for exports of livestock

No State Veterinarian should certify livestock for export before they are satisfied with the validity or the following documents:

1. Export Permit issued by Meat Board/Directorate of Planning (in compliance with Government of Namibia marketing requirements)
2. Livestock Improvement Permit issued by the Law Enforcement subdivision of Directorate of Extension and Engineering Services (in compliance with Livestock Improvement Act with regards to genetic material protection)
3. Original Veterinary Import Permit issued by the country of destination.

Movement permits to the border should only be issued if proof of final destination is provided in the form of an import permit from country of destination and a Veterinary Health Certificate. This is because border posts are not approved farming or grazing areas.

Controls at the border: Checking documents for export of livestock

Veterinary staff at the border must check that the following original documents are present and fully completed:

1. Export Permit issued by Meat Board/ Directorate of Planning (in compliance with Government of Namibia marketing requirements)
2. Livestock Improvement Permit issued by the Law Enforcement subdivision of Directorate of Extension and Engineering Services (in compliance with Livestock Improvement Act with regard material protection)
3. Original Veterinary Import Permit from the country of destination
4. Original Veterinary Health Certificate (issued by State Veterinarian of origin)
5. Original Movement permit
6. Departure register for individual livestock identification (a copy left at the VCF gate and the original at border exit point)

No movement permits should be issued to border posts and places near border posts unless conditions for moving to the NCA have been met as outlined below.

Movement of livestock from south of the Veterinary Cordon Fence to the Northern Communal Areas

All movements of animals from south to north of VCF should only be authorised provided the following documentation is provided to State Veterinarian of origin:

1. Written authorisation by the State Veterinarian of destination (a copy of this letter must be attached with the veterinary movement permit to be shown at the VCF gates).
2. Alternatively, a written authorisation by the Traditional Authority of destination (a copy of this letter must be attached with the veterinary movement permit to be shown at the VCF gates).
3. The State Veterinarian of destination **must** do spot checks on these animals to verify if really they are at their final destination.
4. A copy of the Veterinary Movement Permit must be left together with the departure/arrival register at the VCF gate and be send back to office of origin for capturing.

Records of authorisation should he kept on file and reported on in the monthly summary report.

The following movement to the NCAs will not be affected by the above measures:

1. Movement of few animals (five or less)
2. Movement to slaughter facilities - both formal and informal
3. Movement to auctions. However, movements of livestock from auctions will be subject to the above measures.

Movement of livestock (small stock) from NCA to south of VCF

All current measures and protocols remain unchanged and are not affected by the measures mentioned above.

Please note that State Veterinarians are ultimately responsible and accountable for implementation of above measures.

Quarantine Stations

General Guidelines

Agreement Form For Quarantine of Animals

1. Ensure that this document is fully explained to stock owners before it is signed.
2. Terms and condition therein are binding.

Herdsmen

1. Only one herder is allowed for every herd of between 1 to 25 cattle.
2. **Government responsibility:**
   - accommodation sites and field toilets,
   - supervision of treatments of small stock.
3. **Stock owners' responsibility:**
   - Food and camping equipment for herdsmen,
   - animal care: report all sick and dead animals to quarantine master,
   - Supplementary animal feed and lick for their animals,
   - Seals for sealing vehicles transporting animals from quarantine station, needles and syringes,
   - approved injectable parasiticides (Ivomec, dectomax etc) for small stock, parasiticide injections of small stock under the quarantine master's supervision,
   - disinfection of animal transporting vehicles,
   - ensuring that animals are collected from quarantine farm as soon as possible after the 21-day quarantine period,
   - owners will be charged a fee as per Agreement Form if their animals overstay.

Access to quarantine station by stock owners

1. Once a week as per agreement with quarantine master.

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Quarantine Stations Cattle

Intake of cattle – Individual owners

1. Only on specific weekdays, for example Tuesdays and Thursdays, between 08h00 and 17h00.
2. Admission is only on production of the following documents:
   - Reservation for slaughter from Meatco.
   - Valid movement permit.
   - A signed Agreement Form.
3. Vaccination status has to be up-to-date as indicated by the brand mark.
4. "A" branded cattle from Angola, or any other country may not be allowed into the quarantine station.
5. Register the animals in the Quarantine Register as soon as they are received.

Intake of cattle – Meatco

1. Auctions at which Meatco buys cattle have to be properly supervised by DVS officials.
2. Cattle from Tsumkwe, if traveling through the route south of VCF, must be in sealed vehicles and escorted by DVS personnel, and under cover of a movement permit.
3. Meatco representative must sign Agreement Form.
4. Quarantine master must be advised of the auction dates and intended dates of entry

Handling of cattle

1. Mouthing may only be done by the quarantine master within 24 hours of admission.
2. The animals are then branded and put into a specified camp.
3. Various batches of animals are to be identified by different brandmarks or brandmark positions.
4. Each mouthed group of cattle must be put in its own camp with no contact with other animals already in quarantine.
5. The 21-day quarantine period starts after mouthing.
6. Any contact with other animals undergoing quarantine nullifies the days already spent in quarantine. If any such contact occurs, the day of contact becomes the first day of the 21-day quarantine period.
7. Avoid handling more than one group of animals without disinfecting yourself in between.
8. Cows with calves born in quarantine must be branded with a different brand and kept in specific camp reserved for that purpose.
9. The calves can then be sent for slaughter when at least 6 months old.
10. No animals may be kept for milking purposes.
11. Any movement of animals within the quarantine station has to be with the approval of the quarantine master.
12. **Sick animals**: quarantine master should try to assist as much as possible; any costs incurred are to be borne by owner and the latter has to indicate if they are willing to do so on the Agreement Form; the withdrawal period of any drugs administered may not exceed the quarantine period of the treated animal.
13. **Deceased animals**: quarantine master should try to ascertain the cause by performing a PM, collecting samples etc. If there is any suspicion of anthrax, rabies or CBPP the State Veterinarian has to be informed beforehand.

Release of cattle from quarantine

1. After 21 days in quarantine, the animals have to be mouthed and kept in a loading camp.
2. Only if the entire group does not have any evidence of FMD lesions are they transferred to the loading camp.
3. In case of multiple owners, cattle of different owners must be clearly distinguishable.
4. Movement permit: issued in the name of the cattle owner; has to be fully endorsed by the owner or his representative or the driver, seal numbers and truck registration numbers must be endorsed.
5. Transporting trucks: transporter has to have it thoroughly cleaned and disinfected before loading animals; must be sealed by seals supplied by cattle owner.
6. Vehicles traveling south of VCF must be escorted to Oshivelo Gate.
7. Notify the abattoir about the consignment.
8. No cattle from the quarantine farm may be transported to farms south of VCF.

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Quarantine Stations Small Stock

Intake of Small stock (Sheep, Goats)

1. Intake is on a quarterly basis during the months of February, April, July and October only, according to the specific dates given on the detailed annual intake program, provided by each State Veterinary office.
2. Each consignment has to be accompanied by a movement permit.
3. Annual program is to be distributed to all stakeholders.
4. No animals may be admitted on dates outside the annual intake program.
5. Agreement Form has to be signed.

Handling of Small stock

1. Treat, within 24 hours of arrival, with an approved external parasiticide like Ivomec, Dectomax, Qualimectin, Ecomectin etc – to be supplied by stock owner.
2. Repeat treatment after 10 days.
3. No need for treatment with external parasiticide if the animals are intended for direct slaughter after quarantine.
4. Quarantine period is 21 days.
5. The small stock are to be mixed with sentinel cattle during the entire quarantine period.
6. The sentinel cattle must be negative for FMD antibodies prior to mixing with each new small stock consignment.
7. The sentinel cattle must also test negative for FMD antibodies after at least 14 days of mixing with each new small stock consignment.
8. Ensure that the sentinel cattle are not displaying any symptoms of FMD before release of each small stock batch.

Release of Small stock

1. Release after 21 days, on condition that the sentinel cattle are both serologically and clinically (symptomatically) negative for FMD.
2. Transporting vehicle must be cleaned and disinfected by the transporter before loading animals.
3. Transporting vehicle must be sealed with seals provided by stock owner.
4. Each released consignment has to be accompanied by a fully endorsed Red Cross permit.
5. Remember to indicate seal numbers and vehicle registration numbers on the permit.
6. For animals intended for slaughter, firm arrangements must be in place with the state veterinarian at destination, before departure.
7. Animals intended for breeding purposes south of Cordon fence must be further quarantined for 3 months at destination.

8. Movement should also be in sealed, clean and disinfected trucks, under the cover of a fully endorsed Red Cross permit.
9. In all cases, firm arrangements with the state veterinarian at destination must be in place before departure.

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Quarantine Stations Sentinels

1. A separate register is to be kept for sentinel cattle.
2. Ensure that vaccinations, deworming and tick control programs are kept up-to-date and recorded.
3. Check these animals at least two times a week
4. Keep detailed records of all blood samplings and inspections.
5. Report any sick animals to the State Veterinarian as soon as possible.

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Quarantine Stations Registers

The quarantine master is to ensure that the following registers are always kept up-to-date.

1. Cattle Quarantine Register
2. Permit Register
3. Small stock Register
4. Inventory Register
5. Fuel Register
6. Visitors Register
7. Instructions Register
8. Attendance Register
9. Overtime Register
10. Sentinel Cattle Register
11. Rainfall Register
12. Housing Register
13. Telephone Register

A register of small stock going to the south of VCF is to be kept at the main state veterinary office of that particular veterinary district.

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Quarantine Stations Planning and Reports

The following reports/returns are to be handed to the Chief Animal Health Technician (CAHT) at the end of every month.

Work programs

1. Quarantine master must produce Mothly and Weekly Work programs in consultation with the CAHT.
2. Weekly tasks must be discussed at meeting of all quarantine staff every Monday.

Monthly Quarantine Farm Report

1. To be completed fully by quarantine master and submitted every month-end to CAHT.

Trip Control Forms, Trip Authority, Vehicle Log Summary

1. To be fully completed and handed to CAHT every month-end.
2. Fuel and maintenance receipts, vehicle cards must be handed to Clerical Assistant as soon as possible after transactions.

DSA and overtime claims

1. Prior permission from SV or CAHT needed before embarking on overtime work or camping.
2. Submit with monthly report to CAHT.

Rainfall figures for the month

1. Submit with monthly report to CAHT.

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Quarantine Stations Maintenance

The quarantine master is ultimately responsible for general upkeep, maintenance and smooth running of the quarantine station. The handyman and labourers are all ultimately answerable to the quarantine master.

Office premises

1. These have to be kept clean and tidy, including the surroundings.
2. Avoid littering surroundings with plastics, bottles etc.
3. Structural damages have to be immediately reported to the Department of Works.

Fences

1. Handyman and labourers are primarily responsible for fence repairs and maintenance.
2. Prompt repairs to any damages have to be undertaken.
3. Conduct regular inspections.

Water infrastructure

1. Water installations need regular upkeep, inspections and maintenance.
2. Remember to clean water troughs regularly.
3. Report problems which you are unable to handle to CAHT.

Staff accommodation

1. Houses have to be inspected and appropriate forms (**Allocation of Official Accommodation Form**) completed before staff members move in; tenants have to maintain the houses and keep the surroundings clean; tenants will be liable for any damage they cause.

Telephone/Radio

1. Keep Telephone Control Register updated comprehensively.
2. All private calls are to be paid for and even these have to be kept to the absolute minimum.

Pastures

1. Ensure sound pasture utilization and management.
2. Every effort has to be made in order to keep the risk of fire as low as possible.
3. Avoid littering pastures, especially with plastics, as these can be dangerous to animals.
4. Dead animals must be immediately and safely disposed of in order to reduce the risk of botulism.

Tools and equipment

1. All tools, vehicles, water engines, fencing materials, and other equipment have to be well maintained and looked after.
2. Keep an inventory register of all materials received and used.

Bush control chemicals

1. Extreme caution has to be taken in their use to avoid self poisoning.
2. Do not handle these chemicals unless you are absolutely sure of how to use them.
3. Quarantine master must ensure that all staff members are familiar with all precautions needed to be taken when handling these chemicals.
4. Take care to avoid contaminating pastures and water sources.

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Quarantine Stations Personnel and Transport

In all cases a Special Trip Authority is required when traveling outside normal working hours

Month-end shopping

1. Do not overload the vehicle; someone must remain guard and under no circumstances should the premises be left unattended.

Personnel Meetings

1. Quarantine master and 50% of staff members may attend personnel meetings on alternate days.
2. Deliberations of these meetings must be fully conveyed to the rest of the staff.

Staff members' children on holidays

1. These may be transported to/from school during main holidays.
2. Only the staff members' children or children for whom they are legal guardians may be transported.

Sick staff members and their family

1. Liase with CAHT or State Veterinarian
2. Sick staff members and their immediate family members may be transported to the nearest health facility; this provision should not be abused.

Staff on or from leave

1. These may be transported to/from the nearest main road.
2. Prior arrangements must be made for official transport.

Workers' Committee

1. Labourers have to be represented.
2. Representative must always give feedback to fellow workers.

Channels of communication

1. These must be strictly adhered to.
2. It is from labourer to handyman to quarantine master to CAHT to State Vet and then to the Deputy Director.

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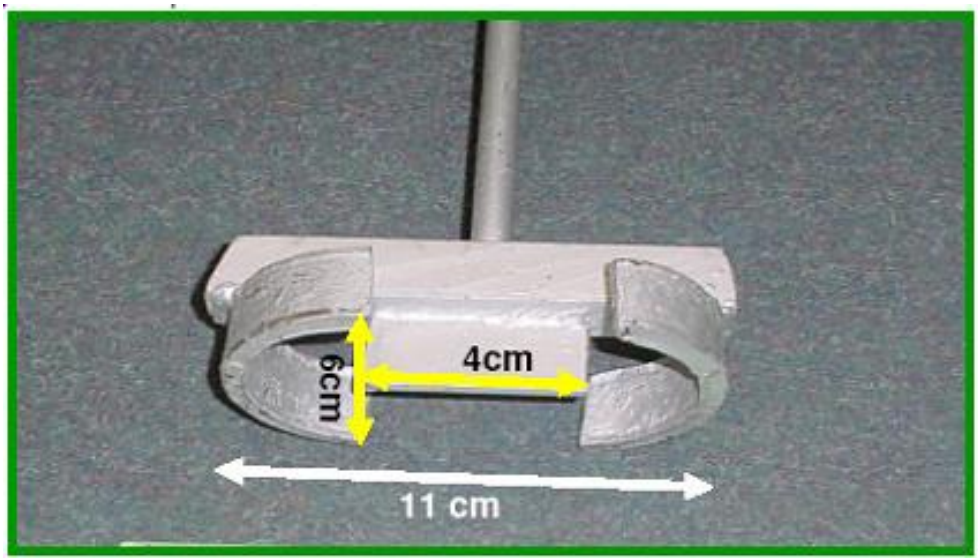
Disease Control at International Entry Points

Animal and animal products are imported into the country through specified entry points. These are manned permanently by DVS staff that ensures that documentation and products comply with veterinary requirements before they are allowed into the country. Imports are controlled centrally through a permit system. The import permits specify the conditions under which the animals or animal product may be imported. The conditions are based on OIE guidelines and designed to minimise the risk of introduction of diseases, particularly FMD, through imports.

Imported cattle are required to be branded by a clearly recognisable brand on the left neck (—) before arrival. The dimensions of the branding iron for cattle are shown on the figure below:

Dimensions of branding iron used for identifying imported cattle



In addition the animals are identified by means of a set of official tamperproof red RFID/visual ear-tags for individual identification. The tags display a unique black identification code and the DVS logo on a red RFID tags background. The movement of imported animals will be traced but they are not allowed to be slaughtered at EU approved export abattoirs.

In the case of imported small stock, they are required to be identified by branding on the left cheek using a hot branding iron which is smaller in dimensions than the one for cattle. In addition they are to be individually identified by a metal ear-tag. The tags are marked VS followed by a serial number. Their identification marks will disqualify them from EU slaughter at export abattoirs.

General Standard Operating Procedures

SOP Routine Farm Inspection

SOPs for routine farm inspections by Animal Health Technicians

Issued: **February 2009**

Under the **Animal Health Act, 2011 (Act No. 1 of 2011)**, officers in the Ministry of Agriculture, Water and Forestry are empowered to "enter upon any land" in order to do anything that they are required to do in terms of this Act, including livestock inspections. Therefore, Animal Health Technicians (AHTs) are at the forefront of the Directorate of Veterinary Services' disease surveillance and control programs, since they are always in contact with livestock owners. It is therefore of utmost importance that they use the time that they are in contact with the farmers to educate and to disseminate as much information to them as possible.

These standard operating procedures were drawn up to assist AHTs in this regard. Animal Health Technicians should ensure that all points mentioned in these standard operating procedures are adequately addressed before leaving a farm.

Annual Farm Inspection Program

The annual farm inspection program must be completed and approved by the Chief Animal Health Technician and/or State Veterinarian by the 31st January each year.

Notice of inspection

The notice of inspection letters must be sent by registered mail at least one month before the intended date of inspection. Ensure that these are entered into the mail register before dispatch, as proof.

Before visiting a farm

Before visiting a farm thoroughly acquaint yourself with background information on that farm. A print-out of the following reports from the NamLITS database should be used for this purpose:

- Farm Permits Report
- Herd Inventory Report
- Outstanding Permit Report
- Farm Movement Exceptions Report

On arrival at a farm

On arrival at a farm for inspection, first report to the farm owner's house and introduce yourself. Produce your official DVS identity card for identification.

Inspection procedure

Together with the farm owner or his/her representative or farm manager, proceed to all livestock posts with cattle, sheep, goats or pigs and do the following:

i. Record the numbers of all the livestock on the farm.
ii. Check all cattle above 6 months of age to ensure that they are all correctly and legibly branded in accordance with Section 7 of the **Stock Brands Act 24 of 1995** and Regulations 13 in terms of the Act.
iii. Check that all cattle above 6 months are double-tagged with NamLITS ear-tags.
iv. Check that all small stock (sheep & goats) at least 3 months old are correctly ear-tagged or tattooed in accordance with in accordance with Section 7 of the **Stock Brands Act 24 of 1995** and Regulation 13 in terms of the Act.
v. Inspect the health status of the animals, especially signs associated with FMD, CBPP, BSE, sheep scab, goat mange etc., and any other notifiable diseases.
vi. Conduct inspections for illegal use of banned substances in accordance with Sections 7, 8 and 9 of **Prevention of Undesirable Residue in Meat Act 147 of 1997**. Remember to check behind the ears for any evidence of illegal use of growth stimulants.
vii. Inspect the feeding troughs and any lick available and note it down.
viii. Collect feed samples as outlined in the BSE surveillance and control program.

Imported stock

Verification of the presence of imported stock

i. Cattle: ensure that the special brand (-) on the left neck remains legible and that they are ear-tagged with official green ear tags.
ii. Small stock: these should bear a special brand (-) on the left cheek as well as import brass tags with the symbols 'VS' and a serial number.
iii. Brass tags for small stock from the buffer zone have the symbols 'NVS' and a serial number.
iv. Check that the register for imported animals is available and up-to-date.

Wildebeest Camps

If there are any wildebeest, record their numbers and assess their camps for compliance with Malignant Catarrhal Fever control regulations.

Pigsties

Check for compliance with African swine fever control regulations. Check the health status of the pigs and pay attention to welfare aspects. Check that pigs are identified in accordance with Animal Identification Regulations in terms of the Animal Diseases and Parasites Act 13 of 1956 when they come into effect.

Surveillance zone isolation camps

Inspect the facilities and check for compliance. Verify that the number of animals in isolation match with records in the NamLITS database. Any animals in such facilities must be inspected and all details noted down.

Registered ostrich export farms

For registered ostrich export farms, ensure that you have the relevant inspection form; inspect for compliance with export registration requirements in accordance with **Circular V6/2000**.

Check registers, feed & stock remedies

After completing the farm inspections return to the farmer's residence to check the feed and stock remedies as well as to check that the livestock owner's registers are filled in and updated. If need be, spend time teaching the livestock owner how to keep these registers updated. The following must be done:

a. Movement control: Reconcile all stock numbers by balancing the animals born, permits into the farm (arrival registers), permits out (departure registers), deaths (termination registers), and the numbers recorded on the inspection day. Stock numbers observed must be at least 80% of the total number of each species of animals present on the farm.
b. Movement Permits:
    i. Ensure that the movement registers are attached and collect them, if any.
    ii. Remind the farmer to return movement permits within 21 days from the date of issue and that failure to do so may lead to the farm being automatically restricted by the system. Remember, permits are valid for 7 days and must be returned within 14 days after expiry.
    iii. Check all movement registers: Departure Registers, Arrival Registers, Termination Registers etc.
d. Complete/update the Livestock Register (this replaces the stock card).
e. Inspect the FAN Meat Scheme records and ensure that they are properly completed. Remind and/or explain to the farmer the essentials of the FAN Meat Scheme. Check for compliance.
f. Sign the on-farm drug/treatment register and the lick/feed register in the FAN meat file.
g. All farm audits must be made as outlined in the 'Auditor's Guide' which will soon be made available.
h. In addition to the inspection done, conduct an interview with the farmer or manager
i. Complete the Animal Health Inspection form and the FAN Meat checklist in the farmer's presence, who must countersign it.
j. Ensure that all the forms are well explained to the farmer before he/she countersigns them.
k. Complete the wildebeest inspection form, if applicable.
l. Complete the ostrich inspection checklist for export registered establishments.
m. Inspect the register of imported animals. Ensure that it is well completed and up to date. The figures must tally with those in the register kept at the office.
n. Inspect the stock feeds and remedies stored on the farm and give any relevant advice, especially on withdrawal periods and proper storage.
o. all non-compliances observed and where necessary collect evidence/records in terms of relevant legislation

Vaccinations

Obtain proof of compulsory vaccinations – anthrax for all cattle, brucellosis for heifers below 8 months, and rabies for dogs and cats (3 months old or more). For brucellosis and anthrax, only receipts and/or used empty bottles are acceptable as proof of vaccination. Compare vaccine expiry dates with vaccination records to make sure that the farmer didn't present last years bottles. For rabies, only vaccination certificates are acceptable.

Deferred vaccinations

If the farmer intends to vaccinate at a later date, note it down, and explain to him/her that the onus would now rest on him/her, to supply you with the proof of vaccination when that date comes. If this is not done his/her farm would be placed under movement restrictions without further notice. (Not applicable for rabies)

Rabies vaccinations

Vaccinate any dogs and cats against rabies and issue rabies vaccination certificates. The totals of pets vaccinated must be submitted to the CAHT, together with your monthly returns, monthly.

Inspect 80% of animals

The farmer is required to produce at least 80% of all the animals for inspection. Failure to do so may lead to movement restrictions, unless there are compelling factors like rain etc. Movement restrictions on the farm would only be lifted after a satisfactory re-inspection at the farmer's cost.

Movement restrictions

Any movement restrictions on a farm should only be imposed with the authorization of the Chief Animal Health Technician and / or the state veterinarian.

Education on DVS programs and policies

Educate the farmer on the various DVS programs/policies:

i. **BSE surveillance and control program**: remind the farmers to report all cattle above 2 years which show and/or die of nervous symptoms
ii. **Residue control program**
iii. **Brucellosis surveillance program** in small stock: remind farmers to report all abortions in small stock
iv. **Control of imported animals protocol**
v. FAN Meat scheme
vi. **Stock Brands Act**
vii. Any other relevant information.

Update contact details

Ensure that all contact details of the farmer are updated before leaving the farm.

Update registers (at office)

Back at the office, update these registers weekly:

i. Wildebeest camp register
ii. Surveillance zone isolation camps
iii. Pigsties
iv. Register for imported animals
v. Farmer address list
vi. Closed farms register

Closed farms

Closed farms must be notified in writing under the signature of the state veterinarian or his/her delegate. File a copy in the farm file and give one copy to the CAHT and mail one to the farm owner.

Submit required forms

Forms must be handed to the CAHT on a weekly basis:

- **Animal Health Inspection Forms (Farm Visit Forms)**,
- **Farm Assured Namibian Meat Scheme Checklist** [1],
- **Wildebeest Inspection form**.

Guidelines for Animal Health Declaration Forms from farmers

- Every six months commercial farmers are expected to complete Animal Health Declaration forms every 6 months. The farmers must complete the form with respect to the first 6 months of the year (January to June period and July to December period)
- Forms for the first 6 months must be handed in July and information in them cover the January to June period. The forms for the second half of the year (July to December) must be handed in January of the subsequent year.
- The forms must be handed or posted to the nearest veterinary office
- An **Electronic AHD Form** [1] has been developed which can be completed and sent to the email address: lilungwea@mawf.gov.na.

Instructions for Clerks

- Order forms from epidemiology at Head office
- Receive forms from epidemiology
- Register the forms and acknowledges receipt
- Receive the forms from the famer
- Inform NamLITS-AHD data base that the forms were received
- Issue receipt to farmers
- Record date received on the back of the form at the end of the page
- Hand in forms to the CAHT
- Capture the form on the system once they have been verified and signed by the CAHT
- Filing of hard copies in farm file
- If staff at the State Veterinary Office do not have capacity capture the data, copies must be sent to the epidemiology Section at DVS Head Office. After data capture they will be returned to the SV office for filing.

Instructions for Animal Health Technicians

- Train farmers on requirements for completing the forms
- Complete the Animal Health Inspection Form during annual farm inspections which must be in accordance with farm inspection protocol
- Submit the form to the CAHT

Instructions for Chief Animal Health Technician

- Receive forms from AHTs and farmers
- Check the form for accuracy and completeness (verification)
- Enter the date of verification
- Rate the form as follows:

  Excellent

  Satisfactory

  Acceptable

  Need for follow-up

- Need for follow-up means there is information on the form which requires immediate action which may require contacting the farmer, restricting the farm or making an immediate farm visit. This is for example where the farmer has admitted to be using banned substances, has fed meat and meal, has seen clinical sign of FMD, or there are animals showing nervous signs.
- Write the name on the space provided and sign to indicate that you have seen the form and verified its content.

Instructions State Veterinarian

- Monitor progress on the number of farms inspected and Animal Health Declaration Forms submitted by the farmers
- Analyze the data on NamLITS database for your state veterinary district to monitor trends with a view to taking action where needed.

Deputy Chief Veterinary Officer

- Check progress on farm inspections and Animal Health Declarations Forms submitted by the farmers
- Issue instructions to offices with poor performance to carry out inspections

Check forms for accuracy

Always ensure that all forms are completed fully and correctly. Falsification of any information by the staff member will lead to disciplinary measures being taken.

Behave appropriately

On leaving the farm have the courtesy to close the farm gates behind you and avoid being a nuisance by asking for gifts.

Undertaking

I……rank…… have read and understood these ‘standard operating procedures for routine farm inspections’ as described herein. I undertake to do all my farm inspections according to these guidelines.

Signature…….Date …….....

SUPERVISOR:

Signature ……Date ……..……

Forms

References

[1] http://www.nammic.com.na/jdownloads/Industry%20Acts/AHQQuestionare.pdf

SOP Communal Areas

Standard operation procedures for community visits in communual areas

Issued: **APRIL 2009**

A community is a group of people who live in the same area and have common cultural and historical heritage. In the context of community visits, it is a geographical area (usually a village in a communal area) where community members share common resources (e.g. grazing area, water point or crush-pen) and fall under an officially recognised traditional leader such as a headman, councillor or a chief.

Community visits are scheduled visits to communal livestock farmers which are carried out by Animal Health Technicians (AHT) as part of the Directorate of Veterinary Services' (DVS) disease surveillance programme. Community visits are part of the directorate's epidemiology information system (EIS). During these visits the Animal Health Technician holds meetings with the community, inspects animals and trains farmers on basic animal health care and priority diseases, which may include showing videos. The AHT also gathers information about diseases that have been experienced in the community within the previous twelve months.

Instructions to Animal Health Technicians

Annual Work Plan and Budgeting

- Draw up a programme for the Community Visits/Farmers' Days to be carried out during the year in January of each year
- Submit the programme to the Chief Animal Health Technician (CAHT) and State Veterinarian by the 31st of January every year.
- Animal Health Technicians whose areas of operation covers border posts should remember to take these into account when drawing up the annual work plan.
- Draw up a list of all the communities, which you will visit during the course of the year in the Register of Communities/Farms. (See **Annexure 1**). Using this information you then draft an annual workplan (see **Annexure 2**), where you give a detailed program of community visits in your area of responsibility.
- Apart from indicating the communities/farms to be visited, the annual work plan should also indicate the estimated kilometres to be covered and estimated DSA (daily substance allowance) to be used.
- This programme should then be submitted to the CAHT who will review it with the AHT and approve it when satisfied. In doing this the CAHT will take into consideration some activities that are not part of community visit which will be carried out during the course of the year like vaccination campaigns, leave etc.

Monthly Planning

i. The monthly planning programme should be done using the attached form. (See **Annexure 3**)
ii. Consult the Agricultural Extension Technician (AET), local farmers' unions or other staff members working in the same area of operation in order for you to work in collaboration with them for the purpose of optimal resource utilisation during the visit.
iii. Submit your programme/plan to the CAHT as part of the monthly activity report.
iv. The CAHT will then review and approve the program and allocates the kilometres to be covered and DSA to be claimed by the AHT before the latter goes out on community visit/farmers' day.
v. The CAHT files the approved program for future reference.

Weekly Planning

One week before the community visit/farmers' day the AHT should be able to answer the following important questions:

i. Is the meeting necessary?
ii. Was the community notified of the meeting?
iii. Will the community members attend the meeting (did they confirm)?
iv. What are the objectives of the meeting?
v. What do I know about the people attending the meeting?
vi. What kind of chairperson does the meeting need?
vii. How can I obtain contributions from members attending the meeting?

Visit the local leadership of the community to be visited (e.g. Headman, local farmers' union member, councillor or chief) and the Community Animal Health Worker (CAHW) in order to highlight the following:

i. Necessity and importance of the meeting
ii. Objectives of the meeting
iii. Chairperson needed
iv. What is expected from the community members

Agree with the community leader, farmers' union and CAHW on:

i. The date for the meeting
ii. Venue for the meeting
iii. Time for the meeting
iv. Chairperson of the meeting

Agreement should be reached on the methods to be used in informing the community (e.g. invitation/announcement by community leader at points such as 'cuca' shops, schools, radio or at the auction or permit sales).

Draw up the agenda in consultation with the community leader/farmers' union ensuring that provision is made for the farmers' contributions. The local CAHW should always be involved in the planning of meetings, drawing up of the agenda and can also be tasked with responsibility of inviting the community to the meeting.

Office preparations

i. Before visiting any community, thoroughly acquaint yourself with background information on that community. A print-out of the following reports from the NamLITS database should be used for this purpose (only applicable south of VCF):
   - Farm Permits Report
   - Herd Inventory Report
   - Outstanding Permit Report
   - Farm Movement Exceptions Report

iii. Prepare all the materials and equipment needed for the meeting such as:
   - Video machine, cassettes, cool box, leaflets and booklets, GPS and batteries, vaccine (rabies), AHT kit, syringes and needles, rabies vaccination certificates, generators and fuel, flip chart, community visit forms and suspicion forms.

One day before the meeting

Test all your equipment (generator, video machine etc.) to ensure that it is functioning properly.

On the day of the meeting

i. Leave early enough to ensure that you give yourself enough time to test and set up your equipment well before the proposed starting time.
ii. Pass through the grazing fields to assess the quantity and quality of the pastures.
iii. Look out for poisonous plants in the pastures.
iv. Pass by the waterhole to evaluate livestock body condition. If cattle are still in the kraals then pass by a representative number of kraals to evaluate the body conditions.
v. While evaluating the body condition, find out if farmers are adhering to the stock brand Act (owners' stock brands identification on cattle).
vi. Inform the Headman and the proposed chairperson of the meeting that you are already in the community for meeting and you are proceeding to the meeting venue.
vii. Vaccinate pets before meeting starts, while waiting for headman, chairperson and members of the community to arrive.
viii. Before the meeting starts, complete first two sections the Community Visit Form. (See **Annexure 4**).

Time of meeting

Preferably, the Headman or any delegated member of the community should do the introductions.

With the help of a chairperson you shall then perform the following:

i. Inform the community members about activities of DVS.
ii. Upgrade farmer's knowledge on basic animal health care.
iii. Ask farmers to list diseases that they experience and how they attempt to treat their animals
iv. Discuss priority diseases and diseases of national importance like bovine spongiform encephalopathy (BSE), avian influenza (AI), rabies, foot and mouth disease (FMD), contagious bovine pleuropneumonia (CBPP), anthrax, brucellosis, tick-borne diseases etc.
v. Explain the EIS, the stakeholders (CAHWs, VEDRES, and AETs etc) that are involved the role that farmers play in the system.
vi. Explain to farmers why they need to report diseases to DVS.
vii. Discuss their animal health problems.
viii. Take note of problems/issues, which need further investigation after the meeting.

ix. Complete last two sections of the Community Visit Form by asking questions to community members (farmers).
x. Suspicion forms must be completed if the community members have encountered any priority diseases.
xi. Inspect the FAN Meat Scheme records and the Livestock Registers (this replaces the Stock Card). Update them accordingly.
xii. Close the meeting by thanking and encouraging the community members for attending the meeting.

Livestock Inspections and Vaccination of Pets

Livestock inspections and vaccination of pets can be done before or after the meeting/farmers' day depending on the local circumstances.

- Vaccinate any dogs and cats against rabies and issue rabies vaccination certificates. The totals of pets vaccinated must be submitted to the CAHT, together with your monthly returns.
- Inspect all available livestock in the community as follows:
  - Record the numbers of all the livestock in the community.
  - Check all cattle above 6 months of age to ensure that they are all correctly and legibly branded in accordance with Section 7 of the Stock Brands Act 24 of 1995 and Regulations 13 in terms of the Act.
  - Check that all cattle above 6 months are double-tagged with NamLITS ear-tags. (Only applicable south of VCF)
  - Check that all small stock (sheep & goats) at least 3 months old are correctly ear- tagged or tattooed in accordance with in accordance with Section 7 of the Stock Brand Act 24 of 1995 and Regulation 13 in terms of the Act.
  - Inspect the health status of the animals, especially signs associated with FMD, CBPP, BSE, sheep scab, goat mange etc., and any other notifiable diseases.
  - Conduct inspections for illegal use of banned substances in accordance with Sections 7, 8 and 9 of Prevention of Undesirable Residue in Meat Act 147 of 1997. Remember to check behind the ears for any evidence of illegal use of growth stimulants.
- Complete a Suspicion Form for every case that you encounter.

Movement controls and registers (only applicable south of VCF)

After completing the livestock inspections check that the livestock owner's registers are filled-in and updated. If need be, spend time teaching the livestock owner how to keep these registers updated. The following must be done:

a. Movement control: Reconcile all stock numbers by balancing the animals born, permits into the farm (arrival registers), permits out (departure registers), deaths (termination registers), and the numbers recorded on the inspection day.
b. Movement Permits:
   1. Ensure that the movement registers are attached and collect them, if any.
   2. Remind the farmer to return movement permits within 21 days from the date of issue and that failure to do so may lead to the farm being automatically restricted by the system. Remember, permits are valid for 7 days and must be returned within 14 days after expiry.
   3. Check all movement registers: Departure Registers, Arrival Registers, Termination Registers etc.
d. Complete/update the Livestock Register (this replaces the stock card).
e. Inspect the FAN Meat Scheme records and ensure that they are properly completed. Remind and/or explain to the farmer the essentials of the FAN Meat Scheme. Check for compliance.
f. Sign the on-farm drug/treatment register and the lick/feed register in the FAN meat file.
g. Complete the Declaration Form and the FAN Meat checklist in the farmer's presence, who must countersign it. (**FANMeat Self Declaration Form**)
h. Ensure that all the forms are well explained to the farmer before he/she countersigns them.

At the office

- Place the vaccine back into the fridge
- Clean and pack all the materials in the store room
- Complete the community visit register (**Annexure 1**)
- Submit the Community Visit Forms at least once a week to the CAHT
- Submit any completed Suspicion Forms to the CAHT

Instructions to Chief Animal Health Technicians

- Ensure that AHTs submit Community Visit Forms, as part of their monthly activity report submission.
- Check whether all planned Community Visits were carried out
- Check if the AHT used allocated kilometres properly.
- Update the Community Visit register file at least once a week.
- Send copies of Community Visit forms by mail to Epidemiology section in Windhoek by the 10th of the subsequent month.

I.....rank..... have read and understood these 'Standard Operating Procedures for Community Visits in Communal Areas' as described herein. I undertake to do all my community visits according to these guidelines.

Signature.....Date.....

SUPERVISOR: Signature.....Date.....

Forms

Annexure 1: Register of communities/farms

Annexure 2: Annual workplan for communities/farms to be visited

Annexure 3: Monthly planning form

Annexure 4: Community visit form

FANMeat Self Declaration Form

Laboratory details form

Investigation and response to major threats

Sighting FMD-infected buffalo

If potentially FMD-infected buffalo are sighted, the following response is to be implemented:"

1. Report sighting to CAHT or State Veterinarian
2. Determine their current location, where they originated from (if possible) and where they have been
3. Visit farms/communities where they have been and check for signs of FMD
4. Report findings to CAHT or State Veterinarian
5. Continue to monitor in-contact animals for evidence of FMD

Outbreaks of FMD in neighbouring countries

In the event of FMD outbreaks in neighbouring countries staff should:

1. Maintain a high level of alert for animals with suspicious clinical signs
2. Encourage awareness of FMD and reporting requirements among farmers/communities when doing routine farm/community inspections
3. Investigate suspect cases as a high priority
4. Follow-up and investigate immediately any reports or rumours of illegal animal movements from the infected country

Breaks in cordon fences

If staff become aware of breaks in the VCF they should:

1. Report the break to the appropriate authority for it to be mended
2. Visit farmers in the vicinity of the break to check for any illegal or stray movements of animals through the fence
3. When making farm/community visits in the area, inspect cattle for any clinical signs or lesions of FMD
4. Encourage awareness of FMD and reporting requirements among farmers/communities in the area

Increased illegal movements

I the event of reports of illegal movements from neighbouring countries or from north of the VCF, staff should:

1. Investigate and attempt verify whether an illegal movement has in fact occurred
2. If illegal movements are confirmed (or appear likely to have occurred):
    1. Inspect the animals that have moved and/or in-contact animals for signs of FMD or other diseases
    2. collect evidence for possible prosecution, if appropriate
    3. report the illegal movements and findings of investigations to your supervisor for further action

Vaccination Campaigns

Budgeting and Work Plan

1. A successful Vaccination Campaign starts with appropriate budgeting in the previous year. **In May**, when the Annual Budget and planning for the new financial year is being done, make sure that sufficient money is allocated to the vaccination campaign of the next financial year.
2. From **May to October** order the all the things to be used in the next vaccination campaign and leave only things that are not practically possible to have beforehand.
3. Offices must submit their vaccine requirements to the Chief Vet by the 31st July every year.
4. The list below is exhaustive checklist of things to consider for each vaccination team.

ITEM	QUANTITY	VOTE No	COMMENT
Vehicles	1	102/0204	Per team of 2/3 staff members
Kilometre allocation		023	Depend on number of crush pens
Camping Tents	1 or 2	103/1300	Two if different sexes in one team
Stretcher Beds	2 or 3	103/1300	For each staff member
Metal Table/ Clip board	1	101/0700	For writing on at crush pen
Shade net/ Umbrella	1	103/0700	For shade to the cooler box and writing staff
Metal Cooler Box	1	103/0700	For vaccine storage
Polythene Cooler box	2	-	Use empties of vaccine to put the vial under use
Ice bags (Plastics)	Depend on crush pens	022/2800	For making ice
Cast Iron pots	1	022/0500	Sterilisation of needles & syringes
Gas Bottles	2	022/0500	For Branding/ cooking
Cooking pots	2	022/0500	Staff members' cooking
Metal Plates (Aluminium)	4	022/0500	Food serving
Large water drums 200l	1	022/0500	Bulk water supply
Small water container 25l	2	022/0500	Carry water from camping site to crush pen
Branding irons	4	022/0500	Branding
Stock Cards	Depend on census	022/0200	Stock register for farmers' record
A4 Bond Paper reams	Depend on area	022/0200	Vaccination program duplication, registers printing, livestock counting, etc
B18 writing Books	2	022/0200	Back up register of vaccines
Pens	4	022/0200	Recording
Calculators	1	101/0200	Summing up figures
Vaccination registers	Depend on census	022/0200	Record keeping for office use
Brief cases	1	103/1300	Safe keeping of records
Roux syringes	2	103/1300	Vaccination
Roux syringe spares	2	103/1300	Replacement in case of breakages
141/2 G reusable needles	50	103/1300	Vaccination (sufficient for constant change)

Disposable syringes 2/5 ml	Pet census	022/3100	Pet vaccination
Disposable 211/2 G needles	Pet census	022/3100	Pet vaccination
Safety shoes	2/3	022/0600	Staff safety
Protective clothing	4/6	022/0600	Staff safety
Mosquito repellents	9	022/2400	For staff member camping
Prodders	1	022/3100	For loading animals into crush pen
1.5V Batteries	12	022/1800	For prodders
CBPP Vaccine	Census	022/0400	Immunisation
FMD Vaccine	Census	022/0400	Immunisation
Rabies Vaccine	Census	022/0400	Immunisation
Communication radios (cell phones)	1	022/0500	For quick communication i.e. cold chain to be maintained.
Firewood	Km to fetch	023	For branding
Shovel/ Spade	1	022/2800	For emergency break downs
Axe	1	022/2800	For emergency break downs
Pliers	1	022/2800	For emergency break downs
Trampolines	1	022/2800	
First aid kit	1	022/0400	For emergency treatment of injured staff members in the field.
Daily Subsistence Allowance	N$70/ Day	021/0101	Camping Allowance
Overtime		001/0500	When necessary (should be minimised)

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Vaccination Campaigns Planning

Objective Planning Three Months Before Commencement

1. **Three months** before the commencement of the vaccination campaign, you must do detailed work planning.
2. Draft the vaccination campaign program. This should be done jointly with State veterinarian, Chief Animal Health Technician, Animal Health Technician and clerical assistant. Remember camping places and missing crush pens from previous campaign. If necessary, the Control AHT may also be called in for his inputs at this stage.
3. Make sure that camping sites are planned for places that will minimise cost. This implies that the camping site should be near to water points and central to a number of crush pens. Plan the program that the teams moves from one block to another without having to return for some crush pens i.e. No omissions of crush pens are acceptable. Teams may have to camp at the next crush pen if distance from the camping site is getting more and also when the next crush pen is a way ahead.
4. Receive vaccines and update vaccine registers. Follow up out standing deliveries as a matter of urgency.
5. Sensitise communities during community visits about their responsibilities i.e. driving cattle into crush pens, branding and repairing of crush pens.
6. Draft stock owner name list for each crush pen (census register). This kind of planning helps you to follow changes in livestock population and ownership dynamics.
7. Service vehicles and check emergency repairing kit.
8. List of things which have to be checked on vehicles is as follows:
    - pump
    - jack
    - wheel spanners
    - spare wheels
    - patch and solution
    - Tyre levers.

One Month Before Commencement

1. Check all equipment in store and make sure they are working well and are marked according to team numbers. (Refer to the budget list in Budget and Work Plan.
2. Start making ice block, take temperature reading daily on chillers to ensure that it is working optimally.
3. Inform Department of works to assign an electrician to be on standby in case of freezer failure.
4. Finalise and distribute program to schools, regional council offices, Headmen, churches, companies (fishing, mining etc) and Head office.
5. Organise teams, their leaders and responsibilities.
6. Set apart all the necessary documents (stock cards, stock owner list/ census register, vaccination report forms, community visit forms, branding irons, cooler boxes, tents, firewood etc) for each team.
7. Make sure participating staff members are informed. Do not include staff members with compromised health in the team line up.
8. Liaise with other offices and Chief Veterinarian if you need reinforcement from other offices.
9. Follow up vehicles still under repair and warn garages to be punctual through the Division of Plant and fleet.

One Week Before Commencement

1. Issue all camping equipment and the vaccination equipment as outlined in section Budget and Work Plan. Only the vaccine and ice are to be issued just before departure to the field. Use vouchers to issue all the equipment to ensure accountability.
2. Also include a first aid kit for each team in the issue voucher.
3. **Pre-vaccination campaign training:** Gather all participating staff members for an update on the vaccination campaign protocol. Ensure that the following topics are covered:
    - The importance of vaccination campaigns
    - Vaccination handling, sterilisation of equipment and safety precautions.
    - Demonstration of the correct vaccination procedure and correct vaccination sites.
    - Cold chain maintenance and precautions to be taken during transportation of vaccines.
    - Government transport maintenance system. The need to maintain appropriate registers and to park after work and avoid night driving.
    - Public service staff rules and behaviour as well as customer charter at the work place.
    - The need to liaise with farmers and convince them to assist with branding and driving cattle.
    - Surveillance system and new updates.
    - The need to inform farmers about stock brand registration and the entire traceability system in order to increase off take.
4. Make all the participants to sign the Vaccination Technique Protocol as an undertaking that they have understood the contents and the implications of not abiding by the rule. (See Vaccination Techniques/Protocol).
5. Submit the vaccination campaign program to the local radio station for daily announcement of the crush pens to be vaccinated. It may be necessary to invite the television staff to attend the first day of vaccination for an effective awareness campaign of your undertakings.

Day before commencement

1. All teams depart to their respective camping sites.
2. Issue vaccines and ice blocks. Make sure each team carries sufficient vaccine to avoid embarrassment and wastage of kilometres to fetch vaccine too soon.
3. Update vaccine register
4. Appropriate trip authorities are issued to all drivers. The teams should be released in ample time to allow them to shop for their groceries and drive to arrive early at vaccination campaign site.

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Vaccination Campaigns During and After

During Vaccination

1. CAHT must remind the radio station(s) on the need for daily announcement by phoning them every morning.
2. All vaccination teams must arrive at crush pen and commence vaccination early in the day to avoid a situation where farmers arrive and depart before the teams appear. This may cause vaccination to be a failure as they are likely to tell others on their way back that vaccination teams did not come.
3. Vaccination teams should begin the day by addressing farmers on important issues (See One week before commencement (paragraph 3)).
4. Dogs should be vaccinated first as they are likely to escape soon after the cattle are vaccinated.
5. Vaccination teams should ensure that they keep appropriate records as listed below:
    - Livestock census as indicated on the prescribed form in Annex B: Vaccination Register. Teams must ensure that they use census forms with pre-completed names to avoid variation of name spellings. This also enables teams to take note of those who abscond and those who are turning up for the first time.
    - Batch numbers and the expiry dates of the vaccines that are used Annex C: Vaccine Report for vaccination teams.
    - Record of all contaminated vials and the daily wastage as prescribed in Annex C: Vaccine Report for vaccination teams
    - Number of animals vaccinated for each type of vaccine as prescribed in Annex A: Vaccination Techniques/Protocol and Annex B: Vaccination Register.
    - Take note of change of ownership on the stock cards and update them appropriately.
    - Do proper inspection to avoid vaccination of sick animals. If a priority disease is suspected the AHT must complete a suspicion form and forwards it to the CAHT for delivery to the SV.
    - Teams should note that use of scruff and small pieces of paper during counting is prohibited. Each team must ensure that they have B18 books or A4 plain paper for recording the counting. Figures of each herd must be recorded in the appropriate form before starting vaccinating for the next farmer.
    - Complete all overtime claim forms on prescribed forms and trip control form (Annex E: Vaccination trip control form) on a daily.
    - All records must be kept very tide and well protected from water and fire.
    - All DSA claims must be completed and submitted to the CAHT on the last day of the month.

After vaccination campaign

1. All equipment received on vouchers from team leaders.
2. Check all equipment for condition and to plan for replacement.
3. Store equipment according to team numbers.
4. Hold meetings with all teams to discuss shortcomings of the campaign, and to suggest improvements for next vaccination. Minutes of such meetings have to be well documented for future reference.
5. Give a word of complement to the teams.
6. Complete Vaccination report in the prescribed format (Annex E: Vaccination Campaign Report) and send it to the Chief Veterinarian within 14 days from day of completion.

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Vaccination Campaigns Supervision

Supervisory work

1. CAHT should supervise vaccination teams regularly to make sure things are going well. The CAHT should also give constant feed back to the State vet.
2. Vaccination and livestock census registers should be send to office on a weekly basis for data capture. If allowed to pile up, this will result in erratic entries as there will be too much pressure on the clerk to enter the data in a limited time.
3. CAHT to replenish ice blocks and vaccine for all teams under his supervision.
4. State vet must also visit vaccination teams regularly to ensure things are all right and to keep up high staff morale.
5. The following is a checklist [no check list provided (or is it Annex D again?)] that should be used by supervisors when visiting teams at crush pens.

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Residue Program

NRMP Background

This National Residue Monitoring Program Guideline provides an organized framework for use by members of the Namibian Veterinary Inspection System such as officials in Veterinary Public Health Division (VPHD); Animal Disease Control Division (ADCD); Veterinary Epidemiology, Import/Export and Training Division (VEIETD); as well as Diagnostic and Research Division. Other users include livestock and meat producers as well as consumer lobby groups. The guideline includes vital information pertaining to chemical residue monitoring priorities, helpful technical information, and resources to facilitate the investigation of residue violations routinely carried out by the Directorate of Veterinary Services (DVS). This document would further provide guidance for enforcement measures to be followed in case of a residue violation.

A chemical residue is the presence of such chemical in one or more tissues of the body for some time after administration or exposure, particularly at the time of slaughter. Veterinary drugs and agricultural chemicals when used according to label directions should not result in residues at slaughter. Possible reasons for the presence of such residues in edible animal tissues include:

- Not following recommended label directions or dosage (extra-label usage);
- Not adhering to recommended withdrawal times;
- Use of drug-contaminated equipment, or failure to properly clean equipment used to mix or administer drugs;
- Dosing, measuring or mixing errors;
- Allowing animals access to spilled chemicals or medicated feeds;
- Animal effects (age, pregnancy, congenital, illness, allergies);
- Chemical interactions between drugs;
- Environmental contamination; and
- Improper use of agricultural chemicals such as pesticides.

The tissues of importance for the purposes of the National Residue Program (NRP) shall be muscle, liver, kidney, and fat.

Although microbial contamination of food continues to account for the majority of instances of illness, consumers have a high level of concern about the possible presence of antibiotics, hormones, or pesticides in meat. These concerns include allergic reactions, antimicrobial resistance, direct effects, acute toxicity, chronic toxicity, and consumer confidence. For this reason, drugs used by the livestock industry in Namibia must be approved for registration and the prevalence of chemical residues thereof be monitored.

Ensuring the safety of meat consumers, shall requires therefore, the identification and monitoring of residue hazards from veterinary drugs, pesticides and environmental contaminants that are reasonably likely to occur, and the development of control measures aimed at guarding against such hazards. It is important that inspections are conducted to determine the possible cause of the illegal drug or pesticide residues in food producing animals. Such inspections would also support in developing data descriptive of on-farm management practices and animal drug use for program decision making, identification of educational needs, and policy development.

This NRP guideline outlines the following: a structured process for identifying and evaluating compounds of concern; field and abattoir inspections; planning and implementation of sampling schedules; the laboratory capability to analyze for the compounds of concern; the appropriate reporting of analytical data, including the appropriate regulatory method to be followed in case of a violation; data collection, statistical analysis and the overall reporting of all the activities related to the NRP.

In addition, the NRP shall assist in revealing the illegal sale of veterinary prescribed drugs; the unlawful use of bulk drugs; the extra-label use of drugs, including inadequate pre-slaughter withdrawal period; cross-contamination of animal feeds due to poor “Good Manufacturing Practices (GMPs)”; failure to follow good animal husbandry practices, such as the misuse of drugs in animal feeds, the marketing of medicated animals intended for rendering purposes being diverted to slaughter for human consumption and; inadequate animal identification.

Furthermore, Namibia is a meat exporting country with five approved establishments for the exportation of products from the cattle, sheep, goats, and game animals. With this consideration in mind, it could be emphasized that the information contained in the Guideline could be useful to current and potential importers in accessing the status of the National meat inspection system.

NRMP Implementation

Introduction

This Guideline shall provide a framework on which all stake-holders could base their chemical residue control initiatives. DVS requests that all stake-holders receiving reports on suspected violative tissue residues of animal, take the necessary steps to protect the consumer by either conducting onsite investigations at the farm, abattoir or at any other point of responsibility throughout the farm to fork chain, and also to initiate actions commensurate with the findings. DVS shall issue inspection assignments to request for Government investigation of repeat violators and also for violative residues detected in animal derived human food. Field-based Veterinary Officials shall be encouraged to enforce action for such violations.

Legal Authorities

In Namibia, the monitoring of chemical residues in meat is carried out in accordance with the following national legislations:

- “Prevention of Undesirable Residue in Meat, Act 21 of 1991 as Amended by Act 11 of 1994”;
- “Fertilizer, Farm Feed and Agricultural Remedies Act, 1956 (Act No. 36 of 1947) Section 15 (2) (a)”;
- “Animal Disease and Parasite Act, 1956 (Act 13 of 1956), Regulations thereto and Amendments – Animals and animal products and;
- Medicine and Related Substance Control Act, 2003 (Act. No 13 of 2003) – “Registration of veterinary medicines on recommendation by a veterinary standing committee”, which also regulates the manufacture and sale of medicated feeds, and the on-farm use of medicated feeds;
- Meat Safety Act, 40 of 2000

Furthermore, since Namibia is involved in international meat trade, the monitoring of chemical residues in meat shall also consider importing country’s regulations, for example “Directive 96/22 EC” and its amendments, the “FSIS National Residue Program, blue book” as well as the “South African Meat Safety Act”.

When residues of veterinary drugs prohibited under the “Prevention of Undesirable Residue in Meat Act, 1991” and its Regulations are involved, an inspector appointed under the “Medicines and Related Substances Control Act, 2007” who reasonably believes that any of these drugs are present on the premises, has the customary range of powers to enter, sample, detain, examine records, and so on. Similarly, an inspector appointed under the “ Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947” who reasonably believes that there is any feed to which this Act applies has the customary range of powers to enter, sample, detain, examine records, and so on.

Based on the degree of health risk and concern that they may cause, veterinary drug substances are classified in various categories as follows:

Group I substances

These are mainly substances formulated as implants or feedstuff-ingredients intended to promote growth artificially. These drugs are total ban and even the possession of such substances is a punishable offence. These substances are not permitted to be administered to food-producing animals without written authorization of national Chief Veterinary Officer (CVO), but are available for the treatment of pet animals and in the human medical sphere. These substances are all either under control of veterinarian (animal sector) or medical practitioner (human medicine) and are only administered on doctor's prescription. Such substances include:

- Stilbenes
- Thyrostatics
- Anabolic substances with estrogenic, androgenic or gestagenic substance except those declared as prohibited or Group II substances.
- Beta agonists (except for therapeutic purposes)
- Antibiotic growth promoters in food and drinking water (except for therapeutic purposes)
- Chloramphenicol

Group II Substances

These substances are listed and may be used for therapeutic or zoo-technical purposes in food-producing animals.

Group III substances

This section deals with adherence to withdrawal times indicated by the manufacturer (or Minister), and prohibits extra-label use, except under authorization of a veterinarian and related matters.

The Namibian legislation authorizes the competent authority (DVS) to execute various actions such as inspections, sampling, identification of animals, certificates to be issued and so forth.

Objectives

- To set the basis for designing the residue control and sampling plan
- To conduct investigations and inspections to determine the cause of illegal drug residues and/or shipment of adulterated meat.
- To develop data descriptive of on-farm management practices and animal drug use for program decision support, identification of educational needs, and policy development.
- To obtain correction through voluntary and/or enforcement actions.

Program Management Instructions

All information related to drug violation concerning slaughter houses shall report to the VPHD. Similarly, the information from field-based Veterinarians shall report to the ADCD. Upon receiving the laboratory report on a non-compliant sample, VPHD or ADCD will issue an assignment shall task its officials to investigate and document the violation. In association with these assignments the VPHD/ADCD shall investigate all those involved in the marketing chain who may have acted irresponsibly.

The two divisions, VPHD and ADCD shall monitor trends or patterns and types of residues or involved parties; for example, the same buyer/dealer involved in a number of residue violations or a sudden increase in residue reports involving the same drug.

Responsibility

1. Veterinary Drugs

- Traceback inquiries for veterinary drugs, with the exception of those administered via medicated feeds, shall be conducted by Field State veterinarians and Animal Health inspectors. The purpose of these investigations is to determine the source of the residue and to educate the producer in avoiding further occurrences of such residues. Although these inspections usually begin at the farm, the trace back process may require the inspector to contact the producer's veterinarian in finding the source, as the veterinarian may administer a substance without the producer's knowledge.
- Since effective inquiry requires knowledge of the specific drugs may have been used, their purpose, mechanisms of clearance, and drug interactions, and may require communication with the producer's veterinarian, such inquiries must be conducted by a veterinary inspector or by an inspector who has the education and training to perform them. Such inquiries must always be conducted under veterinarian's supervision.
- Animal Health residue traceback inquiries are considered to be primarily educational and informative. It is therefore, advisable to use a positive, helpful approach is used.

2. Medicated Feeds

- Traceback inquiries for drugs or other residues which may be associated with medicated feeds shall be conducted by Feeds Inspectors of the Law-enforcement Division under the Directorate of Agriculture Engineering and Extension of MAWF.

3. Route Uncertain

- When the route of administration may have been either via feed or by individual treatment, the initial inquiry should be conducted by an Animal Health Inspector. If the inquiry reveals that a feed-related problem is likely, a Feeds Inspector should be called in. When appropriate, the inspection may be conducted jointly. All in all, sampling procedures for food animals and feeds must be followed.

4. Other Compounds

- Inquiries into residues other than veterinary drugs, such as agricultural or industrial chemicals or environmental contaminants, may require the assistance of other regulatory agencies for example, Ministry of Environment and Tourism, Municipal Authorities, Ministry of Mining and so forth.

NRMP Program

Introduction

In Namibia, tolerance and actions levels (violative residue concentrations) shall be determined with reference to residue limits established by recognized standard agencies such as WHO/FAO's Codex Alimentarius Commission, European Food Safety Authority (EFSA) and American standard agencies namely Environmental Protection Agency (EPA) and, Food and Drug Administration (FDA). Residue samples may be collected under three separate initiatives namely: monitoring; surveillance and; enforcement. The DVS inspectors involved in the National Residue Program shall collect samples at slaughter establishments and livestock farms under DVS inspection authority. These samples shall then be analyzed for violative residue concentrations, either at DVS' laboratories or DVS sub-contracted laboratories.

Monitoring

Monitoring involves the sampling of specified animal populations to provide national information about the occurrence of residue violations on an annual basis. The compounds considered are usually the ones with established residue limit either tolerances or action levels. Monitoring information is obtained through a statistically based random selection of specimens of healthy-appearing animal based on the number of carcasses produced during the previous year's slaughter. The carcass is not held after the sample is taken. Specific compounds, or compound classes, are considered in specific slaughter classes. The results of the monitoring program are also used to identify producers or other entities marketing animals with violative concentrations of residues. When such producers subsequently offer animals for slaughter, the animals may be subjected to enforcement testing until compliance is demonstrated.

Selection of substances

The selection of substances for inclusion on the annual national residue monitoring plan shall be done by the "National Residue Committee (NRC)". This committee shall be consisting of a Veterinarian from VPHD; a Veterinarian from the VEIETD; Deputy CVO of Diagnostics and Research Division; a slaughter-house-based State Veterinarian; a field-based State Veterinarian; Registrar of Veterinary Drugs; two Food Scientists (chemistry and microbiology) from the Diagnostics and Research Division. The committee shall meet once annually, during the first quarter of each year, to evaluate test results from the previous year and to decide on the substances to be included on the national residue monitoring programme for the current year. The compounds included in the national residue monitoring program are selected based on scoring them using the following weighting parameters:

- Regulatory concerns
- Withdrawal time
- Acute or chronic toxicity concern
- Historical testing information on violations
- Relative number of animals treated

The modality as to how to use these weighing parameters is further explained in annexure A.

(a) Criteria for compound selection

The main function of the NRC shall be to evaluate the risk associated with compounds of interest and decide on their inclusion in the Residue Monitoring Plan. The NRC members shall use the scoring system as explained in Annexure A. If a substance is receives 60% or more of the total score, then it is worth to be included on the National Residue Monitoring Plan.

The compound groups currently considered under the Monitoring Plan are Hormones, Antibiotics, Antiparasitic Drug, Anticcocidials, Pyrethroids, Sedatives, Non Steroid Anti-inflammatory Drugs, Pesticides, Heavy Metals as

well as Mycotoxins. The national residue monitoring sampling plan shall be based on two factors namely, domestic market and the export market.

(b) Domestic Market-based sampling

The number of samples to be included, on any particular year, shall be determined on the basis of the total number of animals slaughtered in the previous year for each production class. This sampling targets abattoirs including those under municipal authorities; border entry points; retailers markets; as well as butcheries. Samples shall also be collected from individual animal producers. A statistical sampling program to detect the violation prevalence at a required frequency shall be designed by the VEIETD each year. For veterinary drugs, the monitoring is only considered for registered drugs, except in cases where it is required by the trading partner(s).

(c) Export-based Sampling

The number of samples analyzed per year and for each production class is determined based on the requirements of the importing countries (EU, SA, FSIS, Asian markets, etc). These countries specify the basis for determining the minimum number of samples to be analyzed for each compound and for each production class aimed for exportation to their respective markets. The number of samples analyzed varies each year as it is based on number of animals slaughtered at export abattoirs, the previous year and the current food safety concern. The European Union (EU) for example, provides a Microsoft Excel template for the determination of the number of analyses per animal class for each group of compounds of interest. The FSIS publishes a guideline for designing national residue sampling plan (FSIS' Blue Book) on an annual basis. Many other importing countries also provide guidelines on the designing of the sampling plan to be followed by any country willing the export to their respect meat market. The National Residue Program Sampling Plan should always be designed in such a way that it covers requirements of all its meat importing countries.

Random Selection of Specimens

Random sampling involves the collection of n items from a lot of N items in such a way that all possible combinations of n items have the same probability of being collected. The objective is to avoid preferentially choosing items which are more easily accessible or which can be differentiated by a visible characteristic. Each combination is known as a compound/slaughter class pair. Generally for a specific pair, the number of specimens chosen should provide a 95 percent probability of detecting at least one violation when one percent of the animal population is violative.

Samples for the NRP are collected from two different types of sampling sites namely Slaughter-house (abattoirs) and animal farms (field). The principle for random sample selection of animals is thus categorized into abattoir and field random sampling.

(a) Abattoir Sampling

Once the compounds to be included in the NRP have been selected by the NRC (section 3.1.1 of this guideline), the next step is to determine the annual number of samples required for each analysis and for each abattoir. In order to obtain the number of samples (**M**) per each establishment, the total annual number (**Z**) of samples is then divided by the number of abattoirs (**V**). For the purpose of randomization of sampling, all carcasses are allocated numbers in an incremental order, with number 1 being allocated to the first carcass produced by that particular abattoir in the year and so on. To obtain a number (**X**), that dictates the frequency of sample collection, the estimated total number (**Y**) of carcasses to be produced in the year by that particular abattoir is divided by the number (**M**) of the analyses for the specific compound/compound group. To implement the random sampling strategy, one carcass is always to be sampled after at regular intervals of **X**. In other words one sample will be collected after every **X** number of carcasses produced.

Please Note:
M: Number of samples per each establishment,
V: Number of abattoirs,

X: Number that specify the frequency of sample collection (sampling of carcass will take place every after X number of carcasses produced by that particular abattoir),
Y: The estimate total number of carcasses to be produced in the year by that particular abattoir. For some substances/substance groups, the number (Y) might refer to the number of carcasses for a specific production class,
Z: Total annual number of samples to be analysed for a certain compound or compound group in a year.

(b) Field Sampling

In order to obtain the number (**N**) of samples to be collected by each State Veterinary Office involved in the NRP, the total annual number (**W**) of samples is then divided by the number (**U**) of State Veterinary Office involved. For the purpose of randomization of sampling, all farms under inspectional authority of a particular State Veterinary Office are allocated numbers in an incremental order. To obtain a number (**X**), that dictates the frequency of sample collection, the estimated total number (**R**) of farms under jurisdiction of that particular State Veterinary Office is divided by the number (**N**) of the analyses for the specific compound/compound group. To implement the random sampling strategy, one sample is always to be collected after at regular intervals of **X** number of farms. In other words, one farm is to be sampled after every **X** number of farms inspected.

Please Note:
N: Number of samples per regional State Veterinary Office involved,
U: Number of regional State Veterinary Offices,
X: Number that specify the frequency of sample collection (sampling of farms will take place every after X number of farms produced by that particular abattoir),
R: The total number of farms to be inspected in the year by that particular State Veterinary Offices,
W: Total annual number of samples to be analysed for a certain compound or compound group in a year.

Procedure for sample collection

Samples shall be collected at export abattoirs and/or farms according to the "National Residue Sampling Plan". These samples shall be collected by DVS' Meat Hygiene inspectors (at slaughter-houses) and Animal Health Inspectors (in the field) under the supervision of a DVS Veterinarian. The Central Veterinary Laboratory (CVL) shall provide the DVS Veterinarians based at the establishments with sampling annual instructions, which should address the following:

(a) The accompanying form

Each sample shall be accompanied by a form stating the following information: all examinations (tests) required; the date the samples were collected; animal's age; sex; species type; the owner's name; the farm name; the farm number and the district in which the farm is located must be clearly indicated on the sample submission form.

(b) Animal owners

For each test, the animals sampled in a year, must be from different farms.

(c) Specifications regarding certain sample

Ideally, all samples should be delivered to CVL on the same day on which they were collected. In the case of serum, if not delivered to CVL on the same day, the samples are to be centrifuged at + 4°C for 10 minutes at 3000 revolution per minute (rpm), in order to obtain a clear serum. The serum must then be stored at − 20°C for delivery to CVL the following day.

Urine samples collected from the field shall be filtered before delivery to CVL. The filters used for this purpose are to be provided by CVL. Along with sampling instructions, CVL also provides containers for urine and serum samples.

(d) Packaging and Labeling

Each sample is to be packaged in a separate container. Pieces of solid samples must be put in clean plastic bags, whereas liquid samples are to be placed in clean bottles provided by CVL. Each sample must be labeled with a

clearly-marked sticker, indicating the sender's reference number and type of matrix, sex and age of animal and the production class.

(e) Specific guidelines regarding the sampler

The sampling DVS inspector must avoid applying any substance that may result to sample contamination when sampling.

Transmission of samples to CVL

The laboratory sample shall be kept in such a manner that the integrity is not compromised by any chance. Moreover, the laboratory samples should be placed in a clean inert container offering adequate protection from external contamination and protection against damage to the sample in transit. The use of a plastic cool box could be suitable for this purpose. The container shall then be sealed in such a manner that unauthorized opening is detectable, and sent to the laboratory as soon as possible taking any necessary precautions against leakage or spoilage. For examples, all samples (except blood), shall be kept frozen and blood samples should be kept cooled, as appropriate.

Sample reception at CVL

Samples to be analyzed for chemical residues of veterinary drugs, pesticides and environmental contaminants are received as per CVL's standard operational procedure (CVL REC 001)

Surveillance

The competent authority shall conduct surveillance testing for residues of veterinary drugs in food of animal origin which must serve a specific objective of controlling occurrence of residue violations. This is achieved through ensuring that residues above the Action Limit do not occur and that prohibited or illegal drugs are not being used. The carcass sampled for surveillance should be held at the slaughter-house until the test results are obtained. Violations of MRLs or the use of prohibited substances, detected under the surveillance testing, are investigated and, where appropriate, are prosecuted. Legal sanctions can be taken against individuals who ignore instructions on the proper use of products.

Enforcement

Enforcement testing shall be consisting of the analysis of specimens collected by DVS inspectors from suspect animals based upon their observations of clinical signs or their knowledge of the history of the animal or the producer. Enforcement testing is performed to detect individual animals with violative concentrations of residues and the number of violative residues does not necessarily reflect a statistically valid incidence within the entire slaughter class. DVS encourages the use of in-plant rapid screening methods as a key tool in support of enforcement testing. These methods are recommended for use in animal populations with high prevalence as a mechanism to prevent residues from entering the food supply. They are also used to follow up on producers and others who have been identified to be marketing animals with violative concentrations of residues. Slaughter classes being sampled under this initiative are bulls, beef cows, dairy cows, heifers, steers, calves, sheep, goats and game.

NRMP Laboratory

Introduction

As per international standards i.e. Codex Alimentarius Commission guidelines for laboratories involved in the import/export testing of foods, DVS shall recommend that national laboratories involved in food safety should follow the following criteria:

1. The laboratories should use internal quality control procedures, such as those described in the "Harmonised Guidelines for Internal Quality Control in Analytical Chemistry laboratories;
2. Participate in appropriate proficiency testing schemes for food analysis which confirm to the Requirement laid out in "the International Harmonized Protocol for Proficiency Testing of chemical) Analytical Laboratories,
3. Comply with the general criteria for testing laboratories laid down in ISO/IEC Guide 17025:2005 "General requirements for the competence of calibration and testing laboratories"; and
4. Make use of methods which have been validated according to the principles laid down by the Codex Alimentarius Commission.

In Namibia, the Central Veterinary Laboratory (CVL) which is based in Windhoek is the only state laboratory involved in meat residue testing.

Central Veterinary Laboratory (CVL)

The testing of chemical residues in meat shall be carried out at CVL. CVL is the public institution responsible for veterinary diagnostic services for the agricultural industry, and it falls under DVS within the Ministry of Agriculture, Water and Forestry (MAWF). The main functions thereof comprise the provision of quality analytical and diagnostic services to the agricultural industry including of residue analysis, toxicology, food and water microbiological analysis pathology, parasitology and rabies diagnostic services, clinical microbiology and animal reproduction, serology as well as molecular diagnostics.

The Food Science sub-division (Toxicology and residue analysis section and Food Hygiene section) is particularly responsible for testing for veterinary drug residues.

Functions of the Food Science Sub-division Regarding Residue Testing

Section: Toxicology and Residue Analysis

- Provision of sampling instructions to export abattoirs and State Veterinary Offices
- Reception, preparation and temporal storage of samples from export abattoirs and State Veterinary Offices, for chemical residue testing
- Chemical analysis of traces of veterinary drugs used in animal husbandry as well as pesticides and environmental contaminants, in conformity with international standard requirements
- Sub-contracting of analyses to other laboratories, for analyses that cannot be carried out at CVL. This include sourcing, oversight review, sending of samples and receipt of analytical results
- Reporting of final analytical results to the respective abattoirs or State Veterinary Offices

Section: Food Hygiene

- Reception, preparation and temporal storage of samples, specifically for antimicrobial substances from export abattoirs
- Analysis of meat samples to determine the presence of antimicrobials

The laboratory is not yet accredited however; work is under way for CVL to have its quality system in place by 2010.

Laboratories other than CVL

CVL might not have the ability to carry out a certain type of analysis at some point in time, due to either technical or technological limitation. In such cases, DVS sub-contracts to another laboratory to carry out the analysis on behalf of the CVL provided such laboratory meets the quality performance requirements. At the same time, the sub-contracted laboratory shall be signing a Memorandum of Understanding (MoU) with MAWF. The sub-contracted laboratory then reports test results to CVL within 6 weeks of sample receipt.

Analytical methods

Analytical methods used to determine compliance with maximum residue limit for veterinary drugs (MRLVDs) and related limits shall be suitable for routine use by DVS testing programmes for all residues of veterinary drugs and substances which may be used as veterinary drugs, certain pesticides which have veterinary uses as well as environmental contaminants. At the same time the DVS, which is the competent authorities responsible for designing national residue control programmes shall ensure that appropriate residue methods of analysis are used to assure compliance with NRP action limits. The analytical method must be validated with the intention to demonstrate that it is fit-for-purpose.

Integrating analytical methods for residue control

Analytical methods for veterinary drug residues in meat must reliably detect the presence of an analyte of interest, determine its concentration and correctly identify the analyte. When residues of any substance included on the NRP are detected at concentrations above an established action limit, the results should be confirmed before regulatory enforcement actions are taken. The principal performance attributes of analytical methods used in residue control programmes are dependent on whether a method is intended to *simply detect*, to *quantify*, or to *confirm* the presence of a target residue.

(a) Screening methods are qualitative or semi-quantitative in nature and shall be used as screening methods to identify the presence (or absence) of samples from a herd or lot which may contain residues which exceed an MRLVD or other regulatory action limit established by DVS. These methods may not provide adequate information to accurately define the concentration present or, to confirm the structure of a residue but may be used to quickly determine which products require further testing and which can be released.

(b) Quantitative methods provide quantitative information which shall be used to determine if residues in a particular sample exceed regulatory limit or other regulatory action limit, but do not provide unequivocal confirmation of the identity of the residue. Such methods which provide quantitative results must perform in good statistical control within the analytical range that brackets the MRL or any other regulatory action limit.

(c) Confirmatory methods provide unequivocal confirmation of the identity of the residue and may also confirm the quantity present. Confirmatory methods are the most definitive and frequently are based on combined chromatographic and mass spectrometric techniques, such as liquid chromatography – mass spectrometry (LC/MS). Such methods when used for confirmation of residue identity should provide reliable structural information within established statistical limits. When the confirmatory method does not provide quantitative information, the quantification result of the original quantitative method should be verified by analysis of replicate test portions using the original quantitative method or a suitably validated alternative Quantitative method. These three categories of methods – screening, quantitative and confirmatory - often share some performance characteristics. Samples which test “positive” with the screening method are suspects and will be therefore subjected for further laboratory testing using more definitive methods, including repeat testing of replicate test portions with a screening method, but typically quantitative and/or confirmatory methods will best establish that the sample does contain residues in excess of the regulatory limit.

Consideration for selection and validation of analytical methods

Identification of Method Requirements

a) Method scope:

The intended purpose of the method is usually defined in a statement of scope which defines the analytes (residues), the matrices (tissues, milk, urine, etc.) and the concentration range to which the method applies. It also states whether the method is intended for screening, quantitative, or confirmatory use.

(b) Marker residue:

The MRL is expressed in terms of the marker residue, which may be the parent drug, a major metabolite, a sum of parent drug and/or metabolites or a reaction product formed from the drug residues during analysis. In some cases, the parent drug or the metabolite may be present in the form of a bound residue which requires chemical or enzymatic treatment or incubation to be released for analysis. It is important that the marker residue should, whenever possible, provide unequivocal evidence of exposure to the drug.

(c) Target Tissue:

The usual target tissue selected by DVS to be tested for veterinary drug residues in a residue control programme is the edible tissue in which residues of the marker residue occur at the highest concentrations and are most persistent. For lipophilic substances, the usual target tissue is fat. For most other substances, the target tissue is liver or kidney even though in some cases urine and blood serum may be used, depending on the primary route of elimination in the animal involved.

(d) Analytical performance characteristics

(i) Performance Characteristics of Screening Methods

Screening methods are usually either qualitative or semi-quantitative in nature, with the objective being to discriminate samples which contain no detectable residues above a threshold value (“negatives”) from those which may contain residues above that value (“positives”). The validation strategy therefore focuses on establishing a threshold concentration above which results are “positive”, determining a statistically based rate for both “false positive” and “false negative” results, testing for interferences and establishing appropriate conditions of use. For a screening test, the term “sensitivity” refers to the lowest concentration at which the target analyte may be reliably detected within defined statistical limits. The “selectivity” of a screening method refers to the ability of the test to determine that samples which give a negative response are truly negative. The test must also be able to distinguish the presence of the target compound, or group of compounds, from other substances which may be present in the sample material. The “cut-off” or threshold for the test for a particular compound is established by conducting concentration-response experiments, typically using replicates (from at least six sources) fortified at each of a series of increasing concentrations.

(ii) Performance Characteristics for Quantitative and Confirmatory Methods

The performance characteristics for Quantitative Methods are selectivity, accuracy, trueness, or bias; precision (repeatability and reproducibility), linearity, detection limit, limit of quantification (LOQ), determination limit and recovery.

Quality Management Systems

A Quality Management System is an essential component for residue analysis. It both monitors those factors associated with the analysis of a sample by an analyst and provides the oversight by independent reviewers to ensure that the analytical programme is performing in an acceptable manner. The use of an accredited Quality Management System supports decision-making for residue control agencies, improving the reliability of analytical results, and providing quality data for residue control programmes to demonstrate food safety to consumers, producers, and law making bodies regarding residues of veterinary drugs in food.

Analysts

Analytical methods shall be performed by a properly trained analyst using the specified equipment and materials, and following the procedures described in the method, reliably and consistent with aim be obtain results within specified statistical limits for the analysis of a sample. The analyst shall be subjected to continuous trainings and their performance will be checked through participation into proficiency testing as well as through the inclusion of internal quality checks.

NRMP Reporting

Reporting of results to the various stakeholders

Samples analysed at CVL

Once the analyses have been completed by the analyst and confirmed and signed by the Diagnostician responsible for the laboratory section in question, the results shall be sent to the DVS Veterinarian at the relevant Abattoir or Veterinary State office. The results shall be sent within two (2) working days after completion of analysis.

Samples analyzed at laboratories other than CVL

Once the analyses have been completed, the results are conveyed to CVL via post-mail, e-mail and/or fax mail. Up-on receipt by CVL Officials, such results shall be critically scrutinised and signed by the Diagnostician responsible the Toxicology and Residue Analysis section, the results are sent to the DVS Veterinarian at the Abattoirs or regional Veterinary State offices from where the sample originated. This should be done within two (2) working days after receipt of the results at CVL.

Reporting of results to the importing country

Annual residue monitoring program results shall be compiled by the Veterinary Diagnostician Specialist in Charge of the Food Science Sub-Division at CVL, as per requirement of the importing country, and shall be sent to the Deputy Chief Veterinary Officer responsible for the VPHD, who shall then review and forward them to the competent authority in the importing country.

Procedure to be followed in case of a non-compliant sample

In the event of a non-complying sample, the procedure laid down in chapter 6 of this guideline shall apply.

Data collection and statistical analysis

The objective of the Data collection and statistical analysis is to evaluate residue trends. On quarterly basis, the Toxicology and Residue Analysis section at CVL shall compile all laboratory residue results and submit them to the VEIETD. Simultaneously, residue violation related information from abattoirs and State Veterinary Offices must be forwarded to the same division. It is the responsibility of VEIETD to compile a full annual residue data report and perform a statistical analysis. The annual report will focus on the following:

- Consumption data (Table and Chart)
- Definition of production classes
- Summary of the national data (chart)
- Number of sample tested by production class
- Number of sample tested by compound class
- Sampling results for each compound against Production class; Number of non violative positive samples; Number of violations; Percentage violation at 95 % confidence interval

- Residue Violation versus abattoirs
- Residue Violation versus specie
- Residue Violation versus location (region, District etc)

NRMP Response

General

DVS shall determine the National Maximum Residue Limits (MRLs) and other residue related regulatory limits for meat based on WTO recognized standards setting bodies including Codex, OIE etc, as well as standards specified by the various meat trading partners. Enforcement follow-up activities are prioritized by the degree of human health risk potential involved in the residue violation(s). Additionally, enforcement action will be taken against the individual(s) responsible for multiple residue violations involving drugs presenting a lesser human health risk. The information in this chapter covers most violative residue situations. However, unique situations are encountered which might require new or special investigational or enforcement procedures. New or special situations can be discussed with the CVO as they occur so that an acceptable investigational or enforcement strategy could be applied.

The objective of the residue tracebacks is mainly to prevent recurrence by identifying the cause and informing the producer. However, regulatory action can be taken against a producer or other responsible persons when it has been documented that the animals offered for slaughter at abattoir resulted in illegal residue(s) in edible tissue. For example, a regulatory action can be taken against a producer who sells animals containing illegal drug residues to an intermediate party, which in turn sells them at an auction, where they are purchased by a buyer who in turn sells them to a slaughter plant. In these situations the producer can be charged with causing the delivery for introduction of adulterated meat into the market, even if the producer has no specific knowledge of the ultimate destination of the animals.

The other parties involved in the scenario may also be charged with causing the delivery for introduction or the actual introduction of adulterated food into the market, or they may be charged with offering for the introduction of adulterated meat into the market. Additionally, "caused to be introduced", charges may be brought against veterinarians, animal dealers, buyers, vendors, auctioneers, or other persons who are responsible for having caused the residue or having introduced animals into market without first assuring that the animals were free of illegal residues.

When treated animals remain on the premises, the local State Veterinarian shall initiate action to prevent further processing of the animals, such as requesting that DVS collects samples and hold future presentation of animals for slaughter from the particular producer and/or requesting DVS detention/quarantine of the animals. It is also vital to provide complete information (e.g., suspected consignment date, destination, drugs involved, etc.) to cooperating agencies and officials. Generally, whenever a suspicion about residue violation has been reported the under-listed actions are to be followed:

1. The state veterinarian(s) responsible for the area(s) in which the incident occurred shall obtain a complete traceability report of the affected livestock or farms from the NAM-LITS system and alert other state veterinary offices and VPHD or ADCD about similar movements to their areas.
2. The affected farms shall be restricted for the movement of livestock from the particular farm or holding. The restrictions feature on the NAM-LITS system can be used for this purpose if available.
3. An initial inspection shall be undertaken within at least three working days of receiving the report.
4. At least two Veterinary officials shall conduct the investigation to ensure thorough inspection of all aspects mentioned hereunder is carried out.
5. The information about the suspicion shall be given personally to the farmer on the farm or holding. If the farm owner is not present the attending veterinary officials shall wait for his or her arrival on the farm or proceed with

the necessary investigations if the owner is not due to arrive on the farm or holding within a reasonable time frame.

6. Veterinary Officials shall be present on the farm to:
   a. Interview the farmer and herdsman in order to obtain a signed declaration by the farmer or owner about
      i. the number of animals on the farm,
      ii. camps and up to date maps of the farm or holding
      iii. activities on the farm especially the use of medication and feed formulations over the previous six months.
   c. Observe and record the gathering of livestock. They should drive to the various camps to establish the spatial distribution of livestock on the affected farm or holding.
   d. Evaluate all movement records to and from the farm or holding. Particular attention should be given for the presence of imported animals.
   e. Evaluate all records pertaining to the treatment of animals and observance of withdrawal periods. The level of the farmer or herdsmen's understanding of withdrawal periods should be assessed and recorded.
   f. Check and record all drug stores and all medication present on the farm.
   g. Check and record all feed stores and all ingredients of feedstuffs.
   h. Check all surface dams and open water sources, and record the level of contamination and pollution of such water sources.
   i. Examine all cloven hoofed animals visually and by palpation for the presence of growth implants or subcutaneous nodules caused by injection marks. The findings should be recorded.
   j. Verify that all imported and received animals are branded and identified in the prescribed manner. Such findings should be recorded.
   k. Examine treated animals with the aim of possibly confirming the diagnosis made. The treated animals should be identified, recorded along with the diagnosis and treatment given.
   l. Bleed a statistically representative sample of animals on the farm for serum and collect urine samples.
   m. Feed samples should be collected from the various stores and feed troughs on the farm.
   n. Dispatch samples within 24 hours to the CVL in Windhoek. Ensure that samples are clearly marked and relevant documentation accompanies the samples to the lab.
8. The farm or holding shall remain under restriction until all laboratory results are returned negative.
9. Movements from the farm can be made for newly arrived livestock but only if a written agreement had been concluded between the farmer and the relevant state veterinarian to allow inspections of such livestock and the settlement of costs related to such inspections.
10. The farmer shall be informed about the final results in writing as soon as it becomes available and additional sampling should be conducted on the farm or holding if need be within 3 days of the office receiving the final results.
11. Only if all results are negative can restrictions on an affected farm or holding be lifted within 48 hours of the office receiving such results.
12. CVL and Agricultural laboratories shall ensure the confidentiality for the laboratory results
13. All records shall be filled in terms of MAWF's existing filling policies.

Initial Violation

The Violation notification letter from CVL, Abattoirs or State Veterinary Offices to the relevant authorities shall provide an appropriate language for DVS to take the action against the producer presenting animals with violative residues, in accordance with section 11 of the "Prevention of Undesirable Residue in Meat, Act 21 of 1991" and its amendments. Under the following circumstances it is appropriate for DVS to act against initial violator in any event that the investigation confirms his/her culpability.

- Involvement of drugs considered of high risk to human health/safety whether approved or unapproved.

- Involvement of apparent extra-label use.
- The occurrence of residue levels so high as to indicate intentional misuse of the drug
- Involvement of drugs where no tolerance limit has been established

According to the said Act, the initial violator would receive a penalty of N$ 2 000 or imprisonment period not exceeding six (6) months or both such fine and imprisonment.

Repeat/ Multiple Violations

Farmers or individuals who repeatedly present adulterated animals for slaughter may represent a significant public health risk. They thus, deserve a heavier penalty as per the "Prevention of Undesirable Residue in Meat, Act 21 of 1991" and its amendments, depending on the degree of the investigation outcome.

The Act stipulates that, on the second conviction, the violator would be penalized for fine of N$ 4 000 or an imprisonment period not exceeding one (1) year or both such fine and imprisonment.

The same Act further states that on the third and subsequent convictions, the violator would either be fined for N$ 8 000 or receive an imprisonment period not exceeding two (2) years or both such fine and imprisonment.

Prosecution Procedure

Prosecution shall be considered when the residue violations involve one or more of the following elements and the individuals knowingly do or use:

- Drugs not permitted for extra-label use in food animals, banned or unapproved drugs that present significant human health safety concerns.
- Blatant misuse of toxicologically significant drugs resulting in residues substantially above tolerance.
- Issuing false guarantees that animals with violative residues were drug-free or had been properly withdrawn from the drug(s).

The VPHD/ADCD shall be responsible for reviewing all matters for which a criminal investigation is recommended, and is the focal point for all criminal matters. State veterinary officials and other stakeholders shall refer all criminal matters, regardless of their complexity or breadth, to VPHD/ADCD, including criminal search warrants, prosecutions and referrals for criminal investigation. With the authorization of the MAWF's Minister, through the Permanent Secretary and CVO, the VPHD/ADCD will then proceed with the necessary legal actions.

Regional State Veterinary Offices must obtain authorization from the CVO before pursuing any criminal matter. This authorization is absolutely essential to preclude potential interference with other on-going criminal investigations and to prevent confusion among the components of the Office of the Prosecutor General under the Ministry of Justice that are responsible for handling MAWF's legal issues, including criminal cases. During this communication, the Office of the Prosecutor General is to be provided with all of the facts of the potential case and any additional information that is relevant to, or could impact, the case in any way. The Office of the Prosecutor General will decide promptly whether or not it is interested in pursuing the case and will communicate its decision back to the MAWF Permanent Secretary's Office.

Injunction

In addition to the legal actions, the “Prevention of Undesirable Residue in Meat, Act 21 of 1991” further vests the power in CVO to consider seizing of the meat or meat product in question, if a tissue residue violation(s) occurs, against a producer and/or other parties that are responsible for or linked to providing/introducing animals for slaughter that result in illegal residues.

As with most injunctive actions, information on the history of violations and a good description of scope and size of the violator's operation is vital to aid in explaining the need for court action to achieve compliance. It is important to contact the CVO to initiate intensive/targeted sampling of the producer's animals. The injunction will be reviewed concurrently with the effort to obtain any additional documented violations. In order to proceed with a preliminary injunction, a documented violative residue or, if it involves a producer, the VPHD or ADCD inspection, no older than 60 days is required. If the 60-day time frame cannot be met, consider proceeding with a permanent injunction. If another residue violation occurs after a consent decree has been signed, and the inspection documents a violation, responsibility, and jurisdiction, the VPHD or ADCD shall alert the CVO, who in turn instruct the VPHD/ADCD to proceed with the appropriate legal action.

NRMP References

a. Animal Disease and Parasite Act, 1956 (Act 13 of 1956) and Amendments
b. Annex II of 86/363/EEC
c. Annex IV of directive 96/23/EC
d. Codex General Guidelines on Sampling; CAC/GL 50;2004
e. EU Regulation 2377/90
f. Fertilizer, Farm Feed and Agricultural Remedies Act, 1956 (Act No. 36 of 1947) Section 15 (2) (a);
g. Food Safety and Inspection Service Requirements Laboratory Training Manual for Namibian Inspection Officials and Laboratory Technicians; June 25-29, 2007
h. Joint FAO/WHO food standards programme Codex Committee on Residues Of Veterinary Drugs in Foods; Eighteen Session Report; May, 2009
i. Meat Safety Act, 40 of 2000
j. Medicine and Related Substance Control Act, 2003 (Act. No 13 of 2003)
k. Namibian Act 21 of 1991; Prevention of Undesirable Residue in Meat Prevention of Undesirable Residue in Meat, Act 21 of 1991 as Amended by Act 11 of 1994”;

Priority Disease Programs

FMD Contingency Plan

Please Note: This is the shortened version of the contingency plan and does not contain the details of the actions and procedures that will be carried out in dealing with a case of FMD or a potential major threat. For more information please refer to the full contingency plan.

Introduction

The FMD contingency plan details course of action to be followed in the event of an FMD outbreak or a potential major threat of FMD and the implications thereof. Namibia is a net exporter of beef and animal derived products. Each time an outbreak of FMD occurs in our country it adversely affects the trade and economy and consequently livelihoods of our farmers. It is therefore essential that all stakeholders and role players have a full understanding on the steps required to prevent an outbreak from occurring and to know what to do in the event of an outbreak.

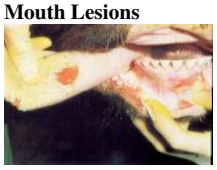
FMD is a highly contagious acute viral infection of cloven-hoofed domestic and wild ruminants and pigs. It is characterized in livestock by high morbidity, low mortality (except in young animals), and by vesicles and erosions in the mucosa of the mouth and skin of the inter-digital spaces and coronary bands.

FMD should be suspected when a combination of 2-3 of the following clinical signs is observed:

- Lameness in a number of animals
- Vesicles/lesions in the mouth (on tongue, gum, cheeks, lips)
- Salivation (drooling)
- Smacking of lips, grinding of teeth
- Unwillingness to move or stand
- In lactating animals significant drop in milk production

Feet lesions

Mouth Lesions



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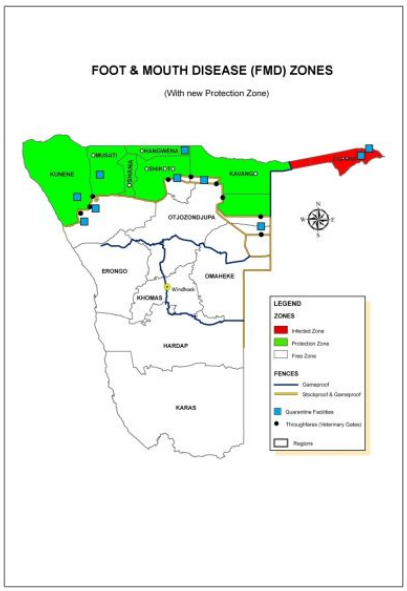
FMD Risk Management

Namibia is a net exporter of livestock and livestock products. Most of the exports originate from the internationally recognised FMD-free zone which is south of the Veterinary Cordon Fence (VCF). North of the VCF is the FMD protection zone and to the east is the FMD infected zone. These zones are managed by a countrywide system of disease surveillance, strict animal movement and import controls and vaccination in the infected zone. The map below shows the demarcation of these zones. An outbreak of FMD in the FMD-free zone will result in the immediate suspension of all livestock and meat exports and its effects on the economy will depend on how fast the outbreak can be contained.



FMD Control Zones

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FMD Response

Actions Following an FMD Outbreak

There are three ways of dealing with an FMD outbreak:

a) Stamping out:

Stamping out means that those animals that are in infected herds or have had contact with infected herds will be slaughtered and destroyed. This is likely to be carried out in the FMD free zone if the outbreak involves a small number of livestock.

b) vaccination:

Vaccination means all animals in the area where the disease has been detected will be vaccinated. This is likely to be applied in the infected and protection zones. In the event of a very large outbreak in the free zone, stamping out will not be economically feasible and therefore mass vaccination will have to be applied.

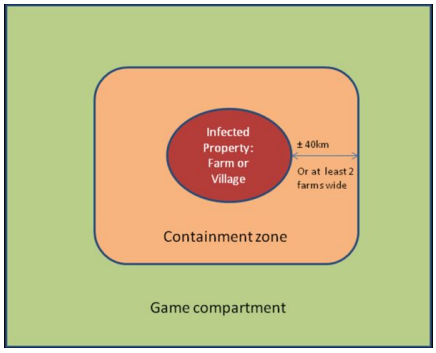
c) a combination of a) and b):

A combination of vaccination and stamping out are likely to be applied in the FMD free zone if the outbreak is medium in size and affecting a number farms.. Vaccination is done in order to limit the amount of virus circulating in the animal population and to give DVS time to organise stamping out.

Each of these approaches has its advantages and disadvantages. Generally, where stamping out is applied the disease will be eradicated quickly and the country can regain its FMD status considerably fast (within 3 months after the last sick animal was eliminated). In the case of mass vaccination, the waiting period according to OIE standards to regain free status can be 6 months or more after the last sick animal is eliminated.

An outbreak of FMD will trigger a series of actions by DVS and its stakeholders. To limit economic losses resulting from an outbreak of the disease, everyone needs to work quickly to prevent further spread and to eliminate the source of the disease. The following major steps will have to be taken:

1. An announcement of restrictions to limit movement of animals and animal products that may include the banning of exports from certain areas.
2. Demarcation of infected and containment areas or zones as shown below. The infected area refers to farms, villages or feedlots where sick animals have been identified.
3. Regular weekly to monthly inspection of livestock and collection of samples.
4. Trace-back and trace-forward inspections at farms that have moved animals into the infected area and those that received animals from the infected area respectively within the previous 30 days following the detection of the disease.
5. Results of the inspections and tests done on samples collected during inspections will guide DVS and its stakeholders on what course of actions to take as outlined above.
6. Communications to all relevant stakeholders like our trading partners, farmers, International Organisation for Animal Health (OIE) and the public.



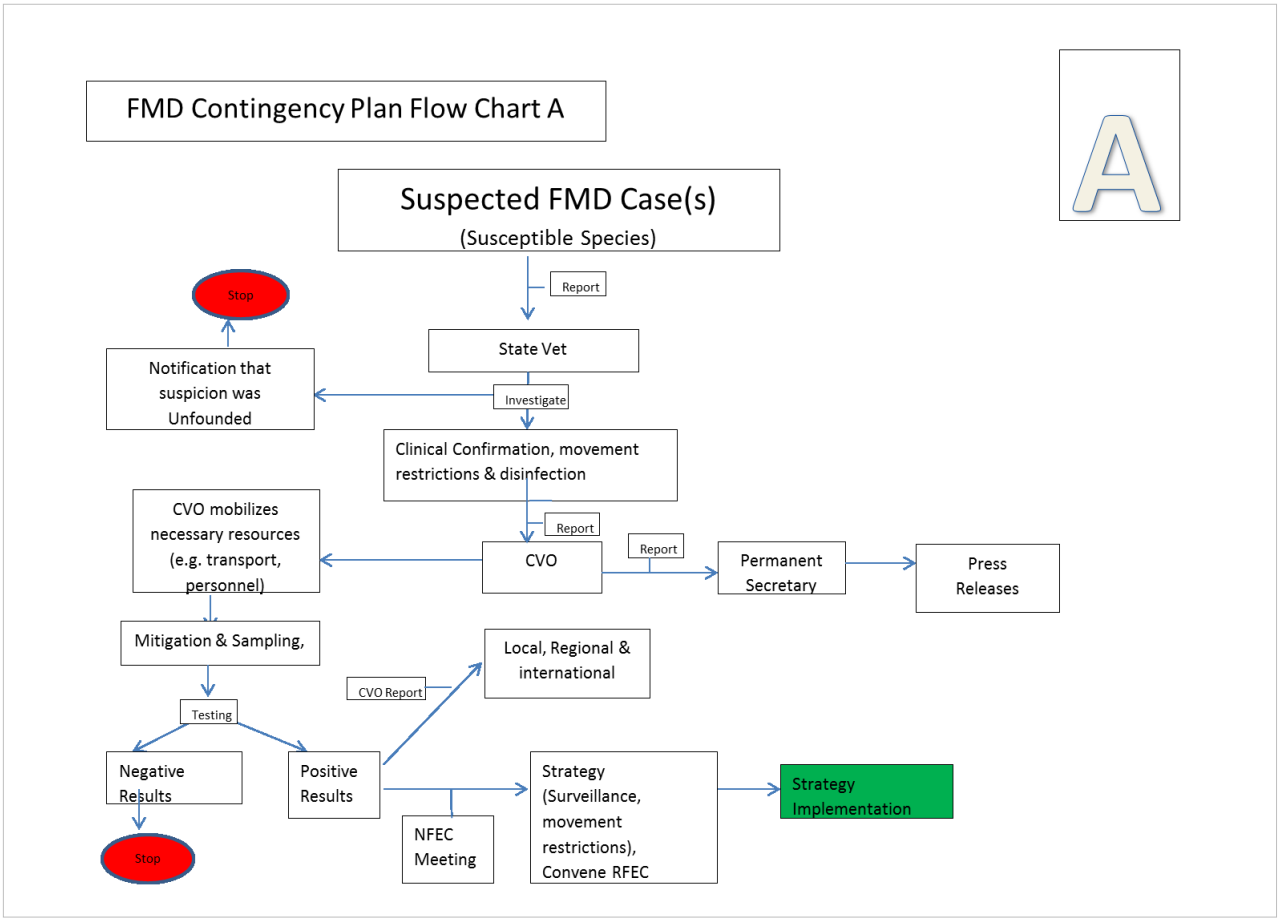
Diagrammatic representation of restricted areas following an FMD outbreak

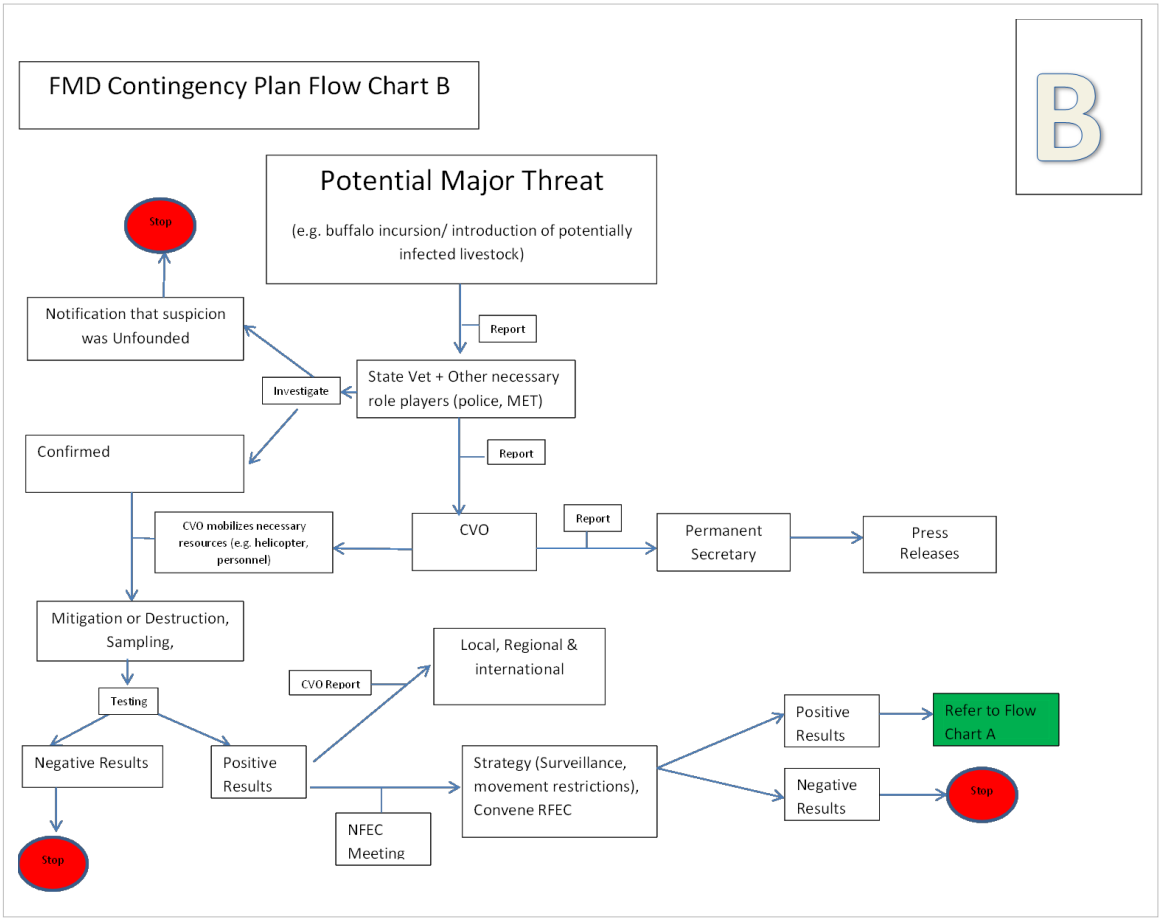
Role Players and Stakeholders

A number of role players will be involved in the management of the contingency plan. These include DVS, the Meat Board of Namibia, farmers representative organisations, Office of the Prime Minister Directorate of Disaster Risk Management, the Ministry of Environment and Tourism, the Namibian Police and others. See **Consultative Committees** for more details.

What will trigger actions by DVS and its stakeholders?

Two scenarios are likely to trigger activation of the contingency plan on the part of DVS. These are the occurrence of a suspicious case of FMD or that of a potential major threat. The series of actions that will follow are summarised in the flow charts below.





Contact Details

In the event of a suspicion of an outbreak of foot and mouth disease the offices that need to be informed are as follows. The Directorate of Veterinary Services must inform all its outlaying offices. Relevant government departments should be contacted through pre-arranged contact persons or offices as well as relevant private sector stake-holders such as the Farmer Organisations, Meat Board, Agronomic Board, major importers and exporters of animals and animal products. The contact details are at **Important Contact Numbers**.

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Contagious Bovine Pleuropneumonia (CBPP)

National CBPP Contingency Plan

Contagious bovine pleuropneumonia (CBPP) is an infectious and highly contagious disease of cattle and water buffaloes, and considered to be amongst the most important infectious diseases. Affected animals have difficulty in breathing due to damage to the lungs, lose condition and a proportion die. All ages of cattle are susceptible, but young cattle develop joint swellings rather than lung infections. Many cattle show no disease signs, despite being infected. Others recover quickly after a transient mild disease, yet they can carry the infection for as long as two years, and may be responsible at a later stage for passing on infection to susceptible cattle.

The disease is caused by a bacterium called *Mycoplasma mycoides* subsp. *mycoides* Small Colony variant (MmmSC), which is difficult to see even with a light microscope. However, growth of the organism can be seen when infectious material is cultured on suitable media in the laboratory.

Cattle of both *Bos taurus* and *Bos indicus* types are susceptible; domestic buffaloes are generally more resistant. Sheep and goats are resistant to the disease.

CBPP is widespread in Africa and is recognized to be present in some countries of Asia and Europe.

In Africa, it is found in an area south of the Sahara, from the Tropic of Cancer to the Tropic of Capricorn and from the Atlantic to the Indian Ocean. Endemic infection extends throughout the pastoral herds of much of western, central and eastern Africa, with Angola and northern Namibia. Areas of Namibia south of the Veterinary Cordon Fence are free of CBPP.

Small numbers of outbreaks occur in northern Namibia in most years and are eradicated.

Full details of the CBPP Contingency Plan for Namibia can be found at **CBPP Contingency Plan**.

CBPP surveillance

Objectives

- Early detection, reporting and reactions to outbreaks.
- Fast and reliable laboratory confirmation.
- Fast feed-back of results to field staff and farmers.
- Monitoring the progress of control efforts.

Staff involved in the field surveillance

Staff	Involvement
Farmers	Report to DVS / DEES / CAHW
SV	Disease Report Form
AHT + SIA, CAHW, AET	Suspicion Form
Open market butchers	Report to AHT
Meat Inspector	SHIV Form

Methods

Passive

Suspicion reported by a farmer to an animal health officer (SV; AHT + SIA; CAHA, AET).

Active

- Regular visits to communities (FVF by AHT, FED groups for AET).
- Regular visits to markets, auction pen and open market butchers.
- Examination of animals at Border posts.
- Vaccination campaign.

During these field visits, farmers, butchers and all other people involved in cattle farming and trade must be provided with information on CBPP (leaflets, posters) and the importance to report this disease.

Legitimate suspicion of CBPP

A legitimate suspicion of CBPP must arise in each of the following cases:

Live animals

Suspicion on an individual animal Make a standardized clinical examination. If coughing and difficulty to breath & poor body condition, examine the whole herd.

Suspicion in a herd

- Determine the herd size by direct counting of the cattle.
- Interview the farmer, the herder and any other person in charge of the cattle to:
  - Determine the date when clinical cases began.
  - Count the number n of cows who have been dying with respiratory symptoms since this date.
  - Count the number o of cows who have been leaving the herd since this date (sales, slaughtering, loans,…).
  - Count the number s of cattle showing cough and difficulty to breath, associated with body condition loss.
- A legitimate suspicion of CBPP arises if:

- > 5% of the cattle show coughing and difficulty to breath, associated with a loss of body condition, i.e.

OR

- > 5% of the cattle died with respiratory symptoms, i.e. .

A special attention should be paid to cases where o is large compared to n (say o > n / 10): this might be an indication that the farmer quickly got rid of his cattle, being scared by the risk of high losses related to CBPP.

Post mortem examination at the abattoir or during a necropsy

A legitimate suspicion of CBPP arises if the examination shows:

- the presence of marbled lesions in the lung with abundant pleural fluid, yellow fibrin and adhesion of the lungs to the thoracic wall,

OR

- the existence of sequesters in the lung,

In any case of legitimate suspicion of CBPP (clinical or post mortem examination), a suspicion form must be filled and **biological samples** must be taken and submitted to the veterinary laboratory as described in **Sample submission guidelines**.

If a case is detected at the abattoir, it case must be traced back to the originating herd.

CBPP outbreak investigation

Introduction

A survey must be undertaken in any case of suspicion, to identify the origin of the infection. A questionnaire will be filled with the following items:

- Nature of the diseased cattle (sex, age…)
- Origin of animals
- Total number / number sick / number died,
- Vaccination status of the herd (last vaccination)
- Date of the first symptoms
- Treatments done
- Antecedent of such symptoms in the herd, in the area (name of farmers)
- Animals bought in recently, coming from where ?
- Common grazing with other cattle, contacts at water points…
- Animals recently sold : when, where, to whom ?

Samples

Samples must be collected by the DVS staff.

Selection of cattle

- All diseased cattle,
- A quarter (25%) of other cattle in the herd.

Nature of the samples, quality requirements and storage

- Alive cattle:
  - cleanly sample veinous blood (e.g. jugular vein) in a dry tube to get at least 1 ml of serum (i.e. at least half of a 5-ml tube). Wait for a full cluttering before storing the tube at +4°C. Full blood should never be frozen.
  - The blood must be centrifugated to separate the clutter from the serum, which must be clear (colorless or yellowish) and clean (transparent).
    - Opaque sera are often a sign of bacterial contamination, resulting in improper sample for many diagnostic techniques.
    - Pink-to-red sera indicate that hemolysis occurred. Such sera are improper for laboratory tests such as the fixation complement test (CFT).
  - Serum can be stored either at 4°C (a few days) or frozen and sent to the CVL for further processing (diagnostic tests).
- Dead cattle (abattoir or natural death):
  - Sample a small piece of lung tissue (1 cm3) at the limit between healthy lung and lesion (acute lesion or sequestrum wall), for the purpose of Mycoplasma isolation.
    - When a cold chain is available, these samples should be stored at +4°C and quickly sent to the CVL. This is the preferred kind of sample and storage. Avoid to freeze the samples: negative temperatures kill the Mycoplasma.
    - When no cold chain is available, samples might be stored at room temperature in 10% formalin (10% vol. by vol. dilution of the commercial solution of formalin).
  - Sample pleural fluid using strips of sterile filter paper, dry the strips and store them at room temperature before sending them to the CVL.

Sample and cattle identification

Paint marks on animals: an identification number + “H” for healthy, “S” for sick. Same identification number on the animal than on the tube.

Transmission

Use the DRF to transmit information about suspected cases to the laboratory.

Information feed-back to the farmers

Inform the farmer that he can collect the result at the SV office 3 weeks after sampling. A specific register must be created at the SV office for this purpose. In case of a positive result, i.e. if CBPP was diagnosed in the samples sent to the CVL, the AHT and the SV must go to the farm to inform the farmer and take further actions.

Laboratory analysis

Bacteriology results are usually available 7 days after the reception of samples at the CVL. The Complement Fixation Test (CFT) is used to analyze the sera. Results are reported as the maximum serum dilution where the test was found positive.

Dilution	Laboratory Interpretation	Epidemiology (case of unvaccinated cattle)
0	Negative serum	Either the animal was not infected, or the CFT was not sensitive enough to detect the infection. The latter is a common problem. An individual negative value is not a strong evidence that the animal was not infected. Negative results for the whole herd have more weight with this respect.
1/10 to 1/40	Doubtful result	Such cases may arise at the beginning of the infection, or a few month after the animal was infected, and might still be infective. If no positive sera was found in the same herd, farm or community, go back to the farm and make further samples, preferably on the same animals and on a larger population than for the initial survey.
1/80 and higher	Positive result	The animal and the originating herd, farm or community was infected with CBPP. Urgent actions need to be taken to control the outbreak.

Provisional Timing

Event (involved actor in parentheses)	Time Allotted (days)	Cumulated
Suspicion of CBPP after a herd / farm / community visit (AHI, SIA, CAHA, AET)		
Fill the suspicion form (AHI, SIA, CAHA, AET) Samples for laboratory diagnosis	Immediate	
Fill the disease report form (state vet) Register the sample at the regional level (state vet)	0 – 5	0 – 5
Sample reception and registration (CVL)	1 – 2	1 – 7
Availability of serological result (CVL)	3 – 7 (3 d by phone)	4 – 14
Availability of bacteriological results (CVL)	14	15 – 21
Information of the farmer (SV, AHT)	1 - 2 (+ result) 1 – 7 (- result)	5 – 17 5 – 21

People in charge and documents

Event	Document	Actor
Diseased animals	Suspicion Form Epidemiological Survey	AHT + SIA, CAHA, AET
Send samples to the CVL	DRF Sample register	State veterinarian Clerk
Analyses in the CVL or regional lab	Serology register Bacteriology register	Technicians in charge
Reception of the results (region)	Register	Clerk
Feed back to the farmers	Result form	State vet (signature) Negative result: AHT, SIA Positive result: SV or CAHW + person who filled the SF

CBPP response

Notification

CBPP is a notifiable disease, under the Animal Health Act, (Act No. 1 of 2011). In the event that the disease is suspected the official carrying out the investigation shall notify the Chief Veterinary Officer or his immediate supervisor. In the case of a private veterinarian or person responsible for the animals shall within 24 hours report his/her suspicion to the nearest State Veterinarian.

Actions to be taken in case of CBPP suspicion (north of VCF)

- Notify your supervisor and/or the Chief Veterinary Officer
- Official movement restrictions may be imposed with the area affected to be determined by the CVO.
- Inform the farmer involved in the outbreak on the necessary measures:
  - Isolation of the diseased cattle
  - Avoid any movement of his cattle in the area and any contact with other cattle
  - Avoid any entry / exit of cattle (sale, purchase, gift, loans,...)
- Undertake an **outbreak investigation** as prescribed.
- Vaccinate or re-vaccinate all the exposed cattle.
- Organize meetings to inform neighboring farmers about the disease and what they must do in case of a CBPP suspicion in their herd.

Actions to be taken in case of CBPP suspicion in the FMD Free Zone (south of VCF)

- Notify your supervisor and/or the Chief Veterinary Officer
- The CVO will implement the notification and reporting process as described in the **CBPP Contingency Plan** or in **Notification of an outbreak**
- Field staff will implement instructions as described in the **CBPP Contingency Plan**. These instructions include:
  - immediate ban on movement of cloven-hoofed animals south of the VCF.
  - cessation of exports of live cattle.
  - trace-back of animals introduced onto the property in the previous six months and inspection of animals on property of origin.
  - trace-forwards of animals which have left the property in the previous six months and inspection of animals on property of destination.
  - establishment of CBPP Infected and Surveillance Zones.
  - slaughter of cattle in Infected Zone through designated abattoirs.
  - movements of cattle in tyhe Surveillance Zone may be permitted for immediate slaughter at an abattoir only, with movement in a sealed vehicle and according to a route specified in the permit.
  - regular inspection of all properties in the Surveillance Zone for the duration of the outbreak.
  - Intensified surveillance for CBPP in the rest of the country (Free Zone)

Bovine Spongiform Encephalopathy (BSE)

National Contingency Plan for Bovine Spongiform Encephalopathy (BSE)

BSE Contingency Plan presents a strategy paper for the control and eradication of bovine spongiform encephalopathy (BSE) in case of an outbreak in Namibia.

BSE is a listed disease by the Office International des Epizootics (OIE) because of its socioeconomic and/or public health importance and has considerable significance in the international and domestic trade of animals and animal products.

A major implication following the occurrence of BSE in Namibia would be the economic losses associated with restrictions on Namibian's international trade in livestock and livestock products. This strategy therefore attempts as far as possible to address the concerns of the country's main trading partners (EU, Switzerland, Norway and South Africa).

Domestic consumer markets also have a concern about product safety. This could affect local sales of beef. The processing industries will be affected and knock-on effects could bring considerable hardships to the economy. Programmes to restore consumer confidence are therefore necessary as part of the overall strategy.

The full Contingency Plan is available at **BSE Contingency Plan**.

The latest BSE Circular is **Circular V9 of 2008: Bovine Spongiform Encephalopathy (BSE) risk analysis and on-going surveillance programme**.

BSE Communication

Communication instructions for bovine spongiform encephalopathy

Instructions for communications during a suspected and/or confirmed outbreak of bovine spongiform encephalopathy.

The following information is taken from the Directorate of Veterinary Services' **Contingency Plan for Bovine Spongiform Encephalopathy - updated February 2006**.

Administrative Equipment Communication

- All state veterinary offices are expected to maintain their communication equipment in order such as facsimiles, telephones, photocopiers. In the event that the equipment is not working, the equipment is repaired immediately and in the meantime facilities at other government departments can be used.
- A computerized and manual database of animal movements
- Movement permits, quarantine order certificates, Disease report forms, to be available at all times.
- Vehicles currently in service in the Directorate will be used for field operations. Should the need arise for extra vehicles; the Chief Veterinary Officer will make special arrangements to get them.

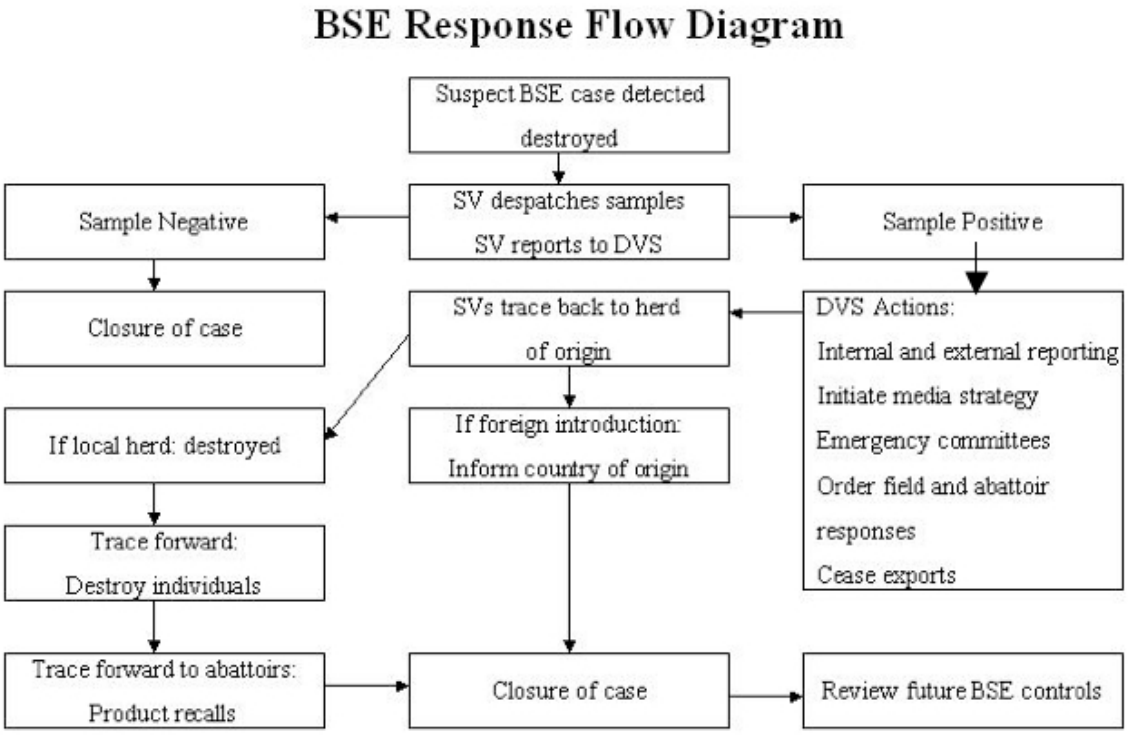
Instructions for dealing with an outbreak

Legal basis for notification

Bovine spongiform encephalopathy is at present classified as an exotic disease under the **Animal and Diseases and Parasites Act, 1965 (Act No.13 of 1956)**. All exotic diseases are notifiable under the Act. The slaughter of animals, valuation and compensation; the destruction of carcasses and access to sites to be used for this purpose; sanitary and other procedures at infected promises; and movement control are also provided for under the Act.

Actions

Flow diagram of actions to be followed in the event of an outbreak.



Notification Procedures

- In the event of a suspected case, the state veterinarian investigating the case shall without delay and following laid down procedures submit samples to the laboratory.
- In the event of confirmation of diagnosis of BSE by the Central Veterinary Laboratory, the Pathologist shall immediately inform the Chief Veterinary Officer and the State Veterinarian who submitted the sample.
- The CVO shall convene a meeting of the National Emergency Committee whereby the contingency plan shall be activated

The notification process will be done in accordance with relevant chain of command, and involves informing the following:

1. Minister via Permanent Secretary
2. All State Veterinary Offices-Information and instructions e.g. movements restrictions, auctions.
3. OIE- First notice of suspicion, then confirmation. Fortnightly reporting after wards.
4. SADC member states
5. Farmers Unions (NAU and NNFU), Meat Board, Meatco
6. EU Brussels / Switzerland / Norway

7. News Release: Ministry of Agriculture – Public awareness. Weekly press releases will be provided for the public.
8. Airports / Customs / Border Posts

Publicity and disease awareness

Before the Outbreak

There is an ongoing program to educate farmers, abattoir operators, feed companies and the general public on the disease. The program for this is outlined in the BSE surveillance protocol which each state veterinarian is expected to follow. See annex 1 for details. Staff members are also given on job training in clinical diagnosis and sampling for the disease. Laboratory staff members are given specialized training to process the samples and interpret results. Use of radio programs, pamphlets, field days, community visits, farmers and staff meetings etc are some of the methods used for disseminating information.

After an Outbreak

Advice to the media for the public awareness campaign must be carefully considered. DVS will inform the public, especially those in the livestock industries, farmers unions and livestock owners of the circumstances of the outbreak and any trade implications. It is likely that fears will be raised about human health issues related to consumption of meat. Early discussions with Ministry of Health and Social Services authorities is essential, in order to ensure that a consistent public health position is developed. In addition advice should be given that products regarded as a significant risk of containing the agent would not be allowed to enter the food chain. These assurances cannot be provided with surety if the source of the disease is a therapeutic agent that has been widely used for some time.

There is also likely to be a considerable level of public concern if trading partners (RSA & EU) decline to accept Namibian exports.

Back to BSE Contingency Plan

BSE Risk Analysis

The geographical BSE risk assessment which was carried out by the European Food Safety Authority and its Scientific Expert Working Group on the Assessment of the Geographical Bovine Spongiform Encephalopathy (BSE) Risk, using data submitted to them in 2003, concluded that the current GBR level of Namibia is II. This means that it is *unlikely but cannot be excluded* that domestic cattle are clinically or preclinically *infected with the BSE agent*. It is stated that although unlikely, external challenge by imported cattle from South Africa in the second half of the nineties may have led to an internal challenge since the end of the nineties.

The report concluded that unless “stability” is increased, it is expected that the GBR will continue to grow, even if no additional external challenge occurs.

The overall assessment was based on “external challenge” and “stability”. The report assesses that Namibia was exposed to negligible external challenge in the period 1980-1995 and to low external challenge in the period 1996-2000 and to negligible external challenge in the period 2001-2003.

The overall assessment of the stability which is based on three main factors: feeding of meat and bone-meal; rendering and specified risk material removal; and surveillance, concluded that the BSE/cattle system of Namibia was very unstable in the period 1980-2001 and unstable in 2002 and 2003.

The report recommended that the stability system needs to be improved in order to eliminate the BSE agent if it was present by: making sure that no specified risk material is included in the rendering process; the rendering process was improved (batch processing instead continuous process being used by most export establishments); and better feed controls were implemented.

The report also recommended that BSE surveillance needed to be bolstered by introducing other methods of BSE examination of cattle brains and active surveillance of at risk cattle populations by means of rapid screening.

Although the GBR assessment did not adversely affect the country’s access to the EU market, it is a drop from GBR level of I achieved in 2001 through a similar assessment. Bold steps are however required if the situation is to improve. Considerable investment is required in the rendering process.

Back to BSE Contingency Plan

BSE Equipment

Equipment, Facilities & Special Procedures

Diagnostic Equipment

The equipment that will be required for sampling which must be maintained by all state veterinary offices is as follows:

Sampling Equipment

1. Scissors
2. BSE Sampling Spoons
3. Forceps
4. Screw top plastic tubes (50ml)
5. Shipping boxes
6. Cool packs
7. Absorbent material/paper
8. Standard post mortem kit with knives, axes, hacksaw, etc

See also **Equipment needed to do a post mortem**.

Safety Equipment for Sample Collection

1. Gloves
2. Protective clothing
3. Face Masks

See **Personal protective equipment** for more details.

Data Collection

1. **Abattoir High Incidence Form / Laboratory Sample Form** to be completed by Abattoir State Veterinarians
2. **Disease Report Form / Laboratory Sample Form** to be completed by Field State Veterinarians

Shipping

Samples will be shipped by Nam-courier to the Central Veterinary Laboratory:

The address and contact details for the Central Veterinary Laboratory are:

Central Veterinary Laboratory
24 Goethe St,
Pr. Bag 13187,
Windhoek

Tel: 061-237 684
Fax: 061-221 099

Hand delivery must be done if applicable

Accuracy

1. State veterinarians collecting samples for the emergency must make sure that samples are collected through the standard procedure as outlined in current standard operating procedures.
2. The forms must be completed in full and accurately.
3. Specimens must be clearly labeled.
4. The results must be communicated by fax the day the tests are completed.

Equipment for Destroying Carcasses

1. In the event that only a small number of animals need to be destroyed then the carcasses will be destroyed using ordinary firewood/tyres/diesel.
2. In the event that the suspected animal(s) are at an abattoir they will be destroyed by incineration if the facility for this is present and is adequate for the operation
3. In the event that large numbers of animals are involved, then the Directorate of Veterinary Services will contract private companies to assist with transporting animals and digging equipment (e.g. bulldozers) for burying. This is an unlikely scenario.

Decontamination Procedures

Decontamination procedures should be undertaken on any materials that are contaminated through close contact with potentially infected carcasses.

1. For items that will withstand steam sterilization, autoclaving at 134-138°C for at least 18 minutes and 3 bar pressure is recommended.
2. Steam sterilizing at 121°C in the presence of 1 molar (M) sodium hydroxide (40g/L) is also effective.
3. Sodium hypochlorite (household bleach) at a concentration of 1.4% will achieve surface inactivation in 30 minutes.
4. Exposure to 1 M sodium hydroxide (40g/L) for at least 1 hour.

Safety Procedures

Persons involved in handling potentially-infected material must wear adequate protective clothing to avoid exposure to these agents. Veterinarians, laboratory workers, and slaughterhouse workers should wear gloves and eye protection when handling tissues suspected of containing the agent.

Care should be taken to minimize environmental contamination during necropsy procedures. Carcasses should be disposed of carefully and instruments thoroughly decontaminated.

Administrative Equipment Communication

1. All state veterinary offices are expected to maintain their communication equipment in order such as facsimiles, telephones, photocopiers. In the event that the equipment is not working, the equipment is repaired immediately and in the meantime facilities at other government departments can be used.
2. A computerized and manual database of animal movements
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Back to BSE Contingency Plan

BSE Diagnostic Laboratory

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Central Veterinary Laboratory
24 Goethe St,
Pr. Bag 13187,
Windhoek

Tel: 061-237 684
Fax: 061-221 099

For confirmatory testing samples will be sent to the OIE reference laboratory ie:

VLA Weybridge
New Haw, Addlestone, Surrey KT15 3NB
UNITED KINGDOM
Tel: (44.1932) 35.73.06 Fax: (44.1932) 34.70.46
Email: d.matthews@vla.defra.gsi.gov.uk

Back to BSE Contingency Plan

BSE response

Legal basis for notification

Bovine spongiform encephalopathy is at present classified as an exotic disease under the **Animal and Diseases and Parasites Act, 1965 (Act No.13 of 1956)**. All exotic diseases are notifiable under the Act. The slaughter of animals, valuation and compensation; the destruction of carcasses and access to sites to be used for this purpose; sanitary and other procedures at infected promises; and movement control are also provided for under the Act.

Actions

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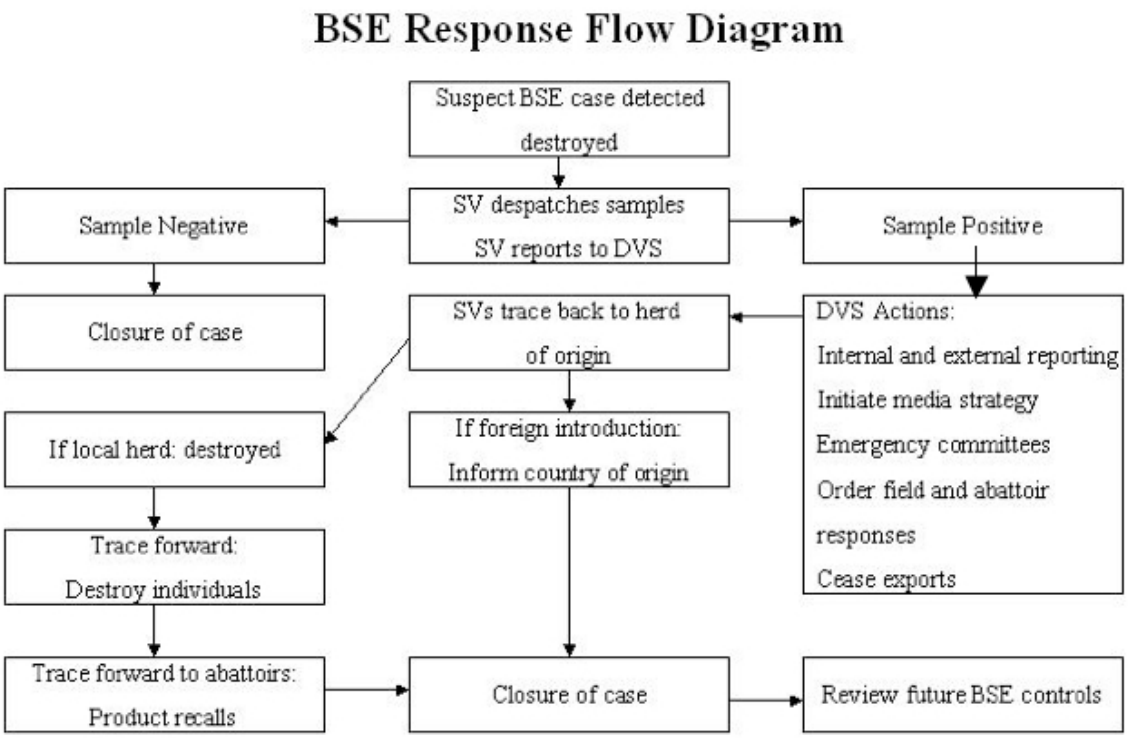

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6. EU Brussels / Switzerland / Norway
7. News Release: Ministry of Agriculture – Public awareness. Weekly press releases will be provided for the public.
8. Airports / Customs / Border Posts

Refer to **Contact details**.

Procedures at the Infected Property/Abattoir

The state veterinarian(s) of the infected farm or abattoir shall:

At farm where outbreak is confirmed:

1. Suspend movement of all animals from infected farm(s) or potentially infected farm (s), including permits already issued. No permits to be issued until further notice. The farm shall be cordoned-off. No animals, meat or other potentially infected material shall be allowed off the farm. All roads leading out of the property shall be manned 24 hours a day where necessary.
2. Determine origin of animals and whether they were imported. If they were imported, records from the Namibian Livestock Identification and Traceability System (NAMLITS) must be checked to identify which other farms may have received animals from that particular farm.
3. Determine access to MBM if animals born on farm. Collect feed samples for analysis to check for animal protein, determine as far as possible history of feed sources at the farm. Records on past feeds samples collected and analysed from the property must be checked.
4. Check all permits to and from infected farm for the past 5 years and report to the CVO.

At an abattoir where a case is confirmed:

1. At the abattoir all carcasses present at the abattoir where the diagnosis is made shall be detained.
2. All carcasses already dispatched shall be re-called and their fate shall await for a decision from the CVO.
3. The farm of origin of the positive animal shall be identified and the process as outlined above shall be conducted.

Risk Assessment

With the information gathered, the National Emergency Committee with the assistance from the Regional Emergency Committee and the Expert Group will conduct a thorough risk assessment, including tracing of all high risk contacts.

The risk assessment process aims to determine the source of the outbreak, identify animals of equivalent risk status to the confirmed case(s); and classify the risk of infection in other groups of stock.

The following classifications shall be used:

1. Affected animals - those showing clinical signs of BSE.
2. Equivalent risk animals – any cattle originating from the same property as affected animals, and the siblings (by the same dam) of affected animals.
3. Exposed animals – the progeny of affected cattle that have been reared in close contact with affected cattle.
4. Calves in contact with placenta of cattle later showing signs of BSE.
5. Low risk animals – the dams of affected animals; any recipient of semen or ova from affected animals; the progeny resulting from artificial insemination or embryo transfer from affected animals and those animals on the same premises which have not been in direct or indirect contact with affected animals.
6. The risk assessment will be dynamic and adjusted according to the results of monitoring of equivalent risk, exposed and low risk groups (suspected animals).

Based on this risk assessment, the eradication strategy would include:

- Monitoring all deaths and regular surveillance
- Selective slaughter and destruction of stock

Prevention of spread

Quarantine and movement controls

Infected farms/premises (containing affected animals) and suspected farms/premises (containing equivalent risk, exposed or low risk animals) should be placed under quarantine in the first instance. Further quarantine and movement controls depend on the outcome of risk assessment. Long-term or lifelong quarantine of groups may be considered necessary

Destruction of Animals

Affected animals:

- Animals with the disease should be promptly slaughtered and incinerated or buried. This will remove real or perceived disease risks and allow a definitive diagnosis.

Exposed or equivalent risk animals:

- As the number of these animals will only be small, suspect animals (exposed or equivalent risk) shall be slaughtered, brains collected and carcasses disposed of by burial or incineration.

Low risk animals:

- Animals may be slaughtered through local abattoirs and released for human consumption subject to negative results of laboratory monitoring.
- The protocol for inspection of carcasses and removal & disposal of potentially infective SRMs must be followed.
- For animals of less then 2 years of age the carcasses can be de-boned. Appropriate eye and hand protection for abattoir and de-boning room workers should be provided.

The preferred method of destruction will be by burning or incineration which must be carried out under veterinary supervision. If burial is the only preferred method then the burial site shall be cordoned off to prevent animals grazing there for 5 years. Alkaline digestion is another possibility.

Hides and skins need not be disposed and may go for processing.

Decontamination

Shall be carried out as outlined in section 6.4 of the **BSE Contingency Plan**.

Highly Pathogenic Avian Influenza

Introduction

This document presents a strategy paper for the control and eventual eradication of Highly Pathogenic Avian Influenza (HPAI) in case of an outbreak of the disease in Namibia.

The recent spread of Highly Pathogenic Avian Influenza caused by the H5N1 virus in countries such as Russia, Turkey, Rumania, Croatia, and UK has heightened fears of a pandemic. A much feared consequence of this is the possibility of the emergence of a human Influenza pandemic. This fear is as a result of the occurrence of human H5N1 virus cases in Some East Asian countries such as Hong Kong and Vietnam. Current evidence is that H5N1 outbreaks are being propagated by migratory birds making it difficult to predict when the disease will eventually spread to southern Africa and to Namibia in particular.

Closer home, the outbreak of H5N2 Avian Influenza outbreak in Eastern Cape in South Africa in August 2004 has made it ever more important that a contingency plan be put together in preparation of a possible outbreak in Namibia.

Nature of the Disease

Avian influenza is an infectious disease of birds caused by type A strains of the influenza virus which occurs worldwide.

All birds are thought to be susceptible to infection with avian influenza, though some species are more resistant to infection than others. Infection causes a wide spectrum of symptoms in birds, ranging from mild illness to a highly contagious and rapidly fatal disease resulting in severe epidemics. The latter is known as “highly pathogenic avian influenza”. This form is characterized by sudden onset, severe illness, and rapid death, with a mortality that can approach 100%.

Fifteen subtypes of influenza virus are known to infect birds. To date, all outbreaks of the highly pathogenic form have been caused by influenza A viruses of subtypes H5 and H7.

Birds that are infected with avian influenza viruses can shed virus in saliva, nasal secretions, and faeces. Contact with faeces or respiratory secretions is important in the transmission of infection among poultry. Between flocks, infection usually spreads due to movement of infected birds and the actions of humans in moving feedstuff, personnel, equipment, and vehicles into and from premises that are contaminated with infected faeces or respiratory secretions. The duration that these viruses can survive in the environment depends on temperature and humidity conditions, but they may survive up to weeks in cooler and moister conditions

Migratory waterfowl – most notably wild ducks – are the natural reservoir of avian influenza viruses, and these birds are also the most resistant to infection. Domestic poultry, including chickens and turkeys, are particularly susceptible to epidemics of rapidly fatal influenza.

Direct or indirect contact of domestic flocks with wild migratory waterfowl has been implicated as a frequent cause of epidemics. Live bird markets also play an important role in the spread of epidemics.

Recent research has shown that viruses of low pathogenicity can, after circulation for sometimes short periods in a poultry population, mutate into highly pathogenic viruses.

The quarantining of infected farms and destruction of infected or potentially exposed flocks are standard control measures aimed at preventing spread to other farms and eventual establishment of the virus in a country’s poultry population. Stringent sanitary measures on farms can, however, confer some degree of protection. In the absence of prompt control measures backed by good surveillance, epidemics can last for years.

All type A influenza viruses, are genetically labile and well adapted to elude host defences. Influenza viruses lack mechanisms for the “proofreading” and repair of errors that occur during replication. As a result of these uncorrected

errors, the genetic composition of the viruses changes as they replicate in humans and animals, and the existing strain is replaced with a new antigenic variant. These constant, permanent and usually small changes in the antigenic composition of influenza A viruses are known as antigenic “drift”.

Influenza viruses have a second characteristic of great public health concern: influenza A viruses, including subtypes from different species, can swap or “re-assort” genetic materials and merge. This re-assortment process, known as antigenic “shift”, results in a novel subtype different from both parent viruses. As populations will have no immunity to the new subtype, and as no existing vaccines can confer protection, antigenic shift has historically resulted in highly lethal pandemics. For this to happen, the novel subtype needs to have genes from human influenza viruses that make it readily transmissible from person to person for a sustainable period.

Conditions favourable for the emergence of antigenic shift have long been thought to involve humans living in close proximity to domestic poultry and pigs. Because pigs are susceptible to infection with both avian and mammalian viruses, including human strains, they can serve as a “mixing vessel” for the scrambling of genetic material from human and avian viruses, resulting in the emergence of a novel subtype. Recent events, however, have identified a second possible mechanism. Evidence is mounting that, for at least some of the 15 avian influenza virus subtypes circulating in bird populations, humans themselves can serve as the “mixing vessel”.

Zoonotic Potential

Avian influenza viruses do not normally infect species other than birds and pigs. Close contact with live infected poultry is the source of human infection. The epidemic of highly pathogenic avian influenza caused by H5N1, is of particular public health concern. H5N1 variants have demonstrated a capacity to directly infect humans in 1997 in Hong Kong, and have done so again in Viet Nam in January 2004. The spread of infection in birds increases the opportunities for direct infection of humans. Such an event would mark the start of an influenza pandemic.

Two other avian influenza viruses have recently caused illness in humans. An outbreak of highly pathogenic H7N7 avian influenza, which began in the Netherlands in February 2003, caused the death of one veterinarian two months later, and mild illness in 83 other humans. Mild cases of avian influenza H9N2 in children occurred in Hong Kong in 1999 (two cases) and in mid-December 2003 (one case). H9N2 is not highly pathogenic in birds.

Risk Factors

The introduction of HPAI into Namibia can be expected to result from 2 major sources: migratory birds or through the importation of infected poultry or poultry products.

Migratory Birds

According to WHO the role of migratory birds in the spread of highly pathogenic avian influenza is not fully understood. Wild waterfowl are considered the natural reservoir of all influenza A viruses. They are known to carry viruses of the H5 and H7 subtypes, but usually in the low pathogenic form. Considerable circumstantial evidence suggests that migratory birds can introduce low pathogenic H5 and H7 viruses to poultry flocks, which then mutate to the highly pathogenic form.

In the past, highly pathogenic viruses have been isolated from migratory birds on very rare occasions involving a few birds, usually found dead within the flight range of a poultry outbreak. This finding long suggested that wild waterfowl are not agents for the onward transmission of these viruses.

Recent events make it likely that some migratory birds are now directly spreading the H5N1 virus in its highly pathogenic form. Further spread to new areas is expected.

Namibia has about 660 bird species. Of these, some 70 species (11%) are Palaearctic migrants, 55 species (8%) are intra-African migrants and 30 species (5%) are Pelagic seabirds that wander over huge areas covering the (mainly southern) oceans (Brown et al. 1998). Some 3.75 billion birds enter sub-Saharan Africa from Europe and Asia each year (Maclean 1990). A very small fraction of these (less than 1%) enter Namibia either as their final destination or

in transit to the south and east (and on the return leg). The relatively low numbers are because (a) Namibia is far south, and many Palaearctic migrants “over-winter” in north, central and eastern Africa, and (b) Namibia is an arid country, and the majority of migrants go to higher rainfall areas.

Imports

The importation of live birds, poultry and poultry products is a risk factor in the introduction of HPAI into Namibia. As a non-poultry producing country, Namibia imports the bulk its poultry requirements from South Africa, Zimbabwe, some European Countries and South America.

The importation of live birds such as psittacine birds, pigeons, love birds etc also increases the risk of introducing HPAI into Namibia. The outbreak of H5N2 in Eastern Cape Province in August 2004 underscores the risks of AI in the region.

Current Avian Influenza Surveillance

Namibia is currently free of Avian Influenza.

Active and passive surveillance for animal diseases is an ongoing exercise in the country. Active surveillance involves annual inspection of all farms in the country as well as scheduled community visits in communal farming areas.

On ostrich farms active surveillance involving the collection of serum from a statistically representative sample of ostriches at all ostrich export farms has been an ongoing exercise. Samples are tested at the Central Veterinary Laboratory and the OIE reference laboratory in Germany (IVA and NDV Institute Fur Geflugelkrankheiten). Antibodies against Avian Influenza A virus of the haemaglutination subtypes H5 and H7 were not detected in any of the serum collected since 2000.

Passive surveillance involves carrying out disease investigation of disease outbreaks reported by farmers through clinical and post-mortem examination and collection of specimens for confirmatory laboratory diagnosis. There is need to improve the diagnostic capacity of the laboratory and field sampling.

HPAI Surveillance

Current Avian Influenza Surveillance

Namibia is currently free of Avian Influenza. Surveillance is undertaken on an ongoing basis for the early detection and eradication of outbreaks. Namibia also has a **National Contingency Plan** detailing the response in case of an outbreak.

HPAI surveillance in Namibia is made up of a combination of active and passive surveillance activities. Active surveillance involves annual inspection of all farms in the country as well as scheduled community visits in communal farming areas.

On ostrich farms active surveillance involving the collection of serum from a statistically representative sample of ostriches at all ostrich export farms is also in place. Samples are tested at the Central Veterinary Laboratory and the OIE reference laboratory in Germany (IVA and NDV Institute Fur Geflugelkrankheiten). Antibodies against Avian Influenza A virus of the haemaglutination subtypes H5 and H7 were not detected in any of the serum collected since 2000.

Passive surveillance involves carrying out disease investigation of disease outbreaks reported by farmers through clinical and post-mortem examination and collection of specimens for confirmatory laboratory diagnosis. Suspected outbreaks are reported through State Veterinary Offices to the Chief Veterinary Officer, as described in the **Reporting section** of the **National Contingency Plan**.

Sample collection and transport details for suspected cases are provided in the **Sampling Methods** section of the **National Contingency Plan** and **Circular V10 of 2013**.

See General disease investigation guidelines **Necropsy Procedures** and **Field Diagnostic Procedures** for more details on newcropsy and sample collection techniques.

For general information about the disease see **Avian Influenza**.

HPAI Outbreak Investigation

Sampling Method

Also refer to latest OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (http://www.oie.int/international-standard-setting/terrestrial-manual/access-online/).

Specimens required

Specimens should be collected from at least six birds. Preferably, three should be birds showing signs of the acute disease and the other three may be recently dead. See **General Disease Investigation** for more information on sampling procedures.

Samples collected from live birds should include tracheal and cloacal swabs. In small delicate birds collect fresh feces as swabbing may harm the little bird. Blood samples should be collected for serum. Samples should be taken from several birds in the flock.

Samples from dead birds should include intestinal contents (faeces) or cloacal swabs and oronasal swabs. Samples from the trachea, lungs, air-sacs, intestine, spleen, kidney, brain, liver, heart, may also be collected and processed either separately or as a pool. Impression smears should be made of internal organs, including kidney and pancreas, for detection of viral antigen.

Swabs of tracheal and cloacal contents, brain and heart blood should be collected aseptically. The material collected on the swabs should be mixed into 3mL aliquots of transport medium in sterile bottles and the swabs discarded. The transport medium to be used to be prepared by the Central Veterinary Laboratory specifically for AIV.

The medium consists of isotonic phosphate buffered saline (PBS), pH 7-7.4, containing antibiotics. Examples of antibiotics that can be used include penicillin (2000 units/ml), streptomycin (2 mg/ml), gentamicin (50 μg/ml) and mycostatin (1000 units/ml) for tissues and tracheal swabs but a five-fold higher concentration for faeces and cloacal swabs. (see OIE Manual of Standards for Diagnostic Tests and vaccines for details).

Transport of specimens

Unpreserved tissues and swab material should be chilled and forwarded on water ice or with frozen gel packs. If delays of greater than 48 hours are expected in transit, these specimens should be frozen and forwarded with dry ice.

1. Specimens must be sent to the Central Veterinary laboratory from where they will be dispatched to the regional laboratory which is the Onderstepoort Veterinary Institute. CVL (virology section) shall be notified in time before samples arrive.
1. Diagnostic capacity using real time PCR technology is being developed at the CVL. Diagnostic procedures will be in compliance with the OIE Manual of Standards for Diagnostic Tests and Vaccines

Laboratory addresses are:

- Central Veterinary Lab

  P/Bag 13187

  Windhoek

  Tel 061-237684/5/6, Fax 061221099

- Onderstepoort Veterinary Institute

  Private Bag X05

  Onderstepoort 0110

  Tel. + 27-12-5299111

HPAI Response

Reporting

Avian Influenza is a notifiable disease, a requirement under the Animal Diseases and Parasites Act, (Act No. 13 of 1956). In the event that the disease is suspected the official carrying out the investigation shall notify the Chief Veterinary Officer or his immediate superior. In the case of a private veterinarian or person responsible for the animals shall within 24 hours report his/her suspicion to the nearest State Veterinarian.

Actions to be taken in case of suspected case of HPAI

- Notify your supervisor and/or the Chief Veterinary Officer
- The CVO will implement the notification and reporting process as described in the **National Contingency Plan for Avian & Pandemic Influenza** or in **Notification of an outbreak**

Field Instructions

Should an outbreak of HPAI be diagnosed in Namibia, the control strategy will be based on a stamping out policy which entails:

- Effective surveillance, reporting and early warning systems
- Rapid, humane destruction of infected poultry and poultry at high risk of infection,
- Disposal of carcasses and potentially infective material in a biosecure and environmentally sustainable manner
- Enhanced Biosecurity at poultry farms and associated premises, including movement of personnel
- Control of the movement of birds and products that may contain virus. This is important particularly important in communal areas
- Changes to industry practices to reduce risk (e.g. segregation of different poultry species and marketing systems). The marketing of village poultry at public markets increases the risk of transmission of AI.
- Vaccination
- Public Awareness

Instructions on Suspicion of an Outbreak

1. The state veterinarian investigates the outbreak
2. Collects Samples
3. Collects all relevant epidemiological information by completing a **Disease Report Form (DRF)**. In particular information on:
    - the length of time the disease is suspected to have been on the property, possible origin of infection (e.g. imported birds, mortality in wild birds etc)
    - Movement of poultry, persons, vehicles, eggs, meat carcasses or any possible means by which infection could have spread to other premises.
4. Any in “contact premises” shall be investigated to determine whether further spread can be established.
5. Premises that are suspected to have been infected or in contact shall immediately be quarantined and monitored for a period of not less than 7 days pending laboratory results.

Instructions on Confirmation of Outbreak

1. All poultry on the holding shall be destroyed on the spot. In communal areas an assessment has to be made to demarcate the extent of the problem as it may involve a whole village. The use of natural boundaries such as unpopulated areas, grazing lands, hills, forests etc shall be used for demarcating exposed and infected populations from the rest of the population.
2. All potentially infectious material shall be destroyed or treated in such way that the virus is destroyed as outlined under disinfection procedures
3. All meat and eggs (hatching or table) produced during the estimated period of incubation shall be traced and destroyed. Chicks hatched from eggs produced during the same period the incubation period shall be traced and placed under surveillance-with appropriate samples collected
4. Buildings, vehicles, equipment etc used during the exercise shall be disinfected
5. No poultry shall be reintroduced to the premises until after 21 days after the slaughter-out procedure is completed
6. An epidemiological inquiry shall be carried out directed by the Epidemiology Division.
7. A 10 km Surveillance Zone around the infected property shall be established for a period of 21 after the last case in the area. A 3km protection zone shall be established around the infected property. Due consideration for geographical, administrative, ecological and epidemiological factors must be taken into consideration in establishing the zones.

Control Measures

- Culling and depopulation
- Disinfection
- Notice of Depopulation
- Compensation Procedures

Measures in the Protection Zone

1. Identification of all holdings having poultry within the zone
2. Weekly inspection visits to all holdings having poultry including where necessary the collection of samples. Farm visit forms to be completed at each visit.
3. Keeping of all poultry confined to their houses or coops. This may prove difficult in communal areas.
4. Use of disinfection at entry and exit points
5. Control of movement of persons handling poultry and poultry products.
6. No poultry or poultry products are allowed into or out of the protection zone without the authority of the Chief Veterinary Officer.
7. Prohibition of shows, markets and other gathering of poultry during this period.
8. These measures remain in force 21 days after the last case of Avian Influenza is diagnosed in the protection zone. The lifting of the restriction shall be approved by the CVO

Measures in the Surveillance Zone

1. Identification of all holdings having poultry within the zone
2. Restriction on the movement of poultry, poultry products and by-products to be imposed in the area. All movements to be sanctioned by the State Veterinarian in consultation with the Chief Veterinarian.
3. These measures shall be applied for not less than 30 days after the elimination of the outbreak at the infected property.

Vaccination

The use of vaccination to control the outbreak shall be decided upon by the CVO. No one will be permitted to use vaccines for control AI without the written authority of the CVO.

Disease Summaries

Notifiable Diseases

African Swine Fever

Introduction

African Swine Fever (ASF) also known as Afrikaanse varkpes (Afr.) is a highly infectious viral disease of domestic pigs, characterised by fever, incoordination, volition, dyspnea and acute deaths. In Namibia, the warthog is frequently infected and an inapparent carrier of the virus. In a zero-survey done in 1979, 97% of warthogs were seropositive. First confirmed outbreak in Namibia occurred on several farms in Okahandja district in 1932. Distribution of the disease is directly linked to presence of the *Ornithodoros spp.* tick and warthog. ASF is endemic throughout the whole of Namibia except Hardap and Karas regions.

Clinical findings

The disease can be seen in peracute, acute, subacute and chronic forms.

- Massive mortality - up to 100%
- Pigs found dead, or with a high fever (42°C) and are moribund
- Reduced food intake
- Reluctant to move, huddle together and become recumbent
- Bluish skin blotching particularly on extremities
- Abortion
- Diarrhoea
- Stunting and emaciation.

Pathological findings

- Pin point haemorrhages throughout body but particularly in the kidney, bladder, lungs and heart - kidneys may have a ‘turkey egg’ appearance
- Haemorrhages of around 1cm and also ‘paintbrush’ haemorrhages on the lining of the stomach and intestine
- Markedly swollen lymph nodes (particularly those near the kidney, intestines and liver). They appear reddened and haemorrhagic and may look like blood clots
- Swollen and reddened tonsils
- Very enlarged spleen full of blood
- Oedematous or solid lungs
- Excess fluid in the chest and abdomen and around the heart
- Fibrinous inflammation around the heart and chest
- Lungs have small, hard, nodular white masses
- Cutaneous ulcers
- Arthritis in one or more joints.

Epidemiology

- Clinical disease occurs in domestic pigs while warthogs, bushpigs and giant forest hogs have subclinical infections
- ASF is usually spread by ticks (of the species *Ornithodoros moubata*) from warthogs to domestic pigs.
- Differential diagnosis:
  - Hog cholera
  - Erysipelas
  - Salmonellosis
- Risk Factors include:
  - Exposure to *O. Moubata* ticks and presence of warthogs or wild pigs
  - Feeding of uncooked swill containing pig meat or pig meat products
  - Recent contact with pigs from endemic areas
  - Free ranging pig production systems
  - Breakdown in biosecurity

Surveillance goal

- To prevent outbreaks by ensuring compliance with biosecurity requirements and prohibition of feeding of uncooked swill. Therefore during farm visits ensure pig farms in designated ASF areas comply with bio-security requirements as directed in **Requirements for approved piggeries in the African Swine Fever (ASF) Control Area**.
- To detect the disease early and prevent further spread and eradicate outbreaks.

Surveillance and Monitoring Actions

- passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Significant production losses

Trade

Restrictions on the movement of pigs

Case Definition

Suspect case

Suggestive recent history of exposure to the virus, clinical and post mortem signs in which there is high morbidity and mortality approaching 100%, fever and generalised haemorrhages in pigs.

Confirmed case

Laboratory detection of virus or virus antigen in peracute or acute forms of the disease or assays that detect antibody in subacute and chronic forms.

Response

Farms raising pigs are required to adhere to minimum bio-security measures as stipulated in **Requirements for approved piggeries in the African Swine Fever (ASF) Control Area**.

Suspect case

- Quarantine premises
- Collect laboratory specimens and arrange for testing at the laboratory

Confirmed case

- Quarantine premises
- Investigate possible source and spread:
  - feeding of swill, vectors (ticks), presence of warthogs, breach in biosecurity,
  - Trace back and trace forward contact
- Inform your supervisor to arrange for the following:
  - Slaughter out all pigs on the premises (no compensation is given in Namibia, inform owner accordingly)
  - Disinfection of premises (Sodium Hypochlorite, Virkon S, Soaps and Detergents)
  - Restock after a period of rest of at least two weeks
  - Strengthen/enforce biosecurity in accordance with **Requirements for approved piggeries in the African Swine Fever (ASF) Control Area**.
- Prohibit the feeding of uncooked swill or animal products-in accordance with Regulations of the Animal Health Act 1 of 2011.
- Raise public awareness on how the disease presents, how it spreads and the need for reporting
- N.B. There is no vaccine or treatment
- Complete the disease report form to record findings

Alert threshold

Confirmed case

Information management

Data collection

- Complete the **disease report form** to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology
- Histopathology

Specimens

- Blood in EDTA from pigs with a fever
- Plain blood samples from pigs suspected of having subacute or chronic ASF for serology
- Fresh spleen, lymph nodes, tonsil, and kidney for virus isolation
- Spleen, lymph nodes, tonsil and kidney in neutral buffered formalin for histopathology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/
- Requirements for approved piggeries in the African Swine Fever (ASF) Control Area

Return to Notifiable Diseases

Anthrax

Introduction

Anthrax, also called Miltesiekte (Afr.) or Eteva (OtjiHerero) is an acute, fatal, infectious bacterial disease affecting many species of domestic and wild animals, and humans. It is caused by the bacterium Bacillus anthracis. In Namibia, the disease occurs mostly in wildlife, particularly in Etosha National Park but sporadic outbreaks also occur in cattle. Recent outbreaks in cattle have been reported in Oshikoto and Omaheke regions, where humans were also infected.

Clinical findings

- Sudden death
- Staggering, trembling and difficult breathing prior to collapse, convulsions and death soon after clinical signs are first seen.
- Fever and excitement may be followed by depression, stupor, disorientation, muscle tremors, difficult breathing and congested mucous membranes.
- Abortion, drop in milk production.
- Bloody discharges from the nose, mouth and anus
- Subcutaneous oedematous swellings of ventral neck, thorax and shoulders

Pathological findings

- Absence of rigor mortis
- Carcass bloated and decomposes rapidly
- Dark, tarry blood oozing from the body orifices, blood does not clot readily
- Oedema, particularly around the throat and neck.

If carcass is opened in error see:

- Evidence of septicaemia
- Spleen enlarged with `blackberry jam' or tar-like consistency
- Oedema and inflammation of the pharyngeal area
- Intestines inflamed

- Lymph nodes, liver and kidneys swollen and congested

Epidemiology

- Global occurrence and often occurs as outbreaks
- Anthrax bacilli are present in the bloody discharges coming from the body orifices of animals that have died of anthrax. When these bacilli are exposed to air they form resistant spores that can survive in the environment for very long periods of time.
- Animals usually become infected by ingesting soil, water or feed contaminated with spores
- Anthrax cases usually occurs on land where cases have occurred at some time in the past
- Once the initial case has occurred there may be spread by direct or indirect contact with the infected carcasses.
- Differential diagnosis:
  - Peracute blackquarter
  - Lightning strike
  - Malignant oedema
  - Hypomagnesemic tetany

Surveillance goal

- Early detection and reporting of outbreaks
- Fast and early transfer of information to and from laboratory
- Fast feed-back of results to field staff and farmers
- Ability to have an early response to control the disease
- To monitor control and prevention programs

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Anthrax can cause serious and sometimes fatal disease in humans exposed to the blood and tissues of infected animals. Skin infections in humans usually respond to early treatment with appropriate antibiotics People can be exposed by handling infected carcasses, processing bones, hides, wool and other animal products and by handling or consuming meat from animals that are sick with or have died of the disease.

The carcass of a diseased or suspect animal must not be opened.

Wear appropriate protective equipment, (including gloves) and prevent any contact of infected blood with skin and mucosa.

Socioeconomic

- Significant production loss through death of large numbers of animals can occur
- Significant social impacts through restrictions on movement of stock from farms until at least 42 days after all stock are vaccinated and the last death from anthrax has occurred

Trade

- Restrictions are placed on movement of livestock and products from affected farms
- Restrictions on movement of livestock and products from the country to some export markets may occur

Case definition

Suspect case

- Sudden death accompanied by the exudation of tarry blood from the body orifices of the carcass (mouth, anus, vagina), failure of the blood to clot and absence of rigor mortis

Confirmed case

- Culture of *Bacillus anthracis*
- Characteristic organisms identified in samples from a clinical case

Response

Suspect case

- Collect blood smear from ear (see **Blood smear** for details on how to take a smear)

WARNING: Wear gloves and prevent any contact of infected blood with your skin and mucosae. See **Use of personal protective equipment** for more details.

When packaging specimens take particular care that there is no blood contamination of the secondary container.

- Send smear to laboratory for testing
- Inform supervisor
- Do not move carcass/s
- Prevent other animals from accessing carcass
- Advise farmer of suspect diagnosis and prevent movement of livestock and produce from farm

Confirmed case

In summary

- Burn or deep burial of carcass at site
- Disinfect site of death/s to prevent survival of anthrax spores
- Quarantine premises
- Trace stock and products moved from farm
- Raise public awareness on how the disease presents, how it spreads and the need for reporting
- Compulsory annual vaccination of all cattle as per Division 6, Part 10 “Animal Health Regulations: Animal Health Act 2011”

For full details of response see **Anthrax response**.

Alert threshold

- One confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Send completed form to supervisor

Laboratory confirmation

Diagnostic tests

- Microscopic examination of blood smears
- Culture of discharges

Specimens

- Blood smear from ear (see **Blood smear**)

WARNING: Wear gloves and prevent any contact of infected blood with your skin and mucosae. See **Use of personal protective equipment** for more details.

- Write on the sample the date collected and name of owner

When packaging specimens take particular care that there is no blood contamination of the secondary container.

- Send samples immediately to CVL
- Contact laboratory to advise them that the samples have been sent
- Attach clear note to secondary container alerting laboratory that the samples are from a suspect anthrax case

Results

- Characteristic organisms identified in blood smear from suspect case
- Culture of *Bacillus anthracis*

Advise farmer as soon as confirmation of positive result is obtained

Related pages

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
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Return to Notifiable Diseases

Bovine malignant catarrh

Introduction

Bovine Malignant catarrhal fever (MCF), also known as Snotsiekte (Afr.) is principally an infectious disease of domestic cattle and a number of other ruminants including water buffalo. With occasional exceptions, the disease in cattle normally is seen sporadically and affects single animals. MCF is typically fatal; however, there are outbreaks in which several animals are affected, with evidence of recovery and mild or inapparent infections in some cases. It also occasionally presents as chronic alopecia and weight loss. Its distribution is essentially worldwide, mirroring that of the principal carriers, domestic sheep and wildebeest. In Namibia MCF is caused by a wildebeest-associated virus. Sheep or non-wildebeest-associated syndrome is yet to be confirmed. In Namibia wildebeests are kept in camps approved by DVS. Prescribed fences around the camps are meant to prevent contact with cattle.

Clinical findings

- Fever
- Depression and inappetance
- Discharge from the eyes and nose
- Necrotic lesions in the mouth and on the muzzle
- Opacity of the corneas leading to blindness
- Enlargement of lymph nodes
- Diarrhoea
- Neurological signs (ataxia, nystagmus, head pressing)
- Death usually within ten days of disease onset.
- Small number of animals affected but 90 - 100% of clinical cases die

Pathological signs

- Inflammatory and erosive lesions in the respiratory and gastrointestinal tract
- Swollen liver
- Swollen, oedematous and haemorrhagic lymph nodes
- Opacity of corneas
- Pin point haemorrhages in brain and meningitis.

Epidemiology

- Bovine malignant catarrh (BMC) is a sporadic fatal viral disease of cattle and other ungulates such as deer, antelope, and buffalo.
- Wildebeest and sheep are reservoir hosts for the causative viruses and have inapparent infections.
- Major risk is cattle herds exposed to wildebeest camps, especially if the wildebeest are calving.
- Differential diagnosis:
  - Mucosal disease
  - IBR
  - Rinderpest

Surveillance goal

To detect incidents and reduce occurrence.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

- Cattle deaths resulting in production loss
- Maintenance of wildebeest camp fences

Trade

Nil

Case Definition

Suspect case

- History of exposure to wildebeest (especially when calving) or sheep
- Clinical signs consistent with BMC

Confirmed case

- Histopathology consistent with BMC
- Detection in the blood or tissues of viral antibodies by ELISA or of viral DNA by PCR.

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings.

Confirmed case

- Confine Wildebeest to approved camps
- Ensure fences around Wildebeest camps are game-proof.

Refer to **Circular V33-1986 'Malignant Catarrhal Fever'** for compliance requirements for separation of Wildebeest.

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Histopathology

Specimens

- Blood samples in EDTA from clinical animals for virus isolation
- Fresh lymph nodes, spleen, lung, kidney, and intestines.

Keep samples cold without freezing until they reach the laboratory.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/
- Circular V33-1986 ‘Malignant Catarrhal Fever’

Return to Notifiable Diseases

Brucellosis

Introduction

Brucellosis is a chronic infectious disease that is primarily caused by the bacterium *Brucella abortus* in cattle, *Brucella melitensis* in goats and sheep, *Brucella suis* in pigs and *Brucella canis* in dogs.
"Brucella abortus" exclusively causes Contagious Abortion also known as Bovine brucellosis, Bang's disease, Besmetlike misgeboorte (Afr.) in cattle, causing many abortions in later stages of pregnancy. This disease was confirmed for the first time in Namibia in 1926 in the Otjiwarongo area. It occurs throughout the country. Since 1972 the law requires heifers to be vaccinated by the age of 10 months.

Clinical findings

- Abortion - usually in mid to late gestation
- Birth of weak or dead offspring
- Retained placenta
- Infertility
- Enlarged testes
- Lameness

Pathological findings

- Inflammation of lining of uterus
- Thickened placenta with yellow gelatinised fluid
- Blood filled placental cotyledons
- Foetuses swollen with subcutaneous blood-tinged fluid, inflammation of lungs and thickened and swollen umbilical cord
- Swelling of the testicles and thickening of the covering membrane.

Epidemiology

- Aborted fetuses and foetal membranes contain large numbers of organisms and contaminate the environment
- Movement of infected animals is the main method of disease spread

Surveillance goal

- To detect and control outbreaks.
- To prevent human infections.

Surveillance and Monitoring Actions

- ***Brucella melitensis*** **surveillance details**
- For other Brucellae, passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Brucellosis causes a significant disease in humans. Human infection occurs following exposure to aborted foetuses, placentae and uterine discharges from infected animals. *Brucella melitensis* is the strain most readily transmitted to humans and causes the most severe human disease.

Veterinarians are also at risk of exposure to organisms from live vaccines.

When exposure to infective material is possible, **personal protective equipment**, including gloves, masks and goggles must be worn and personal disinfection must be thorough.

Socioeconomic

- Significant production losses through abortions

Trade

- Restrictions on animal movements from affected farms

Case Definition

Suspect case

- Abortions in a herd or flock following introduction of animals of unknown Brucella status
- A presumptive diagnosis is made when there is significant serological evidence from several animals in a herd.

Confirmed case

Bacteriological confirmation of Brucellae in aborted foetuses or vaginal swabs

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory

Confirmed case

- Quarantine premises
- Investigate possible source and spread - trace back and trace forward contact
- Inform your supervisor to organise a test and cull program
- Complete the disease report form to record findings
- Burn or bury carcasses and placentae
- Strengthen/ enforce biosecurity
- Ensure vaccination of cattle herds as per Division 7, Part 10 **"Animal Health Regulations: Animal Health Act 2011"**
- Raise public awareness on how the disease presents, how it spreads and the need for reporting

Refer to **Circular V3/2013 "*Brucella melitensis* Sampling Protocol and Maintenance of Free Status"** for *Brucella melitensis* free herd certification protocols.

Alert threshold

One confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Culture
- Serology

Specimens

- Plain blood
- Whole aborted foetuses, or spleen, lung and stomach contents from foetus
- Foetal membranes
- Vaginal swabs collected within six weeks of birth or abortion
- Milk
- Semen
- Arthritis or vaginal discharge
- Head, mammary and genital lymph nodes and spleen.

Keep samples cold without freezing until they reach the laboratory.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Notifiable Diseases

Contagious bovine pleuropneumonia

Introduction

Contagious bovine pleuropneumonia (CBPP), also referred to as "Lung sickness", Longsiekte (Afr.), Otjipunga (OtjiHerero), Epunga (OshiWambo) and Kapunga (RuKwangali) is a highly infectious acute to chronic disease of cattle and water buffalo caused by the bacteria *Mycoplasma mycoides* subsp. *mycoides* Small Colony variant (*Mmm*SC). The disease was introduced into Southern Africa from Netherlands in 1854. It was first diagnosed in Namibia in 1856 in Karas region, from where it spread northwards to the rest of the country. Effective controls resulted in almost eradication of the disease by 1904. By 1919 the disease was eradicated from what is now the FMD free zone of Namibia. Cattle in all the eight northern regions are vaccinated against CBPP where sporadic outbreaks are still reported in some of the regions.

Clinical findings

- Fast, difficult or noisy breathing
- Discharges from the nose
- Coughing, especially after exercise
- Not eating, debility, weakness and loss of weight
- Calves have arthritis with swelling of the joints – usually with no respiratory signs.

For more detail on clinical signs see 'Clinical signs' section of "**CBPP Contingency Plan**"

Pathological findings

- Yellow fluid in the chest cavity
- Lungs covered with yellowish material
- Lungs adhering to the chest wall
- Lungs which do not collapse and are solid or marbled
- Sequestra in the lungs of chronic cases.

For more detail on post mortem signs see 'Post mortem findings' and Annex section of "**CBPP Contingency Plan**"

Epidemiology

- CBPP is invariably introduced into a herd by contact with an infected animal
- Transmission occurs from direct, close, repeated contacts between diseased and healthy animals in shared night accommodation or at water holes, dip tanks, markets, common grazing or gathering places.
- Nonclinical bovine carriers with chronic infection are a major source of infection, and may retain viable organisms in encapsulated lung lesions (sequestra) for up to 2 years.
- Carriers may become active shedders when stressed or immunodepressed
- Risk factors include:
  - Imported cattle
  - Introduction of cattle from endemic areas
  - Introduction of cattle that have recovered from the disease and show no clinical signs but are carriers of the bacteria.
- Differential diagnosis:
  - Pneumonic pasteurellosis
  - Tuberculosis
  - Other pneumonias

Surveillance goal

- Inspection of 100% of lungs for lesions suggestive of CBPP in cattle slaughtered at export abattoirs
- Annual livestock inspections on all farms for signs of illness
- Early detection, reporting and reactions to outbreaks
- Fast and reliable laboratory confirmation
- Fast feedback of results to field staff and farmers
- Monitoring the progress of control efforts.

Surveillance and Monitoring Actions

Passive

Suspicion reported by a farmer to an animal health officer (SV; AHT + SIA; CAHA, AET).

Active

- Regular visits to communities (FVF by AHT, FED groups for AET).
- Regular visits to markets, auction pen and open market butchers.
- Examination of animals at Border posts.
- Vaccination campaign.
- trace forward and traceback from infected premises to detect potential source and or further spread
- See the **CBPP Surveillance plan** for more details.

Implications

Human health

Nil

Socioeconomic

- Production losses in infected herds
- Social impacts due to restrictions on cattle movements from farms

Trade

Restrictions on movement of cattle from infected farms

Case Definition

Suspect case

Clinical case definition:

- The occurrence of respiratory disease in a number of cattle in a herd in which there is acute or chronic coughing, dyspnoea and loss of weight. The cardinal respiratory signs to look for are fast, difficult and noisy breathing; discharge from the nose and coughing, especially after exercise.

Post mortem case definition:

- CBPP should be strongly suspected when there is yellow fluid in the chest cavity; lungs covered with yellowish material; lungs adhered to the chest wall; lungs that do not collapse and are solid, hepatized or marbled; or sequestra can be seen in the lungs of chronic cases.

Confirmed case

- Positive serology in clinical and recovered cases.
- Isolation of *Mycoplasma mycoides* in samples from clinical cases.

Response

Suspect case

- Quarantine affected herds- ensuring that affected and in-contact animals do not come into contact with other animals
- Collect laboratory specimens to confirm diagnosis
- Complete the Disease report form

Confirmed case

- Notify your superiors for further actions which will vary depending on whether the disease has occurred in an endemic or free area
- Collect information on further cases from livestock keepers in the area and key informants.

Free Area

- An emergency response will be activated to contain and eradicate the outbreak.
- Outbreak investigation: to determine the source of the outbreak and possible further spread (trace back and trace forward)
- Slaughter and compensation
- Completion of weekly update reports and follow-up **Disease Report Forms**
- Movement restrictions which may involve deployment of mobile electric fences
- Community awareness raising e.g. community meetings, radio announcements, press releases, distribution of pamphlets etc.
- Activation of the CBPP contingency plan – see 'Instructions for dealing with an outbreak of CBPP in FMD Free Zone' in "**CBPP Contingency Plan**"

Endemic Area

- Isolation of the diseased cattle
- Avoid any movement of his cattle in the area and any contact with other cattle
- Avoid any entry / exit of cattle (sale, purchase, gift, loans,...)
- Vaccinate or re-vaccinate all the exposed cattle.

Organize meetings to inform neighboring farmers about the disease and what they must do in case of a CBPP suspicion in their herd.

Outbreak investigation using 'Inspection Procedure for CBPP' in "**CBPP Contingency Plan**"

Alert threshold

One confirmed case in Free Area

Information management

Data collection

- Complete the **Disease Report Form** to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Culture
- Serology

Specimens

- Nasal swabs or nasal discharges
- Broncho-alveolar lavage or trans-tracheal washing
- Chest cavity fluid collected aseptically from live animals
- Lungs with lesions
- Chest cavity fluid ('lymph')
- Lymph nodes of the broncho-pulmonary tract
- Lung lesions (collected from lesions at the interface between diseased and normal tissue.
- Unpreserved tissue, pleural and joint fluid specimens to be placed in transport medium that will protect the mycoplasmas and prevent proliferation of bacteria for transport to laboratory.
- Specimens must be sent to the Central Veterinary laboratory. The head of CVL shall be notified in time before samples arrive if the outbreak has been suspected south of the VCF.

Send samples to **Central Veterinary Laboratory**

Full instructions on specimen collection and submission are under 8.3.2 Laboratory Diagnosis page 36 in "**CBPP Contingency Plan**"

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/
- CBPP Contingency Plan

Return to Notifiable Diseases

Dourine

Introduction

Dourine, also known as Slapsiekte (Afr.) is a venereally transmitted acute or chronic disease of horses caused by the protozoa *Trypanosoma equiperdum*. The disease occurs in horses in several districts in Namibia, but only very isolated cases are seen in donkeys. Disease was first confirmed in Namibia in 1914 although there are reports indicating suspect cases a few years earlier. Import requirements for horses and donkeys stipulate that only animals tested negative should be imported into Namibia.

Clinical findings

- Vaginal or urethral discharge containing mucus
- Oedema of the genitalia extending along the lower abdomen
- Abortion
- Enlarged regional lymph nodes
- Anaemia and loss of condition
- Raised wheals, 2-10 cm in diameter, particularly on the flanks, which form non-painful weeping ulcers.
- Lameness in one or both hind limbs with muscular wasting
- Mortality of more than 50%.

Pathological findings

- Emaciation
- Anaemia
- Oedema of the tissues around the external genitalia and lower abdominal wall
- Excess fluid in the chest cavity, around the heart and in the abdomen
- Inflamed and ulcerated urogenital tract mucus membranes.

Epidemiology

- Donkeys and mules may have mild or subclinical infections.
- Risk factors include:
  - Imported horse
  - Breeding with imported horse or donkey.
- Differential diagnosis:
  - Nagana
  - Coital exanthema
  - Equine infectious anaemia

Surveillance goal

To detect and eradicate outbreaks.

Surveillance and Monitoring Actions

- passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

- Death of affected horses
- Social impacts through restrictions on horse movements

Trade

Restrictions on horse movements

Case Definition

Confirmed case

Motile trypanosomes in wet preparations of discharge collected from vagina or sheath, discharge from skin lesions, and oedema fluid collected by needle.

Response

Suspect case

- Collect laboratory specimens to confirm diagnosis
- Complete the Disease report form

Confirmed case

- Quarantine premises
- Notify your superiors for further actions which may include:
  - Euthanasia of positive stallions
  - Preventing breeding of positive mares.

Alert threshold

Confirmation of positive case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Microscopic examination
- Serology

Specimens

- Field examination for motile trypanosomes in wet preparations of discharge collected from vagina or sheath, discharge from skin lesions, and oedema fluid collected by needle.
- Washings of the vagina or sheathe collected into sterile saline solution
- Plain blood samples for serology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Notifiable Diseases

Foot and mouth disease

Introduction

Foot and Mouth Disease (FMD), also known as Ekondo neelaka (Oshiwambo), Bek-en-klourseer (Afr.), Ekondo nekana (RuKwangali) or Omutjise oumaraka novi koto (OtjiHerero) is a highly infectious viral disease of cloven-hoofed species characterized by fever and vesicles in the mouth and on the muzzle, teats, and feet. In a susceptible population, morbidity approaches 100%. The disease is rarely fatal except in young animals. Cattle are the most susceptible. Domestic pigs are important hosts and are very effective in propagating the disease. In sheep and goats, the clinical manifestations of infection are usually less severe than in cattle and pigs. All species of antelopes and giraffe are susceptible to FMD. Infection in African buffalo, known wildlife reservoir, is asymptomatic.

The area of Namibia south of the Veterinary Cordon Fence is officially recognised as being free from FMD without vaccination being practised. Most of the Northern Communal Areas west of Ndiyona Constituency in Kavango East region has been regarded by GRN as free from FMD for some time. There is good evidence to suggest that most of the NCA is free from FMD, with the last recorded outbreak occurring over 40 years ago. Regular outbreaks occur in the Zambezi region, which covers most parts of Namibia's FMD infected zone. A sero-survey undertaken in 2010 confirmed there was no evidence of circulating FMD virus in areas within 30 kilometres along the Namibia/Angolan border in Kavango, Ohangwena, and Omusati Regions of Namibia and in two FMD vaccinated constituencies of Ndiyona and Mukwe adjacent to the FMD infected zone.

Outside Zambezi region, the some recent outbreaks were in the Ndiyona and Mukwe constituencies of Kavango East region in 1992 and 2008 respectively. Cattle in both the Zambezi region and the two easternmost constituencies of Kavango (Ndiyona and Mukwe) are currently vaccinated against FMD, and these areas are currently zoned separately from the rest of the NCA. Cattle in the rest of the NCA were last vaccinated in 2006.

Clinical findings

- blisters (vesicles) on tongue, lips, gums, dental pad, snout, skin between toes, coronary bands, bulbs of heels and teats
- raw painful ulcers surrounded by tags of necrotic tissue once vesicles rupture
- excessive salivation
- lameness
- fever (42°C), depression, not eating and dropped milk production.

Pathological findings

- vesicles and ulcers on tongue, lips, gums, dental pad, skin between toes, coronary bands, bulbs of heels, teats and ridges in rumen
- local areas of necrosis of heart muscle in young animals, giving striped appearance – `tiger heart'

Epidemiology

- FMD can be spread by infected animals or products or by people or materials contaminated with the virus.
- Risk factors include:
  - feeding of uncooked swill
  - close contact between stock and wild African Buffalo which can be FMD carriers
  - illegal and uncontrolled movements of livestock and products from Infected Zone
  - introduction of imported stock or stock of unknown origin
  - movement of people and materials from infected premises
- Differential diagnosis:

- Vesicular stomatitis
- Vesicular exanthema
- Mucosal disease
- Swine vesicular disease
- Rinderpest

Surveillance goal

Detection and eradication of outbreaks.

Surveillance and Monitoring Actions

- passive surveillance based on owner reporting and investigation of suspect cases.
- periodic active surveillance to support confidence of freedom in NCA
- trace forward and traceback from infected premises to detect potential source and or further spread

Implications

Human health

Nil

Socioeconomic

- Significant production losses in affected herds and flocks
- Significant social impacts through restrictions on movements

Trade

- No trade permitted from affected farms
- Export bans on animals and animal products

Case Definition

Suspect case

- Many animals in a flock or herd with vesicles, or ulcers, in mouth and on feet

Confirmed case

- demonstration of FMD virus antigen using indirect ELISA
- demonstration of FMD non-structural protein antibodies using ELISA in non-vaccinated livestock.

Response

Suspect case

- Quarantine the premises – prevent movement of animals, animal products and equipment on or off the farm
- Immediately notify the Senior Veterinary officer or CVO
- Collect laboratory specimens to confirm diagnosis and immediately send to laboratory
- Notify laboratory that samples from FMD suspect animals have been sent

Confirmed case

- complete the Disease report form
- ensure disinfection of equipment/ vehicles/ people moving off premises with Sodium Hypochlorite, Acetic acid, Citric acid or Virkon – See 'Disinfection Procedure' in **Contingency Plan for Foot and Mouth Disease** for full instructions.
- collect information on movements to and from suspect herd in previous month
- collect information on further cases from livestock keepers in the area and key informants
- arrange for livestock to be moved toward center of farm away from perimeter fences
- do not leave premises until given permission by Senior Veterinary officer or CVO
- do not visit another place with livestock after leaving the premises.

Further details regarding communication during a suspected or confirmed case of FMD are found in the **Contingency Plan for Foot and Mouth Disease**.

An emergency response will be activated to contain and eradicate the outbreak.

Actions taken will depend on the number of farms infected and the zone in which the outbreak has occurred. Actions will include:

- whole herd slaughter
- epidemiological investigation of farm to determine source of infection and potential spread
- controlling movements on and off the farm
- traceforward and traceback from farm for one month before disease seen
- establishment of a containment zone around the infected farm
- monitoring of livestock on farms in the containment zone.

Details are provided in 'Instructions' in **Contingency Plan for Foot and Mouth Disease**

Alert threshold

Suspect case detected

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology

Specimens

- vesicular fluid
- tissue coverings of intact vesicular lesions
- where vesicles no longer present – fluid from mouth and pharynx
- serum samples.

For detailed instructions on sample collection and packaging see **Samples to take** on pages 54-59 of the **Contingency Plan for Foot and Mouth Disease** (Jan 2013).

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/
- Contingency Plan for Foot and Mouth Disease

Return to Notifiable Diseases

Newcastle disease

Introduction

Newcastle disease, also known Newcastle siekte (Afr.) is a highly fatal and contagious viral disease of domestic poultry and wild birds. It is characterised by sudden onset and high mortalities. First outbreak to be confirmed in Namibia was in Windhoek in 1950. The disease occurs in all parts of the country. It has been a notifiable disease since 1962.

Clinical findings

Newcastle disease can present in a number of ways, from highly virulent form to very mild, depending on the strain of virus and factors in the environment of the birds.

- Mortality of over 90% within 72 hours in highly virulent form
- Swollen head with blue comb in highly virulent form
- Bright green diarrhoea in highly virulent form
- Depression, loss of appetite, drop in egg production
- Respiratory distress: coughing; gasping
- Nervous signs: head tremors; wing and leg paralysis; twisted neck.

Pathological findings

- Inflamed larynx and trachea
- Air sacs thickened and cloudy
- Haemorrhages and necrosis in wall of gastrointestinal tract.

Epidemiology

- Within a flock, the main method of transmission is by inhalation of virus-laden expired air or by ingestion of drinking water or feed contaminated with nasal secretions or faeces containing virus
- The main method of spread between flocks is movement of live birds or personnel and equipment, with transfer of infected faeces on hair, clothing, footwear, crates, feed sacks, egg trays, vehicles or other equipment
- Risk factors include:
  - exposure to wild birds
  - illegal introduction of birds
  - feeding of contaminated refuse from illegally introduced poultry meat to poultry.

Surveillance goal

Detection and eradication of outbreaks of virulent strains.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

The Newcastle disease virus can cause headaches, flu-like symptoms and conjunctivitis in humans. People most at risk are those working in pathology or vaccine production laboratories and those working in poultry slaughtering facilities.

Socioeconomic

Significant production losses

Trade

Restrictions on movements from infected farms

Case Definition

Suspect case

Rapidly fatal, high-mortality disease of poultry with diarrhoea, coughing and gasping with or without nervous signs.

Confirmed case

Isolation of virulent strain of Newcastle disease from flock with high mortality and respiratory and possibly neurological clinical signs.

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory

- Ensure disinfection of equipment/ vehicles/ people moving off premises
- Quarantine premises – prevent movement of birds and equipment off the premises
- Complete the disease report form to record findings

Confirmed case

- Investigate possible source and spread:
  - contact with wild birds
  - trace back and trace forward of birds, eggs, poultry products, litter, waste and equipment for the previous 21 days
  - identify poultry establishments visited by people who had contact with the infected birds.
- Inform your supervisor to arrange for the following:
  - slaughter out all poultry on the premises
  - disinfection of premises
  - restocking after a period of rest of at least four weeks.
- Strengthen/enforce biosecurity
- Investigation of traced properties
- Raise public awareness on how the disease presents, how it spreads and the need for reporting
- Vaccination.

Alert threshold

Suspect case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Virus isolation

Specimens

- Intestinal contents
- Swabs from cloaca and oropharynx
- Fresh samples from trachea, lung, air sacs, intestine, spleen, kidney, brain, liver and heart.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Notifiable Diseases

Rabies

Introduction

Rabies, also known as Hondsdolheid (Afr.) is an acute, almost invariably fatal viral encephalitis affecting all warm-blooded animals and man. Jackal and kudu seem to be highly susceptible. 1887 was named by OvaHerero as Otjorundumba, meaning the year of the madness. This suggest rabies occurred in Namibia before 1900. However, the first confirmed case was in Swakopmund in 1906. Rabies is endemic in Namibia and continues to be reported in domestic animals, wildlife and man.

Clinical findings

Clinical signs can be highly variable between species but commonly include:

- change of temperament including wild animals losing their fear of people
- apprehensive look
- dilated pupils
- abnormal low pitched vocalisation
- twitching of lips, teeth grinding and excessive salivation
- attacking animals and objects
- increased sexual excitement
- paralysis of hind legs
- pain with biting or rubbing at site of exposure
- depraved appetite
- dropped milk production.

Pathological findings

There are no characteristic gross lesions.

Epidemiology

- Meercats, dogs, jackals and bats are reservoir hosts for the virus.
- Rabies virus is transmitted by contamination of a fresh wound with infected saliva, usually by the bite of a rabid animal.
- Differential diagnosis:
  - Cattle:
    - Lead poisoning
    - Lactation tetany
    - Hypovitaminosis A
    - Listerial meningoencephalitis
    - Nervous acetonemia
  - Horse:

    - Protozoal encephalomyelitis
    - Viral encephalomyelitis
    - Nematodiasis
    - Equine degenerative encephalopathy
- Pigs:
    - Pseudorabies

Surveillance goal

- Detect cases and minimise spread.
- Prevent human cases.

Surveillance and Monitoring Actions

- passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

- Approach and handle rabid animals with extreme caution. Always wear **gloves** when handling tissues from a suspect case.
- Staff should be vaccinated for rabies.

Socioeconomic

- A cluster of livestock may be infected by one rabid dog but generally production impacts are not great
- Anxiety among people bitten by a rabid animal or handling rabid livestock

Trade

Nil

Case Definition

Suspect case

Sudden change in temperament, abnormal vocalization in a recently bitten animal

Confirmed case

Identification of virus in animal showing suggestive clinical signs.

Response

Suspect case

- Confine suspect animals
- Destruction of suspect animals
- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings
- Notify supervisor
- Advise local human health officer.

Confirmed case

- Disinfection of premises
- Investigation of incident to identify potential source and other possibly exposed animals
- Trace-back:
  - identify all animals that had come onto the farm and may have been the source of rabies
  - contact farms of origin and investigate if there are any suspect animals on those farms.
- Trace-forward:
  - identify all animals that have moved from the farm that could have been exposed to the rabid animal and potential source of rabies
  - organize prophylactic treatment or destruction of high risk animals.
- Raise public awareness on how the disease presents, how it spreads, the need for reporting and the need to contact health professional if humans exposed
- Ensure vaccination of all dogs as per Section 66 of Animal Health Regulation: Animal Health Act 2011
- Encourage cat vaccination
- Rumour investigation.

Alert threshold

One suspected case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus detection

Specimens

- Whole head
- Where unable to get whole head to laboratory submit brain sample in **sealed straw**

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Notifiable Diseases

Rift Valley Fever

Introduction

Rift Valley Fever (RVF), also known as Slenkdalkoors (Afr.) or Infectious enzootic hepatitis of cattle and sheep is an acute mosquito-borne viral disease of mainly sheep, cattle and goats and also humans. RVF normally occurs in interior grassy plateau areas but can spread to Namibia if there is a massive build-up in mosquito numbers following abnormally heavy seasonal rainfall and accumulation of surface water and introduction of the virus. It is characterised by fever, hepatitis, abortions and high mortality in young animals.

Typically the disease occurs in Namibia as explosive epidemic every 10 - 15 years. It is associated with periods of unusually high rainfall in semi-arid, arid and hyper-arid areas of the country. The first major epidemic occurred in 1957 in the Mariental district. During 1974-75 outbreaks, farmers and veterinary services staff were infected leading to some fatalities. Most recent outbreaks were reported in the Hardap region in 2011.

Clinical findings

RVF is usually more severe in young animals and can cause peracute, acute or subacute disease.

- Most of the flock or herd can be affected
- Mortality of up to 95% in young lambs and 30% in calves
- Found dead or suddenly weaken, collapse and die when driven.
- Abortion
- Fever
- Rapid pulse
- Weakness and unsteady gait
- Vomiting and evidence of abdominal pain
- Discharge from the nose containing mucus and pus
- Haemorrhagic diarrhoea
- Pin point or larger haemorrhages in mucus membranes
- Jaundice.

Pathological findings

- Local or generalised necrosis of liver tissue – see white dead areas of about 1 mm in diameter
- Liver enlarged, blood filled and discoloured with haemorrhages below the capsule
- Widespread pin point or larger haemorrhages in the skin
- Haemorrhages on membranes covering the organs and body cavities
- Lymph nodes enlarged, oedematous, haemorrhagic and necrotic
- Congestion and haemorrhages of kidneys and gallbladder
- Haemorrhagic inflammation of intestines
- Jaundice.

Epidemiology

- The virus circulates between vertebrate hosts and mosquitoes
- Non-vector-born transmission of the virus in livestock is not significant
- Infected stock can spread the virus
- Windborne movement of mosquitoes from infected areas can spread the virus
- Differential diagnosis:
  - Wesselsbron disease
  - Bluetongue
  - Emphemeral fever

Surveillance goal

- To detect and limit outbreaks.
- To prevent human infection.

Surveillance and Monitoring Actions

- passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Humans can readily become infected through handling tissues from infected animals. **Rubber gloves and face masks** must be worn and personal disinfection must be thorough when undertaking post mortems of suspect cases or when handling aborted foetuses.

Socioeconomic

Very significant production losses and livestock deaths

Trade

Restrictions on livestock movements from infected areas

Case Definition

Suspect case

Significant number of deaths and abortions, fever, weakness and jaundice seen prior to death with congested haemorrhagic livers at post mortem associated with a large mosquito populations.

Confirmed case

Virus isolation or evidence of recent sero-conversion.

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory:
  - when packaging specimens take particular care that there is no blood or tissue contamination of the secondary container
  - a prominent warning that the samples are from a suspect rift fever case must be visible when the outer container is opened.
- Complete the disease report form to record findings
- Prevent movement of ruminants from farm

Confirmed case

- arrange burial or burning of carcasses and aborted foetuses
- disinfection of areas contaminated by blood or tissues from infected animals
- collect information on further cases from livestock keepers in the area and key informants
- notify supervisor to arrange:
  - mosquito control
  - vaccination
- raise public awareness on how the disease presents, how it spreads, actions they can take to protect themselves and the need for reporting.

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology

Specimens

- Blood samples in heparin or EDTA collected from animals with a fever
- Liver, spleen and brain both fresh and in neutral buffered formalin
- Plain blood samples from animals in active and recovered phases of the disease for serology

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Notifiable Diseases

Sheep scab

Introduction

Sheep scab, also known as Skaapbrandsiekte (Afr.) is caused by the parasitic mite *Psoroptes ovis* which completes all stages of its life cycle on the host. Typical manifestation of the disease are large scaly and crusty lesions, loss of wool and intense scratching.In the 1920s Sheep scab was one of the most important disease of sheep in Namibia. Costly control measures have been in place for a long time. It has been a notifiable disease since 1901. By 1916, Sheep scab was prevalent throughout the country. Currently sporadic outbreaks reported are limited to sheep producing areas.

Clinical findings

- Large, scaly, crusted lesions develop almost exclusively on woolly parts of the body
- Intense itchiness manifests by:
  - sheep scratching and rubbing, biting at flanks
  - clean areas of fleece, due to licking or biting
  - tags of fleece on flanks, areas of wool loss, discoloured fleece due to rubbing and scratching.
- If left untreated anaemia and weakness sets in
- Sheep standing apart from flock, dull and depressed
- If left untreated emaciation and decreased milk production follow
- Deaths can occur.
- Mites are sometimes found in the ears.

Pathological findings

- Initially multiple small lumps that ooze serum or pustules
- Dry crusty scabs with moist red borders (so-called scabs)
- Damaged, moist skin
- Wool matted and shed
- Secondary lesions from self-trauma

Epidemiology

- Adult mites can live away from the host for up to 3 weeks in cool moist conditions
- Spread is by direct contact between sheep or by contact with contaminated wool, fences or soil
- Risk factors include:
  - introducing infected sheep
  - sheep in contact with saleyards or livestock lorries that have transported infected sheep
  - breakdown in biosecurity
- Differential diagnosis:
  - Mycotic dermatitis
  - Scrapie
  - Ked and lice infestation
  - Psorergates ovis infestation

Surveillance goal

- Early detection and report of outbreaks to prevent spread of the disease.
- Fast feed back of information to field staff and farmers.

Surveillance and Monitoring Actions

Passive

- Suspicion reported by a farmer (SV; AHT + SIA; CAHW, AET).

Active

- Regular visits to communities and farms (FVF by AHI, FED groups for AET).
- Inspections in markets, auction pens, open market butchers and abattoirs.
- See **Sheep scab surveillance** for details

Implications

Human health

Nil

Socioeconomic

- Significant production losses
- Social impacts through restrictions on sheep movements from infected farms

Trade

Restrictions on sheep movements from infected farms

Case Definition

Suspect case

Sheep with intense itchiness and presence of scabs

Confirmed case

Laboratory identification of mite in sample from intensely itchy sheep.

Response

Suspect case

- quarantine farm
- collect skin scrapings from infected sheep and send to laboratory
- inform your supervisor of suspect diagnosis

Confirmed case

- Full instructions on response are outlined in **Sheep scab response**.
- Quarantine farm until sheep scab eradicated
- Investigate possible source of infection – traceback and traceforward from farm
- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

- Ensure the treatment of all sheep on the farm with a DVS-approved product – see details under 'Treatment' in **Sheep scab response**.
- Prevent movement of sheep from affected farms except for direct slaughter, under a permit issued by the state vet.
- Inspect neighbouring farms
- Disinfection of places and equipment possibly contaminated with sheep scab
- Raise public awareness about disease and ensure dipping of sheep as per Division 3, Part 10 *Animal Health Regulations: Animal Health Act 2011*.
- Legislative requirements are summarised in **Sheep scab legislation**.

Alert threshold

Identification of suspect cases

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Microscopic examination of skin scrapings

Specimens

- crusts and scabs
- skin scraping from edge of lesion. For scraping use a clean blade (e.g. washed with soap and quickly blazed with alcohol) and placed in a dry tube kept at 4°C.

Related pages

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Notifiable Diseases

Tuberculosis

Introduction

Tuberculosis is a chronic, infectious disease of almost all vertebrates, caused by 3 main types of tubercle bacilli, namely *Mycobacterium bovid* in cattle, *M. tuberculosis* in man and *M. avium* in avian species. Any of these can infect other host species too. Human tuberculosis has a high incidence in Namibia and this is exacerbated by high levels of immunocompromised people. On the other hand Namibia is free of bovine tuberculosis.

Clinical findings

- Emaciation
- Moist cough
- Respiratory distress.

Pathological findings

Granulomas in the lymph nodes (particularly those of the head and thorax) lung, spleen, liver and the surfaces of body cavities.

Epidemiology

- Each species of mycobacteria are maintained only in their principal host (e.g. *Mycobacterium bovis* in cattle and other bovines) but occasionally other species of mammals are infected including humans.
- Infected cattle shed the bacteria into the air when they cough and also in their faeces.
- The bacteria can remain viable in moist soils, manure and straw for over a year.
- Cattle become infected through inhaling or ingesting the bacteria.
- Risk factors include:
  - imported cattle
  - Illegal movements of cattle
  - introduction of cattle from infected herds.
- Differential diagnosis:
  - Lung abscesses
  - Pleurisy and pericarditis
  - Traumatic reticuloperitonitis
  - CBPP
  - Enzootic bovine leukosis
  - Lymphadenopathy

Surveillance goal

Detection and eradication of outbreaks

Surveillance and Monitoring Actions

- passive surveillance based on owner reporting and investigation of suspect cases.
- active monitoring for suspect granulomas in abattoirs.
- trace forward and traceback from infected premises to detect potential source and or further spread

Implications

Human health

Humans can become infected when exposed to infected cattle coughing near them or through drinking unpasteurized milk from infected cows.

Socioeconomic

Some production losses

Trade

Restrictions on movement of cattle from infected herds

Case Definition

Suspect case

Emaciation, moist cough and respiratory distress in a number of animals

Confirmed case

Culture of organism

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Quarantine farm and prevent movement of cattle from farm
- Investigate possible source of infection – traceback and traceforward from farm
- Inform your supervisor/ State Veterinarian who will arrange:
  - testing of herd every 3 months – instructions on doing the intradermal TB test are outlined in pages 1 to 6 of "**Protocol for testing of animals for TB**"
  - culling reactors to slaughter under Red Cross permit on sealed trucks
  - testing of traced herds
- Disinfection of feed and water and feed troughs and feed areas
- Improve biosecurity

For full details of response see "Procedures for handling infected herd" (pages 7 and 8 of "**Protocol for testing of animals for TB**").

Alert threshold

One confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Culture
- Histopathology

Specimens

- Fresh granulomas for culture
- Granulomas in neutral buffered formalin for histopathology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - http://www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Notifiable Diseases

Notifiable Foreign Animal Diseases

Avian influenza (Fowl plague)

Introduction

Avian influenza (AI) is a highly contagious generalised viral disease of poultry. Although the disease has not been diagnosed in Namibia, it has been reported in neighbouring RSA. Therefore Namibia continues with early detection surveillance activities.

Clinical signs

The clinical signs can be very variable depending on the virulence of the strain, species affected, age, other diseases present and environment.

- Mortalities of 50-100% if highly virulent virus
- Sudden death
- Respiratory signs: eye and nasal discharges, coughing, snicking, difficulty breathing
- Swelling of the sinuses and/or head
- Wattles and comb blue and swollen
- Severe depression, reduced vocalisation, marked reduction in feed and water intake
- Incoordination and nervous signs
- Diarrhoea
- Decline in egg production and increased poor quality eggs.

Pathological signs

- Subcutaneous oedema of head, face, upper neck and feet
- Pin point and broader tissue haemorrhages throughout body, particularly in larynx, trachea, proventriculus and fat around the heart.
- Dehydration
- Nasal and oral cavity discharge
- Necrotic foci in spleen, liver, kidneys and lung
- Spleen enlarged and haemorrhagic.

Epidemiology

- AI viruses survive best in cool humid conditions
- Wild birds, particularly waterfowl, act as a reservoir of the virus
- Contamination of poultry feedstuffs and water by wild birds is the main source of disease for poultry farms
- Movement of live birds is the main method of spread between poultry farms
- Spread between farms can also occur through the movement of feedstuffs, people, equipment and vehicles contaminated with infected faeces or respiratory secretions
- Risk factors include
  - Exposure of poultry to migratory water birds
  - Importation of infected poultry or poultry products
  - Breakdown in biosecurity
  - Free range poultry.

Surveillance goal

Detection and eradication of outbreaks.

Surveillance and Monitoring Actions

- passive surveillance based on owner reporting and investigation of suspect cases.
- Active surveillance involves annual inspection of all farms in the country as well as scheduled community visits in communal farming areas.
- Active surveillance involving the collection of serum from a statistically representative sample of ostriches at all ostrich export farms is also in place.

More details on surveillance for HPAI are provided at **HPAI surveillance**.

National Contingency Plan for Highly Pathogenic Avian Influenza

Namibia's National Contingency Plan for Avian Influenza is available at:

- **National Contingency Plan for Avian & Pandemic Influenza, September 2007** or
- **pdf version**

Implications

Human health

Some virulent AI strains can cause serious, even fatal, disease in humans. Close contact with live infected poultry is the source of human infection.

Staff should be vaccinated with the current season’s influenza vaccine to reduce the possibility of dual infection with avian and human influenza viruses leading to a possible re-assortment of the AI virus.

Personal protective equipment (including gloves and goggles) should be worn when handling infected birds.

Socioeconomic

- Significant production losses
- Social impact related to potential for impact on human health and restrictions on movements from infected farms

Trade

Movement restriction from affected farms

Case Definition

Suspect case

Poultry flock with high rate of sudden deaths in birds showing difficulty breathing, swollen heads, combs and wattles, watery eyes, diarrhea and incoordination

Confirmed case

Isolation of virulent virus

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings
- Quarantine premises – control movement of birds
- Immediately notify supervisor and/ or Chief Veterinary Officer

Further information regarding communication during a suspected and/or confirmed outbreak of avian influenza can be found in the **National Contingency Plan for Avian & Pandemic Influenza**.

Confirmed case

- Investigate possible source and spread - contact with wild water birds? Introduction of infected poultry, movement of contaminated material onto property?
- Identify and record trace back and trace forward contacts from 21 days prior to the disease outbreak commencing
- Disinfection of people, vehicles and equipment moving off property
- Inform your supervisor to arrange for the following:
  - Slaughter out all poultry on the premises (no compensation is given in Namibia, inform owner accordingly)
  - Clean out and **disinfect premises** (any detergent, formaldehyde, bleach, ammonia, acids, heating to 30°C for 3 hours, 32°C for 30 min, drying or iodine containing solutions)
  - Establish a Protection Zone and a Surveillance Zone around infected premises
  - Vaccination (if approved by CVO)
  - Restock after a period of rest of at least 21 days
  - Strengthen/enforce biosecurity
  - Raise public awareness on how the disease presents, how it spreads and the need for reporting.

For full details see **Field Instructions** in the National Contingency Plan for Avian & Pandemic Influenza.

Alert threshold

One confirmed case of virulent AI

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology

Specimens

Samples to be taken from at least 6 birds – 3 showing signs of disease and 3 recently dead.

From live birds

- Swabs of trachea and cloaca
- Blood for serology

From dead birds

- Intestinal contents, cloacal and oronasal swabs
- Samples of brain, trachea, lungs, air sacs, spleen, kidney, liver, heart and intestine
- Swabs of tracheal and cloacal contents, brain and heart blood should be collected aseptically. The material collected on the swabs should be mixed into 3mL aliquots of transport medium in sterile bottles and the swabs discarded.
- Unpreserved tissues and swab material should be chilled and forwarded to Central Veterinary Laboratory on water ice or with frozen gel packs.

References

- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/
- DVS (2007) Avian Influenza Surveillance Plan - HPAI surveillance
- DVS (2007) Avian Influenza Contingency Plan - National Contingency Plan for Avian & Pandemic Influenza, September 2007

Return to Foreign Animal Diseases

Bovine Spongiform Encephalopathy

Introduction

Bovine spongiform encephalopathy (BSE) is a rare brain disease of cattle and other ruminants that is associated with the accumulation of abnormal prion protein in the brain. It is commonly referred to as "mad cow disease". Despite testing thousands of samples since 2007, neither BSE agent nor clinical disease has been confirmed in Namibia. Therefore, for all purposes, Namibia is free of BSE. However, surveillance continues as a requirement for trade.

Clinical signs

- changes in behaviour, such as nervousness, apprehension and frenzy when cattle are confronted by gateways and other obstacles
- abnormal posture and gait, such as staggering, swaying, high lifting of legs when walking, tremors, falling over and being unable to get up when lying down
- extreme sensitivity to sound and touch.

Differential Diagnosis

BSE must be considered in the differential diagnosis of these diseases:

- Rabies
- Lead poisoning
- Plant poisoning
- Mycotoxicoses
- Bacterial encephalitis (e.g. listeria)
- Space occupying lesions
- Acetonaemia and other metabolic disorders such as hypocalcaemia & hypomagnesaemia
- Hepato-encepalopathy
- Polioencephalomalacia
- Botulism, etc.

It is expected that the occurrence of BSE in Namibia would be associated with imported livestock. However contaminated veterinary therapeutics must also be considered a potential source of infection, along with contaminated surgical instruments. Where a contaminated therapeutic agent is the source of an outbreak, the disease would initially become much more widespread than if the source was imported livestock.

Pathological signs

No signs present.

Epidemiology

- BSE is caused by an infectious prion (PrPSc) which is highly resistant to inactivation by physical or chemical procedures
- BSE develops and progresses slowly over several weeks to months
- BSE is only seen in cattle 3 to 7 years of age
- spread occurs by feeding cattle with meat-and-bone-meal that is contaminated with the BSE agent

Surveillance goal

- Detection and eradication of any cases
- Demonstration of freedom from BSE.

Surveillance and Monitoring Actions

- Namibia's national BSE Surveillance Programme consists of awareness and extension, inspection visits, sampling and laboratory testing from abattoirs and the field, control of ruminant derived protein (feed ban on feeding livestock with ruminant derived proteins), control and removal of specified risk material at abattoirs, import control and prosecutions of transgressors.
- **BSE surveillance plan**.

Implications

Human health

BSE can cause a similar disease in humans to that in cattle. People who develop the disease have consumed food containing brain or spinal cord from BSE-infected cattle

Socioeconomic

Restrictions on cattle movements from farm where case occurred would have socioeconomic impacts

Trade

- Restrictions on movement of cattle from farm
- Banning of meat and live cattle exports from Namibia

Case Definition

Suspect case

Clinical signs of progressive neurological disease in a 3 to 7 year old bovine

Confirmed case

Characteristic histopathological changes plus accumulated abnormal prion protein in the brain and spinal cord.

Response

BSE has not been reported in Namibia. Preventive measures such as the banning of feeding of meat and bone meal (MBM) to ruminants in 1998, banning of use of MBM as fertilizer, banning of imports of cattle and risky cattle products from countries where BSE has been reported, the introduction of a BSE surveillance program, the removal of specified risk material during the slaughter process and their exclusion from the rendering process, training of staff and education of farmers and the public about the disease are all part of the control strategy.

Suspect case

- collect laboratory specimens and arrange for testing at the laboratory
- raise public awareness on how the disease presents and about ban on feeding animal-derived meat and bone-meal to ruminants.

Confirmed case

- undertake investigation into herd to identify possible source of infection e.g. feeding of animal-derived meat and bone-meal; imported cattle
- complete the disease report form to record findings
- trace-forward/ trace-back from farm of cattle exposed to the same feed sources as the positive case.

Further information regarding communication during a suspected and/or confirmed outbreak of BSE can be found in the **Contingency Plan for Bovine Spongiform Encephalopathy**.

Alert threshold

One confirmed case

See **BSE response** for more details.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Histopathology
- Immunohistochemistry on formalin-fixed sections of CNS
- Immunochemical detection of PrPSc in homogenates of unfixed CNS tissue
- Detection of scrapie-associated fibrils (SAFs) by electron microscopy

Specimens

- Brain and cord in buffered formalin for histopathology.
- Fresh, chilled cervical spinal cord for detection of prion protein.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/
- DVS (2008) BSE Surveillance Programme - BSE surveillance
- DVS (2008) BSE Contingency Plan - BSE Contingency Plan

Return to Foreign Animal Diseases

Contagious equine metritis

Introduction

Contagious equine metritis (CEM) is an acute, highly contagious venereal disease of horses characterised by a profuse, mucopurulent vaginal discharge and early return to estrus in most affected mares. It is caused by *Taylorella equigenitalis*. Infected stallions and chronically infected mares show no clinical signs. The disease occurs primarily in Europe. It has not been diagnosed in Namibia.

Clinical signs

- Vaginal discharge containing mucus and pus – grey-white in colour
- Very low conception rates
- Stallions show no clinical signs.

Pathological signs

- Vaginal discharge

Epidemiology

- Some mares remain chronic carriers
- Risk factors include:
  - Imported mare
  - Mare exposed to an imported horse
- Some mares remain chronic carriers

Surveillance goal

To detect and eradicate outbreaks.

Surveillance and Monitoring Actions

- passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Economic impact of low breeding rate in horses

Trade

Restriction on movement of infected horses

Case Definition

Suspect case

Poor conception rate with mares showing a vaginal discharge

Confirmed case

Culture of *Taylorella equigenitalis*

Response

Suspect case

- Collect laboratory specimens to confirm diagnosis
- Complete the Disease Report form

Confirmed case

- Quarantine premises
- Notify your superiors for further actions
- Isolation of positive mares on farms
- Testing of mares twice after foaling
- Restriction of movement of mares and stallions until horses' status cleared by the CVO following negative tests

Management of horses introduced into Namibia to prevent the introduction of CEM is outlined in **Circular V8/2013: "Standard Operating Procedure for the Control of Equine Metritis"**.

Alert threshold

One confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Bacterial culture

Specimens

Mares:

- Placenta of aborted foetus
- Swab of cervix or endometrium
- Combined swab from the opening of the urethra, clitoral fossa and clitoral sinus
- Serum samples from acute and convalescent phases.

Stallions:

- Swab from penile sheath, front of urethra, urethral fossa and pre-ejaculation fluid (if possible).

Two swabs to be collected from each site: one to be submitted in Amies Charcoal Media for culture; the other dry for PCR.

References

- Circular V8/2013: “Standard Operating Procedure for the Control of Equine Metritis”
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Foreign Animal Diseases

Equine Infectious Anaemia

Introduction

Equine infectious anemia (EIA) affects horses, mules and donkeys and is caused by equine infectious anemia virus (EIAV). Although the majority of persistent infections appear to result in minimal clinical signs, EIA may be seen in epizootic form with high morbidity and mortality. Because there are no effective and safe vaccines, many countries have established control programs based on serologic testing. Infection with EIAV appears to persist for life. Although EIA has worldwide distribution, it has not been diagnosed in Namibia.

Clinical findings

- Fever
- Not eating
- Weakness and depression
- Jaundice
- Rapid breathing
- Rapid heart rate
- Oedema along lower part of body
- Pin point haemorrhages on the mucus membranes
- Bleeding from nose
- Blood–stained faeces.

Donkeys and mules are less likely to develop severe clinical signs.

Pathological findings

- Enlarged spleen, liver and abdominal lymph nodes
- Pale mucous membranes
- Oedema in limbs and along the ventral abdominal wall
- Pin point haemorrhages on internal organs, including the spleen and kidney
- Emaciation in chronic cases
- Haemorrhages in mucosa and internal organs
- Coagulation of blood in blood vessels.

Epidemiology

- It is most commonly spread by large biting flies, especially horse flies.
- It is often fatal to horses but if the affected animal recovers it remains a lifelong carrier of the disease
- Risk factors include:
  - introduction of horse of unknown status
  - presence of horse flies.

Surveillance goal

To detect and control outbreaks.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Economic impacts through death of some horses and costs of control measures

Trade

Restrictions on horse movements

Case Definition

Suspect case

A number of horses in a herd experiencing fever, anaemia, oedema, progressive weakness or weight loss, particularly when new animals have been introduced into the herd or a horse in the herd has died.

Confirmed case

Positive serology

Response

Suspect case

- Collect laboratory specimens to confirm diagnosis
- Complete the Disease Report form.

Confirmed case

- Quarantine premises
- Notify your superiors for further actions which may include:
  - euthanasia of infected horses, or
  - permanent isolation of infected horses with at least 200 metres between infected and non-infected horses
- Fly control
- Testing of all horses on property and euthanasia or isolation of positive horses
- Prevent movement of positive horses from property
- Biosecurity – only introduce tested negative horses

Alert threshold

One confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Serology

Specimens

Plain blood for serology

References

- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Foreign Animal Diseases

Equine viral arteritis

Introduction

Equine viral arteritis (EVA) is an infectious viral disease of horses. It is transmitted primarily via the respiratory route but can also be transmitted venereally. Despite the widespread global distribution of EAV, laboratory-confirmed outbreaks of EVA are relatively uncommon. Disease has not been diagnosed in Namibia.

Clinical findings

- Abortion
- Fever
- Nasal and eye discharge, conjunctivitis
- Swellings around eyes and of limbs, genitals and mammary glands
- Respiratory distress
- Skin rash
- Muscle soreness
- Depression
- Loss of appetite.

Many horses infected with EVA are asymptomatic

Pathological findings

EVA-aborted foetuses do not show any characteristic lesions.

Epidemiology

- Stallions may become long-term carriers of the disease.
- Risk factors include:
  - introduction of horse of unknown status
  - exposure to aborted foetus
  - mating of mares to infected stallions either naturally or by artificial insemination.
- The prevalence of infection varies widely both between countries and among breeds in the same country. It is frequently highest in Standardbreds and Warmbloods

Surveillance goal

To detect and control outbreaks.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil. There is no evidence that EAV is transmissible to people.

Socioeconomic

Decreased production through abortions

Trade

Restrictions on movement of horses from infected farms

Case Definition

Suspect case

Abortions and respiratory distress in horses with swellings around eyes and of limbs, genitals and mammary glands

Confirmed case

- A rising antibody titre from paired blood samples collected 14 to 28 days apart in mares who have aborted and have respiratory disease
- Viral isolation.

Response

Suspect case

- collect laboratory specimens to confirm diagnosis
- complete the Disease Report form

Confirmed case

- quarantine premises
- isolate infected horses from non-vaccinated horses
- disinfection
- improve biosecurity
- isolate infected horses from non-vaccinated horses
- notify your superiors for response
- vaccinate breeding horses annually
- only breed carrier stallions to infected or fully vaccinated mares.

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology

Specimens

- Paired plain blood samples collected 14 to 28 days apart for serology
- Nasal and semen swabs for virus isolation.

References

- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Foreign Animal Diseases

Hog Cholera (Classical Swine Fever)

Introduction

Hog Cholera, also known as Classical swine fever or Varkpes (Afr.), is a highly contagious generalised virus disease of pigs. It is clinically similar to African swine fever but is caused by a different virus. Disease was reported in Namibia between 1912-1917, introduced through pigs imported from RSA. The last reported suspected outbreak was in Okahandja in 1926. Hog Cholera has been a notifiable disease in Namibia from 1959 to date. However, the country is regarded as free of Classical Swine Fever.

Clinical findings

It can occur in acute, chronic and mild forms.

- Mortality can reach 90% in acute form
- High fever (42°C)
- Depression, not eating, pigs huddle together
- Staggering, convulsions and trembling
- Vomiting and diarrhoea
- Coughing and conjunctivitis
- Red or purple skin blotching on ears, snout, limbs and abdomen
- Ill thrift
- Encrusted skin lesions
- Abortion or stillborn piglets
- Surviving piglets have congenital tremors or deformities.

Pathological findings

- Lymph nodes swollen, congested and haemorrhagic
- Pin point haemorrhages throughout body – kidney may have ‘turkey-egg’ appearance
- Spleen is normal size or only moderately enlarged and contains infarcts
- Haemorrhagic or necrotic gastroenteritis with small infarcts in gut wall
- Bronchopneumonia and pleurisy in chronic infections.

Epidemiology

- Pigs exposed to CSF virus before birth may be persistently infected throughout life
- Movement of clinically normal infected pigs is the most important method of spread between farms
- The virus can survive in fresh pigmeat and in some processed pigmeat products for months under cool conditions
- Ingestion by pigs of pigmeat or pigmeat products infected with the virus is an important method of spread
- Contaminated multiple-use vaccination needles can spreads the disease between pigs and between farms
- Risk factors include:
  - swill feeding
  - illegal importation of pigs
  - exposure to equipment from infected farms
  - breakdown of biosecurity.

Differential diagnosis:

- African swine fever
- Salmonellosis
- Swine erysipelas

Surveillance goal

To detect and eradicate outbreaks.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

- Highly significant production losses in acute form of disease
- Social disruption through movement restrictions from farm

Trade

- Restrictions on pig movements from farm
- Ban on export of live pigs and pig products

Case Definition

Suspect case

High death rate in pigs showing red or purple skin blotching on ears, snout, limbs and abdomen plus diarrhoea, vomiting and conjunctivitis

Confirmed case

Virus isolation from pigs showing clinical signs suggestive of Hog Cholera

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Quarantine premises – prevent movement of animals and animal products off premises
- Investigate possible source and spread:
  - feeding of swill
  - trace back and trace forward contact
- Disinfect people, vehicles and equipment leaving premises (Sodium Hypochlorite, Virkon S, Soaps and Detergents)
- Inform your supervisor to arrange for the following:
  - slaughter out all pigs on the premises
  - disinfection of premises (Sodium Hypochlorite, Virkon S, Soaps and Detergents)
  - traceforward and traceback with monitoring of traced herds
  - restock after a period of rest of at least four weeks
  - strengthen/enforce biosecurity
- Enforce the prohibition on feeding of uncooked swill or animal products - in accordance with regulations of the Animal Health Act 1 of 2011.
- Raise public awareness on how the disease presents, how it spreads and the need for reporting
- Vaccination may be used.

Alert threshold

One confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Histopathology
- Serology

Specimens

- Blood for serology
- Blood in EDTA
- Fresh spleen, lymph nodes and tonsil for virus isolation
- Spleen, lymph nodes, tonsil and kidney in neutral buffered formalin for histopathology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Foreign Animal Diseases

Johne's disease

Introduction

Johne's disease is a chronic mycobacterial disease caused by Mycobacterium paratuberculosis. It occurs in a wide range of ruminants including cattle, sheep and goats. Infection commonly occurs soon after birth and it has a long incubation period. This disease has not been diagnosed in Namibia.

Clinical findings

- Only occurs in adult animals
- Progressive wasting over several weeks or months
- Chronic diarrhoea (may not be seen in sheep).

Pathological findings

- Thin or emaciated carcase
- Oedema in lower part of body and fluid in the body cavities
- Thickened, often corrugated, small intestine wall, particularly in the end section
- 'Chording' of the lymph vessels draining the intestines
- Lymph nodes near intestines enlarged and oedematous.

Epidemiology

- Infection generally occurs early in life with clinical signs not seen until many years later.
- Infected animals can shed large numbers of organisms in their faeces
- The organisms can survive in the environment for up to a year in cool moist conditions
- Animals become infected through ingesting contaminated feed or soil
- Spread between farms occurs mainly through the movement of infected animals
- Risk factors include:
  - introduction of stock into herd or flock
  - grazing of stock on land recently grazed by infected animals
- Differential diagnosis:
  - Diarrhoea in cattle:

    - Gastrointestinal parasitism
    - Salmonellosis
    - Secondary copper deficiency
- Chronic weight loss in cattle:
    - Chronic traumatic reticuloperitonitis
    - Malnutrition
    - Lymphosarcoma
- Diarrhoea and weight loss in sheep and goats:
    - Gastrointestinal parasitism
    - Internal abscesses
    - Dental problems
    - Caseous lymphadenitis

Surveillance goal

To detect outbreaks and prevent spread to uninfected herds/flocks.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

None confirmed

Socioeconomic

- Production losses can occur when young livestock are exposed to high levels of faecal contamination
- Usually low production losses in extensively farmed livestock

Trade

Purchasers may seek evidence that the herd or flock of origin is not infected with Johne's disease

Case Definition

Suspect case

Diarrhoea in thin wasting animals that do not respond to treatment

Confirmed case

- Presence of typical intestinal lesions and positive faecal or tissue culture of organism
- Positive serological test

Response

Suspect case

- collect laboratory specimens to confirm diagnosis and submit to laboratory

Confirmed case

- No specific treatment of significant value
- complete the disease report form
- investigate possible source of infection – collect detailed history of herd/flock
- investigate extent of infection in herd/ flock - serology testing of all adult stock
- obtain information on traceforward and traceback from farm in last 7 years
- develop a management plan with stock owner to reduce impact of disease and improve biosecurity
- prevent movement of stock to uninfected herds or flocks – preferably slaughter-only movements from farm
- advise supervisor of diagnosis and results of tracing
- investigation of disease status of stock on traced farms.

Alert threshold

- Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Culture
- Histopathology
- Serology

Specimens

- Faeces
- Blood for serology
- Fresh mesenteric, ileal and ileocaecal lymph nodes, and sections of distal ileum and proximal colon for culture
- Ileocaecal valve, sections of distal ileum and proximal colon and mesenteric lymph nodes in neutral buffered formalin for histopathology.

Results

- Individual tests can give false negative results
- Serological tests of the herd of origin are required to give confidence an individual animal is not infected with Johne's disease

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Foreign Animal Diseases

Peste des petits ruminants

Introduction

Pest des petits ruminants (PPR) is a viral disease of sheep and goats that is spreading in parts of Africa. It is similar to Rinderpest. PPR causes high mortality resulting in significant economic impact. The disease was for a long time restricted to West, North, East and Central Africa. However, recently it has moved southwards into the SADC region and of immediate concern for Namibia is that it has been reported in the northern parts of Angola. The disease poses a threat to 50 million small ruminants in the SADC region. Therefore, Namibia is under high alert particularly in the Northern regions bordering Angola that are at high risk.

Clinical signs

- Up to 90% mortality in naïve flocks.
- Fever (40-41°C)
- Depression or restlessness, not eating
- Discharge from nose – watery at first then thick and yellow resulting in crusts which bloc the nostrils and cause respiratory distress
- Conjunctivitis with discharge from eyes and matting together of eyelids
- Excessive salivation associated with necrotic erosions in the mouth
- Bad breath
- Severe, watery, blood-stained diarrhoea.

Pathological signs

- Emaciation
- Conjunctivitis
- Necrotic erosions in the mouth involving the inside of the lower lips and adjacent gum
- Crusty scabs along the outer lips
- Bronchopneumonia
- Necrotic or haemorrhagic inflammation of the intestines
- Congestion around ileo-caecal valve, at the caeco-colic junction and in rectum
- Linear engorgement and blackening (zebra striping) of folds of the caecum, proximal colon and rectum
- Congestion and enlargement of spleen and lymph nodes.

Epidemiology

- Animals that have been infected with PPR either die or acquire firm immunity. There appears to be no chronic carrier state
- Infection spreads to new areas by the movement of infected animals. Transmission between animals is usually by direct contact. Infected animals shed virus in expired air, in all secretions and excretions (including semen and urine) at the onset of the fever, and in the faeces at the onset of diarrhoea.
- Contaminated materials are not a significant cause of spread
- Risk factors include:
  - imported sheep and goats
  - illegal movement of sheep and goats

Surveillance goal

Detection and eradication of outbreaks.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

- Significant production losses
- Negatively impact on food security
- Social impacts due to movement restrictions on sheep and goats

Trade

- Restrictions on movement of sheep and goats
- Bans on exports of live sheep and goats

Case Definition

Suspect case

High death rate in sheep and goats with fever, conjunctivitis, discharge from nose, necrotic erosions in the mouth and severe, watery, blood-stained diarrhoea.

Confirmed case

Isolation of virus from sheep or goats with suggestive clinical and post mortem signs

Response

Suspect case

- Complete the disease report form to record findings
- Collect laboratory specimens and arrange for testing at the laboratory

Confirmed case

- Quarantine premises – prevent movement of sheep and goats off the premises
- Investigate possible source and spread
- Trace back movements of sheep or goats onto the property in the previous 21 days
- Trace forward movements of sheep and goats off the property in the previous 30 days
- Ensure disinfection of equipment/vehicles/people moving off premises – sodium carbonate, sodium hydrochloride or chlorine can be used
- Inform your supervisor to arrange for the following:
  - slaughtering out all sheep and goats on the holdings
  - disinfection of premises
  - tracing and destruction of milk products that left the farm in the previous 5 days
- Strengthen/enforce biosecurity

- Investigation of traced properties
- Raise public awareness on how the disease presents, how it spreads and the need for reporting.
- Vaccination

Alert threshold

One suspected case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Histopathology

Specimens

- Swabs of conjunctival discharges and from inside nose and mouth
- Whole blood collected in EDTA
- Fresh lymph nodes (especially from near intestines and lungs), spleen and lung for virus isolation
- Lymph nodes, spleen and lung in neutral buffered formalin for histopathology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/
- SADC (2012) SADC Control Strategy on Peste des Petits Ruminants (PPR)

Return to Foreign Animal Diseases

Scrapie

Introduction

Scrapie, a transmissible spongiform encephalopathy, is a progressive and invariably fatal degenerative disease of the central nervous system of sheep and goats. Although the disease has not occurred in Namibia it is a notifiable disease.

Clinical signs

- Highly excitable, fixed stare, head held high, high stepping gait
- Uncoordinated, ataxia
- Handling can result in fine tremors or convulsions
- Rubbing and nibbling associated with intense itchiness with resulting skin damage and loss of wool.

Pathological signs

No signs present

Epidemiology

- Scrapie is caused by an infectious prion which is very resistant to standard inactivation methods and can survive for at least 30 months
- Transmission within a flock occurs mainly from an infected ewe or doe to her progeny and other lambs and kids in close proximity to her
- There is a very long incubation period with disease most frequently seen in animals 2 to 5 years old
- Transport of live, clinically normal animals during the incubation period is the major method of introducing the disease to a country
- In Namibia scrapie would be most likely to first be seen in sheep or goats imported from a country where scrapie occurs i.e. Europe, North America or Japan.

Surveillance goal

Detection and eradication of cases.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Production loss through slaughter of flock as part of disease response

Trade

Export bans on live sheep and goats and their products

Case Definition

Suspect case

Small number of sheep or goats in a flock showing incoordination, excitability and severe itchiness

Confirmed case

Identification of definitive histopathological changes in the brain and spinal cord of animals with typical clinical signs.

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Undertake investigation into flock to identify possible source of infection
- Complete the disease report form to record findings

Confirmed case

- Undertake investigation into flock to identify possible source of infection
- Inform your supervisor to arrange for the following (once disease is confirmed):
  - slaughter out all sheep and goats on the premises
  - traceforward and traceback movements from property
  - investigation of traced properties.

Alert threshold

One suspected case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Histopathology

Specimens

- Live animals (one or two), or
- Whole brain removed undamaged in 10% formalin

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Foreign Animal Diseases

Poultry Diseases

Avian coccidiosis

Introduction

Avian coccidiosis is caused by a number of species of protozoa from the genus *Eimeria*. Coccidia are found wherever poultry are raised.

Clinical signs

The severity of clinical signs is related to the number of coccidia oocysts (eggs) ingested. Signs can include:

- Droopiness
- Weight loss
- Pale combs
- Watery or bloody diarrhoea
- Deaths can occur

Pathological signs

- Red or white speckled appearance of the intestinal wall (coccidia colonies)
- Thickened intestinal wall
- Intestines and caeca may balloon and be filled with fluid, blood, and tissue debris.

Epidemiology

- *Eimeria* oocysts can survive up to 4 years in a favourable environment and are resistant to many disinfectants
- Chickens pick up infection when they ingest infective (sporulated) oocycts from the litter. In the bird these oocysts develop through a number of stages in the cells of the intestine, multiplication occurs and the cells of the intestine wall rupture releasing further oocysts which are passed in the faeces.
- Wet litter and warm temperatures favour sporulation of the oocysts
- Overcrowding increases the risk of disease occurring

Surveillance goal

- Detection of cases to allow provision of advice to owners to control or prevent cases and minimise losses.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Production losses

Trade

Poultry fed coccidiostats cannot be sent to slaughter until the withholding period for the drug being used has passed

Case Definition

Suspect case

Weight loss, droopiness and watery or bloody diarrhoea in a flock of poultry

Confirmed case

Identification of oocysts or other stages of parasite in faeces or gut scrapings from a clinical case

Response

Suspect case

- Collect samples and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Provide advice to the farmer including:
  - good sanitation and litter management e.g. avoiding wet litter conditions, especially under drinkers and changing the litter after each brood
  - feeding coccidiostats to chickens until about 1 week before slaughter to prevent cases (withholding period for drug has to be obeyed)

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Microscopic examination
- Histopathology

Specimens

- Whole birds, or:
- Fresh intestinal scrapings (i.e. mucosa plus contents), for microscopic examination for oocysts and schizonts
- Portions of affected gut in buffered formalin, for histopathology

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Poultry Diseases

Avian colibacillosis

Introduction

Avian colibacillosis is caused by pathogenic serotypes of the bacteria *Escherichia coli* (*E. coli*)

Clinical signs

- Sudden death in young birds due to septicaemia
- Navel often inflamed and swollen in young birds
- Reduced appetite
- Poor growth rates or weight loss, depression
- Respiratory distress - sneezing

Pathological signs

- Fibrin and pus in air sacs and around heart and liver
- Young birds may have abnormal yolk material, unabsorbed yolk sac and peritonitis
- Enlarged, reddened liver and spleen
- Increased fluid in body cavities
- Inflammation of the oviducts and abdominal cavity

Epidemiology

- *E. coli* are normally found in the intestines of poultry and most other animals; although most serotypes do not cause disease, a limited number produce infections outside the intestines
- The most common route of infection is inhalation of faecally contaminated dust that contains large numbers of pathogenic *E. coli*
- Initial exposure to pathogenic *E. coli* may occur in the hatchery from infected or contaminated eggs
- Predisposing factors such as environmental stressors (e.g. high concentrations of ammonia and dust in poultry houses) or infectious causes (e.g. Mycoplasmosis, infectious bronchitis or Newcastle disease) are usually required before colibacillosis will occur

Surveillance goal

- Detection of cases to allow provision of advice to owners to control or prevent cases and minimise losses.

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Wear gloves and wash hands thoroughly after handling ill and dead birds

Socioeconomic

Economic losses can be due to decreased hatching rates, deaths, lowered production, decreased feed conversion efficiency, carcass condemnation at processing and treatment costs.

Trade

Nil

Case Definition

Suspect case

Flock with sudden deaths, poor growth rates, respiratory distress and post mortem findings of airsacculitis, pericarditis, perihepatitis and peritonitis

Confirmed case

Isolation of a pure culture of *E. coli* from the heart, liver or other lesions

Response

Suspect case

- Collect samples and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Provide advice to farmer including:
  - control predisposing infections or environmental factors
    - Ensure proper ventilation and chlorination of drinking water
    - thoroughly clean out poultry sheds between batches of chickens
    - vaccinate for respiratory disease
  - use of antibacterials
  - improved biosecurity

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Culture
- Inoculation of the allantoic sac of 12-day-old chicken embryos with cultured organism to determine pathogenicity

Specimens

- Heart blood
- Fresh liver, or typical visceral lesions

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Poultry Diseases

Avian Infectious Bronchitis

Introduction

Avian Infectious Bronchitis is a widespread acute contagious viral disease of chickens caused by the Infectious Bronchitis Virus (IBV).

Clinical signs

- All chickens are usually affected in an outbreak and up to 25% can die
- Birds of all ages can be affected but it is most severe in chickens 10 days to 4 weeks of age

Respiratory disease is the main clinical sign seen but in some outbreaks reproductive disorders and damage to the kidneys can also occur.

- difficulty breathing, rattling noise from trachea, coughing, sneezing
- depression, weakness, drop in food consumption.

If reproductive disorders see

- drop in egg production
- soft, pale-shelled and misshapen eggs

If kidney damage see

- ruffled feathers, hunched stance, reluctance to move, excessive water intake, rapid weight loss
- diarrhoea - wet litter.

Pathological signs

- trachea is congested with excessive amounts of mucus,
- reduced oviduct length and ovarian tissue reduced
- dehydrated carcasses - dark in colour
- kidneys enlarged and may be pale or marbled
- deposits of urates in the ureters.

Epidemiology

- Environmental factors, particularly cold stress and co-infection with other respiratory bacteria, can increase the severity of the disease
- More males than females die
- Risk factors include:
  - introduction of chickens
  - contaminated people, poultry equipment, egg- packing materials etc. entering chicken area
  - breakdown in biosecurity.

Surveillance goal

Detection of disease to provide advice to farmer on limiting production losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Production losses

Trade

Purchasers may require chickens to be vaccinated

Case Definition

Suspect case

Majority of birds having difficulty breathing, coughing, ruffled feathers and depressed with dark carcasses and enlarged kidneys at post mortem

Confirmed case

Detection of Infectious Bronchitis Virus in samples from chickens showing characteristic clinical signs

Response

Suspect case

- collect laboratory specimens and arrange for testing at the laboratory
- complete the disease report form to record findings

Confirmed case

- recommend vaccination of flock
- provide advice to farmer on management to enhance biosecurity and reduce risk of exposure to IBV and recommend routine vaccination.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology
- Histopathology

Specimens

- Swabs from upper respiratory tract
- Fresh kidney and oviduct samples
- Kidney in buffered formalin
- Blood samples for serology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Poultry Diseases

Avian infectious laryngotracheitis

Introduction

The Infectious Laryngotracheitis (ILT) is a viral disease that affects chickens, turkeys and some other poultry.

Clinical signs

ILT can occur in mild or severe forms

- severe difficulty breathing, gasping, coughing, coughing up blood-stained mucus, neck extension
- high mortality in severe form – can be up to 70%
- unthriftiness, decreased egg production
- watery eyes, conjunctivitis, swelling of head sinuses, nasal discharge and haemorrhagic conjunctivitis.

Pathological signs

- trachea has mucoid inflammation with degeneration, necrosis, haemorrhage and diphtheritic changes - mucoid casts may extend the entire length of the trachea
- conjunctivitis and sinusitis.

Epidemiology

- Spread on a farm occurs by rapid airborne transmission among birds in close contact
- Spread between farms is usually due to the movement of poultry, people, equipment, litter or manure
- Airborne spread up to 500 meters can occur
- Risk factors include:
  - introduction of birds – recovered and vaccinated birds can be carriers
  - contaminated people, poultry equipment, egg- packing materials etc entering chicken area
  - breakdown in biosecurity
  - free range chickens.

Surveillance goal

To detect outbreaks and provide advise to farmers on minimizing losses from the disease

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production losses in unvaccinated flocks

Trade

Buyers may require birds to be vaccinated prior to purchase

Case Definition

Suspect case

Gasping, neck extension, conjunctivitis and a high death rate in an unvaccinated flock

Confirmed case

- Isolation of virus from birds with characteristic clinical and post mortem signs
- Positive serology.

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Recommend vaccination of flock
- Provide advice to farmer on management to enhance biosecurity and reduce risk of exposure to ILT e.g. keep susceptible stock separate from vaccinated or recovered birds. Apply strict biosecurity in moving equipment or materials between these categories of stock.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology

Specimens

- Tracheal swabs
- Fresh trachea and larynx
- Trachea in formalin
- Blood for serology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Poultry Diseases

Fowl Pox

Introduction

Fowl Pox is a viral disease of chickens, turkeys, and other birds. Infection occurs when there is a break in the skin or mucus membranes. Fowl pox is often seen among chickens and pigeons in Namibia. Most racing pigeons in Namibia are vaccinated against Fowl Pox.

Clinical signs

- Warty, spreading eruptions and scabs on comb and wattles
- Caseous deposits in mouth, throat and sometimes trachea
- Depression
- Not eating
- Poor growth
- Poor egg production.

Infected birds are more susceptible to other infections.

Pathological signs

- Papules progressing to vesicles then pustules and scabs on comb and wattles
- Caseous plaques in mouth, pharynx, trachea and/or nasal cavities.

Epidemiology

- Spread is most common when biting insects such as mosquitoes are most active
- Mosquitoes can spread the virus between farms
- Dry scabs contain high titres of virus
- Virus can survive in environment for long periods under dry conditions

Surveillance goal

To detect outbreaks and provide advise to farmers on minimizing losses from the disease

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Some lost production

Trade

Buyers may require chickens to be vaccinated prior to purchase

Case Definition

Suspect case

Warty, spreading eruptions and scabs on comb and wattles

Confirmed case

Characteristic clinical signs.

Response

Suspect case

Complete the disease report form to record findings

Confirmed case

Provide advice to farmer on improving biosecurity and reducing impact of disease in flock including:

- vaccination of flock
- mosquito control
- separating sick birds from flock
- good sanitation to reduce risk of secondary infections.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Not required

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Poultry Diseases

Fowl Typhoid

Introduction

Fowl Typhoid, and the closely related Pullorum Disease, are severe bacterial diseases of poultry caused by *Salmonella gallinarum* and *Salmonella pullorum* respectively. The bacteria can survive in the environment for many months under favourable conditions. Birds can be infected by ingesting bacteria from a contaminated environment or through cannibalism

Clinical signs

- Chicks dying soon after hatching
- Depression, weakness, sleepiness, loss of appetite, drooping wings, huddling, dehydration, ruffled feathers
- Laboured breathing, gasping
- Diarrhoea and pasting of the vent feathers - droppings white and viscous
- Anaemia with pale shrunken combs
- Lameness and joint swelling
- Blindness
- Decreased egg production, fertility or hatchability.

Pathological signs

- Unabsorbed yolk sacs, peritonitis and signs of septicaemia
- Liver, spleen and kidneys enlarged and congested - spleen mottled
- Lungs congested
- Caecum enlarged with firm, cheesy material (caecal cores).
- White necrotic foci or nodules may be found in the liver, spleen, lungs, heart, pancreas, gizzard, intestine and testes
- Joints swollen with a viscous creamy fluid
- Exudates in the anterior chamber of the eye.

Epidemiology

- Transmission can occur via the egg
- Recovered birds can be chronic carriers
- Rodents and wild birds can carry the bacteria
- Insects, especially red mites, can spread the disease
- Risk factors include:
  - introducing infected eggs
  - introducing recovered birds, contaminated equipment feed or water
  - breakdown in biosecurity
  - free range chickens.

Surveillance goal

To detect outbreaks and provide advise to farmers on minimizing losses from the disease

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production losses

Trade

Buyers may require vaccination of birds prior to purchase

Case Definition

Suspect case

Chicks dying soon after birth with unabsorbed yolk sac in unvaccinated flock

Confirmed case

- Isolation of organism
- Positive serology in birds showing characteristic clinical signs.

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Recommend antibiotic treatment and vaccination of flock
- Destocking with disinfection of premises and equipment before restocking with disease free birds can be recommended to eliminate the disease
- Provide advice to farmer on management to enhance biosecurity and reduce risk of exposure to Fowl Typhoid e.g.
  - only purchase birds from infection-free breeding flocks
  - exclude rodents and wild birds from poultry shed
  - regularly clean and disinfect premises and equipment
  - routine vaccination.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Bacterial culture
- Serology

Specimens

- Cloacal swabs from live birds
- Swabs or tissue samples from liver, spleen, yolk sac and caecum
- Blood for serology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Poultry Diseases

Infectious bursal disease

Introduction

- Infectious bursal disease (IBD), also called Gumboro Disease, is a highly contagious viral disease of immature chickens.
- The virus destroys the lymphocytes in the Bursa of Fabricius which is an important organ in the young chicken's developing immune system. Destruction of the Bursa results in immunosuppression increasing the chickens' susceptibility to other infections.

Clinical signs

- High percentage of chickens up to 4-6 weeks affected but usually mortality of less than 20%
- Watery diarrhoea with urates in mucus
- Depression, not eating, ruffled feathers, reluctance to move, huddling
- Vent pecking
- Trembling, unsteady on feet.

Pathological signs

- Dehydration of muscles with numerous haemorrhages
- Swollen discoloured kidneys, with urates in tubules
- Bursa of Fabricius (situated below the rectum near the cloaca) is initially oedematous, swollen with yellow fluid but can then shrink to smaller than normal. The bursa may be completely haemorrhagic giving the appearance of a black cherry.

Epidemiology

- The virus spreads by direct contact between infected and susceptible birds, and by exposure of susceptible birds to a contaminated environment or contaminated equipment
- Recovered and vaccinated birds may carry and shed the virus for long periods
- Virus can survive for months in litter and faeces
- White Leghorn chickens are more susceptible

Surveillance goal

To detect cases and provide advice to farmers on reducing the impact of the disease on their flock

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production losses

Trade

Nil

Case Definition

Suspect case

Swollen or haemorrhagic Bursa of Fabricius in chickens showing diarrhoea, depression and trembling

Confirmed case

Detection of virus in tissues and positive serology

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to farmer on improving biosecurity and reducing impact of disease in flock including:

- vaccination of flock
- disinfection of premises
- good sanitation to reduce risk of secondary infections
- may recommend antibiotics to reduce secondary infections.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology

Specimens

- Bursa of Fabricius
- Bloods for serology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Poultry Diseases

Psittacosis (Avian chlamydiosis)

Introduction

Avian chlamydiosis, also known as Psittakose (Afr.) is a zoonotic disease of birds caused by the intracellular bacterium *Chlamydophila psittaci*. Human disease caused by this bacteria is called psittacosis. Until 1979 when Avian chlamydiosis was diagnosed in Katima Mulilo in a parrot the disease was unknown in Namibia. Since 1986 a number of cases have been reported mostly in Windhoek. Owners and owners of pet birds have been diagnosed with Psittacosis in recent years. they is no doubt the disease was contracted when handling wild birds.

Clinical signs

- Not eating, dullness, ruffled feathers, weight loss
- Discharge from the nose and eyes that may be watery or contain mucus and pus
- Conjunctivitis
- Respiratory signs
- Diarrhoea with green to yellowish droppings
- May see neurological signs: twisted neck, arching back of head and neck; tremors; convulsive movements; and floppy paralysis.

Pathological signs

- Conjunctivitis with swollen and encrusted eyelids
- Lungs congested with fibrinous pneumonia and inflammation of the air sacs
- Spleen enlarged
- Liver enlarged with many small necrotic areas, fibrin around the liver
- Inflammation around the heart and abdomen
- Congestion of blood vessels.

Epidemiology

- Avian chlamydiosis occurs world-wide
- Chlamydiae are known to infect most species of domestic poultry, pet birds and wild birds
- Psittacine birds and pigeons are the most common carriers of the bacteria and ducks and turkeys the domestic species most affected
- Transmission is primarily from one infected bird to another. Infected birds shed chlamydiae in both the respiratory excretions and in faeces. A susceptible bird can become infected through inhalation of airborne contaminated material or through ingestion of contaminated feeds.
- Transmission via the egg can occur
- Introduction of chlamydia into a new flock or area can be due to the introduction of persistently infected birds.
- Psittacine birds and pigeons are often subclinically infected and will periodically shed the organism

Surveillance goal

Detect and control outbreaks and prevent human infection

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

- Humans become infected by inhaling contaminated dust, feathers or aerosolized secretions and excretions. **Personal protective equipment**, including masks, should be worn when handling birds and cleaning their cages.
- Abattoir workers slaughtering birds from infected flocks may become infected

Socioeconomic

Production losses

Trade

Nil

Case Definition

Suspect case

Birds with yellow-green droppings, not eating, weight loss and discharge from eyes and nose

Confirmed case

Isolation of bacteria in birds showing characteristic clinical and post mortem signs.

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Notify supervisor
- Destruction and disposal of infected birds
- Disinfection of premises
- Enhance biosecurity
- Prevent wild bird access.

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Culture

Specimens

- Pharyngeal or nasal swabs from live birds for culture
- Blood, ocular or nasal exudates, inflammatory exudates, liver, spleen, lung, kidney, pericardium and colon contents for culture.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Poultry Diseases

Cattle Diseases

Anaplasmosis

Introduction

Anaplasmosis, also known as Gallsickness or Galsiekte (Afr.) is an cute to chronic disease of cattle and wild ruminants characterised by fever, anaemia and jaundice. Anaplasmosis is caused by a rickettsial agent, *Anaplasma marginale*. The most important vector of the disease is the blue tick (*Boophilus decoloratus*) It causes considerable loses and occurs throughout the country. Dehorning, ear tagging, castration, bleeding and vaccination may facilitate transmission from one animal to another.

Clinical findings

- Rapid loss of condition
- Severe debility
- Transient fever (40-41°C at peak infection)
- Weakness and respiratory distress, particularly after exercise
- Depression and loss of appetite
- Mucous membranes pale then jaundiced
- Brown urine.
- Constipation, dry faeces covered with mucus
- Animals may abort

Pathological findings

- Carcass anaemic and jaundiced
- Yellowish-pale orange fat
- Blood is thin and watery
- Spleen enlarged
- Liver mottled and yellow-orange, gall bladder enlarged and contains thick brown or green bile
- Dry abomasal content

Epidemiology

- Carrier animals are the source of infection
- Infected animals remain carriers for many years, often for life
- Spread form animal to animal occurs chiefly by insect vectors - usually ticks
- Spread can also occur mechanically by infected needles and castration and dehorning instruments
- Heavy losses are most often during late summer especially in good rain season
- Risk factors include:
  - presence of ticks
  - illegal movement of cattle
  - introduction of infected cattle
  - introduction of cattle with ticks.
- Differential diagnosis:
  - Babesiosis

- Anaemia from worms
- constipation

Surveillance goal

Detection of cases and provision of advice to allow farmer to avoid further losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production loss

Trade

Nil

Case Definition

Suspect case

Fever, anaemia and jaundice on tick-infested cattle

Confirmed case

Identification of organisms on thin blood smear from clinical case

Response

Suspect case

Collect laboratory specimens and arrange for testing at the laboratory

Confirmed case

- Undertake disease investigation noting tick treatment history, livestock introductions and compliance with dip management as per Part 9 of “Animal Health Regulation: Animal Health Act 2011”
- Complete the disease report form to record findings
- Collect information on further cases from livestock keepers in the area and key informants
- Provide advice to owner including:
  - antibiotic treatment (oxytetracycline or imidocarb) for affected animals
  - vaccination of herd
  - tick treatment
  - enhanced biosecurity
- Raise public awareness regarding dip maintenance and stock dipping requirements as per “Animal Health Regulation: Animal Health Act 2011”.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Examination of stained blood smears

Specimens

- Thin blood smear

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Cattle Diseases

Besnoitiosis

Introduction

Bovine besnoitiosis also known as Elephant skin disease or Olifantvelsiekte (Afr.) is a disease of cattle caused by the protozoan Besnoitia besnoiti and characterised by fever and a progressive thickening of the skin. The disease is of particular importance in the Zambezi region. The disease was first diagnosed in Okolongadhi in Omusati region during a Lumpy ski disease outbreak. Isolated cases were reported in the early 1970s in Otjiwarongo, Grootfontein, Windhoek and Okahandja districts. This disease is important to the RSA beef sector where disease has established itself.

Clinical findings

- Swelling of the superficial lymph nodes and loss of weight
- Oedema - subcutaneous swelling plus oedema in joints causing pain during movement that may progress to permanent hindquarter lameness
- Progressive thickening, folding or wrinkling of the skin (known as elephant skin) loss of hair and loss of dead skin
- Infertility in bulls due to necrosis of testes
- Many infected animals remain asymptomatic and the only sign of the disease is the presence of cysts in sclera conjunctiva and/or vulvar area in cows.

Epidemiology

- Bovine besnoitiosis (also referred to as bovine elephantiasis) is a protozoal disease of cattle. Bovines act as the intermediate host in the life cycle of the causative agent
- High infection rates can occur but few cattle die from the disease
- Spread is by direct contact between animals with wounds
- Arthropods such as horse flies may play a role in spreading the disease
- Most cases occur in *Bos indicus* cattle
- Rarely seen in calves less than 6 months of age
- Differential diagnosis:
  - Sweating sickness
  - Photosensitivity
  - Dermatophilosis

Surveillance goal

To detect cases and minimise the impact of the disease

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production loss

Trade

Buyers may be reluctant to purchase affected cattle

Case Definition

Suspect case

Cattle with swelling of the superficial lymph nodes, weight loss, oedema, progressive thickening, folding or wrinkling of the skin and loss of hair

Confirmed case

Identification of organisms on histopathology or positive serology from an animal with characteristic clinical signs

Response

Suspect case

- Collect samples and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to farmer including:

- Vaccination is only recommended in the case of an outbreak
- Improving biosecurity

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Cytology
- Histopathology
- Serology
- PCR

Specimens

- Punch biopsy of skin lesions
- Whole blood for serology
- Blood smears and smears of lesions

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Cattle Diseases

Black Quarter

Introduction

Black quarter, also known as Blackleg, Quarter evil, Sponssiekte (Afr.), Kawenyu (RuKwangali) and Omutjise okapirauka (OtjiHerero) is a rapidly fatal disease of mainly young cattle caused by the bacteria *Clostridium chauvoei*. However, often sheep and goats are affected. It is characterised by an emphysematous swelling of mostly thick muscles (quarters). In Namibia it is almost exclusively a disease of cattle. It was a notifiable from 1901 to 1974. Often wrongly diagnosed by farmers as snake bites (e.g. puff adder).

Clinical findings

- Found dead - small number of animals in herd usually die within a few days
- If seen before death: appear sick, stops grazing and rapidly go down; lame with swelling of a muscle
- Gas under skin – 'crackling' when skin is rubbed over area of affected muscle
- Carcass bloated
- Frothy blood-stained discharge from mouth, nostrils and anus.

Pathological findings

- Avoid opening carcass as this will result in spore formation.
- Emphysematous swelling of mostly thick muscles (quarters)
- Skin over affected muscle may be leathery and possibly cracked
- Affected muscle dark with frothy blood-stained fluid
- Rapid decomposition of carcass.

Epidemiology

- *Clostridium chauvoei* forms very resistant spores which remain dormant in the ground for years
- Cases usually seen in rapidly growing cattle 6 months to 2 years of age on lush pasture
- Risk factors include:
  - lush pasture
  - young cattle in good condition
  - cattle not vaccinated
  - history of previous blackleg cases on the farm
- Differential diagnosis:
  - Anthrax
  - Snake bite
  - Lightning strike
  - Other conditions causing sudden death

Surveillance goal

Identify cases and provide advice to farmer on reducing further losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production loss

Trade

Nil

Case Definition

Suspect case

Sudden death in a number of young, rapidly growing cattle on lush pasture with frothy blood-stained discharge from mouth, nostrils and anus

Response

Suspect case

- Complete the disease report form to record findings
- Provide advice to owner including:
  - burn or deep bury carcass where found to reduce risk of spore formation and contamination of ground
  - recommend routine annual vaccination of up to 3 years

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Not undertaken

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Cattle Diseases

Bovine Viral Diarrhoea

Introduction

Bovine Viral Diarrhoea (BVD) is a highly infectious viral disease of cattle. The BVD virus causes Mucosal Disease in calves infected between 40 and 120 days gestation. BVD occurs worldwide and is of significant economic importance to the beef sector. Persistently infected calves are a major source of virus. Mucosal disease was first reported in 1976 in an outbreak Grootfontein in which 10 infected animals died. Thereafter, sporadic outbreaks have been reported. Serological studies have since confirmed that occurrence of BVD infection in Namibia is widespread.

Clinical findings

Acute infections

- Abortions, stillbirths and severe birth defects
- Short term diarrhoea in a group of cattle
- Short term respiratory signs in a group of cattle
- Increased susceptibility to other diseases
- Infertility in both bulls and cows

Mucosal Disease

- Always fatal
- Usually occurs in calves less than 2 years of age
- Severe diarrhoea
- Ulcers in mouth and nose
- Drooling and watery discharge from eyes and nose
- Lameness
- Not eating, depressed, thin
- Some animals die rapidly, others waste away

Pathological findings

Acute infections

No characteristic signs

Mucosal Disease

- Ulcers in mouth and nostrils
- Ulcers throughout large and small intestine

Epidemiology

- Spread occurs by close contact (nose-to-nose) between cattle
- Spread is greatest during yarding particularly when cattle from different groups or herds are mixed together or penned in adjacent pens.
- When cows that are 40 to 120 days pregnant become infected with the virus for the first time their foetus does not develop an immune response to the virus and the calves are born persistently infected with the virus. These persistently infected calves shed large amounts of virus throughout their lives and they usually develop Mucosal Disease before reaching 2 years of age.
- Cows carrying infected foetuses can spread the virus

- Calves born to persistently infected cows are also persistently infected
- Persistently infected bulls shed virus in semen
- Differential diagnosis:
  - Foot and Mouth Disease
  - Infectious bovine rhinotracheitis
  - Corona virus
  - Bovine malignant catarrhal fever
  - Pasteurellosis
  - Coccidiosis
  - Campylobacteriosis

Surveillance goal

Identification of infected herds so advice can be provided to farmers on limiting production losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

- Production losses of 25-50% when first introduced into a breeding herd
- Production losses of up to 10% when virus persists in herd

Trade

- Purchasers may require evidence that cattle are not persistently infected with the BVD virus
- Semen from persistently infected bulls cannot be used for artificial insemination

Case Definition

Suspect case

Where a small number of calves have diarrhoea, are growing poorly and have ulcers in their mouths and noses in a mob of well grown calves

Confirmed case

Identification of virus in a clinically affected animal

Response

Suspect case

- Collect heparin blood samples from suspected Mucosal Disease animals for antigen detection
- Collect nasal swabs in PSBG from respiratory cases
- Collect whole blood samples from 10 – 15 cows in herd for antibody detection. Submit serum to laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to farmer tailored to the specific conditions on farm. Advice may include:

- Culling persistently infected cattle
- Vaccination of herd
- Management to ensure the exposure of breeders to carriers before joining

Information management

Data collection

- Complete the disease report form to record findings
- Send completed form to supervisor

Laboratory confirmation

Diagnostic tests

- Antigen detection in blood, nasal swabs and tissues
- Antibody detection

Acute infection

- Serum from whole blood samples for antibody detection from 10 – 15 cows in herd with embryonic mortality or abortion
- Nasal swabs in PBGS for virus isolation from respiratory cases

Mucosal Disease

- Heparin blood samples from suspected clinical animals for antigen detection
- Submit chilled to laboratory

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Cattle Diseases

Campylobacteriosis

Introduction

Campylobacteriosis, previously called Vibriosis, is a disease of cattle caused by the bacterium *Campylobacter foetus venerealis*. It is transmitted at mating. It was first diagnosed in Namibia in 1965 Gobabis. Sheath washings for the past 40 years have shown evidenced of declining number of animals infected.

Clinical findings

- Prolonged inter calving interval
- Infertility, early embryonic death/ abortion, prolonged calving season
- Uterine infection.

Pathological findings

- Aborted foetuses may have bronchopneumonia, mild inflammation of the lining of the lung and abdominal cavities
- Placentitis is usually mild; the cotyledons may be haemorrhagic and the intercotyledonary area oedematous.

Epidemiology

- Some bulls may remain carriers for years - especially older bulls
- Cows usually remain infected for only a few months
- Risk factors include:
  - untested bulls
  - sharing bulls between herds
  - use of unvaccinated bulls.

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Reduced fertility of herd resulting in production losses

Trade

Farmers buying bulls may require bulls to be vaccinated before purchase

Case Definition

Suspect case

- low pregnancy, increased inter calving period
- Infertility, early embryonic death/ abortion, prolonged calving season

Confirmed case

Culture of organism or antibody detected from sheath washing or sheath scrapings or vaginal mucus from affected cows

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to owner on:

- vaccination of herd
- vaccination of bulls prior to introduction
- enhanced biosecurity.
- cull aborted cows

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Culture
- Detection of antibody in vaginal mucus

Specimens

Bull

- genital tract; or
- preputial smegma and semen (sheath washings, scrapings, aspirates).

Cow

- genital tract; or
- (cervico) vaginal mucus (aspirates/washings).

Foetus

- aborted foetus
- placenta
- foetal stomach contents.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Cattle Diseases

Dermatophilosis

Introduction

Dermatophilosis, also known as Senkobo disease, Lumpy wool, Strawberry Foot rot or Klontwol (Afr.) is a skin disease caused by the bacteria *Dermatophilus congolensis*. *Dermatophilus congolensis* can infect cattle, sheep, goats, deer, horses and donkeys. Dermatophilosis occurs in the Zambezi region. It has been reported in exceptionally wet years in the Grootfontein area in the early 1970s. Generally the disease is of minor importance in Namibia.

Clinical findings

- Inflammation of skin with yellowish brown exudate forming a horny, yellowish or greyish scab
- Scabs mostly develop along back, head and ears – if extensive enough the animal can have an armour-plated appearance and have difficulty moving

Epidemiology

- Heavy rainfall predisposes cattle to infection
- Transmission occurs when scabs become wet and zoospores are released – dry scabs are not a source of infection
- Some cattle can have small scabs which act as reservoirs of infection

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Decreased skin value from affected cattle

Trade

Buyers may be reluctant to purchase affected animals

Case Definition

Suspect case

Scabs along back, head and ears

Response

Suspect case

- Complete the disease report form to record findings
- Antibiotic treatment may be recommended in severely affected valuable cattle

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Not usually required

The bacteria can be seen on microscopic examination of Gram stained smears of emulsified scabs

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Cattle Diseases

Enzootic bovine leucosis

Introduction

Enzootic bovine leucosis (EBL) also known as Ensooties beesleukose (Afr.) is a viral infection that causes lymphosarcoma in cattle and buffalo. It mostly affects animals between 3 to 8 years. Up to 1994, no clinical cases of EBL had been reported. A serological survey conducted throughout the country showed prevalence between 3.5% and 68%.

Clinical findings

- Clinical disease and deaths only seen in cattle or buffalo over 3 years of age
- Superficial lymph nodes usually obviously enlarged
- Digestive disturbances, inappetance, weight loss
- Weakness or general debility

Pathological findings

- Tumours of lymph nodes in a wide range of tissues e.g. abomasum, right auricle of the heart, spleen, intestine, liver, kidney, omasum, lung, and uterus.

Epidemiology

- Offspring of infected cows usually become infected at birth
- The virus is present in the milk of infected cows
- Only a small percentage of infected animals develop clinical signs and die of the disease
- Virus can be spread by transfer of blood from an infected animal eg by multiple use needles, dehorning equipment not cleaned between animals and repeat use of gloves for rectal examination

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Some production losses

Trade

Nil

Case Definition

Suspect case

Enlarged lymph nodes associated with weakness and weight loss

Confirmed case

Virus isolation or positive serology in cattle with characteristic clinical and post mortem signs.

Response

Suspect case

- collect laboratory specimens and arrange for testing at the laboratory
- complete the disease report form to record findings

Confirmed case

Provide advice to owner including:

- prevent blood transmission between cattle from multiple use equipment e.g. during rectal palpation, vaccination, tattooing or gouge dehorning
- test herd and cull positive cattle to slaughter
- enhanced biosecurity – only introduce test negative cattle.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Serology
- Histopathology

Specimens

- Serum or preserved milk samples for virus serology
- Formalin-fixed sections of affected lymph nodes, spleen, thymus, intestine or other organs showing gross lesions for histopathology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Cattle Diseases

Haemorrhagic septicaemia

Introduction

Haemorrhagic septicaemia, also known as Hemoragiese septisemie (Afr.) is an acute, infectious, highly fatal septicaemia of cattle and buffalo caused by certain serotypes of the bacteria *Pasturella mulocida*. Before 1978 this disease was limited to the Zambezi region. Since then the disease has been reported in the Central and Northern regions of Namibia.

Clinical findings

- Sudden death
- Almost 100% of animals showing clinical signs die and between 5% and 90% of animals in the herd are affected
- Fever, dullness, and reluctance to move
- Salivation and watery discharge from nose
- Painful oedematous swellings in the throat spreading to the lower neck and brisket
- Congested mucous membranes
- Respiratory distress
- Collapse and death 6–24 hours after the first signs are seen.

Pathological findings

- Widespread haemorrhages, oedema, and redness throughout the body
- Oedema consists of a coagulated serofibrinous mass with straw-coloured or bloodstained fluid
- Swelling of the head, neck, and brisket and in the musculature
- Pin point haemorrhages under membranes throughout the body
- Blood tinged fluid in chest and abdominal cavities
- Lymph nodes in the throat and neck swollen and haemorrhagic.

Epidemiology

- In endemic areas around 2% of animals carry the bacteria in their tonsils and lymph nodes and may excrete organisms in nasal excretions, particularly when stressed
- Animals under stress develop the disease
- Spread occurs by direct contact between animals or through contaminated feedstuffs or water
- The organism does not survive in the environment for more than a few days
- Risk factors include:
  - introduction of healthy carrier cattle
  - rainy weather and high humidity
  - crowding and stress.

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Significant production losses can occur

Trade

Nil

Case Definition

Suspect case

Rapid death following high fever, dullness, excess salivation, nasal discharge and painful oedematous swellings of throat with widespread haemorrhages, oedema, and redness throughout the body at post mortem

Confirmed case

Isolation of *Pasturella mulocida* from animals with characteristic clinical signs and post mortem lesions.

Response

Suspect case

- collect laboratory specimens and arrange for testing at the laboratory
- complete the disease report form to record findings

Confirmed case

- Provide advice to owner including:
  - antibiotic treatment if can be given soon after clinical signs are seen
  - vaccination of herd
  - avoiding crowding and stress during wet weather
  - enhanced biosecurity
- Raise public awareness on how the disease presents, how it spreads, actions that can take to protect a herds.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Culture

Specimens

- Blood sample in heparin from heart or swab from heart collected within a few hours of death
- Nasal swab
- A long bone freed of tissue from animals that have been dead for a long time
- Samples of liver, lung, kidney and spleen
- Tips of ears (from live animal only).

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Cattle Diseases

Infectious Bovine Rhinotracheitis

Introduction

Infectious bovine rhinotracheitis (IBR), also known as Red Nose or Aansteeklike beesrhinotrageitis (Afr.) is a highly infectious viral disease caused by Bovine herpesvirus 1 (BHV-1). It occurs worldwide in cattle. First outbreak to be diagnosed in Namibia was in Grootfontein. The disease has since been reported in the Central and Northern parts of Namibia.

Clinical findings

- No appetite
- Fever
- Rhinitis with typical nasal lesions
- Nares red with shallow erosions
- Discharge from nose – watery initially and then with mucus and pus
- Conjunctivitis
- Vesicles, pustules and erosions on mucosa of vulva and vagina or penis and sheath
- Abortion.

Pathological findings

- Rhinotracheitis, bronchopneumonia
- Pustules and shallow ulcers in the upper respiratory tract including larynx and trachea - severe necrotic ulceration of the larynx and trachea in some cases
- Pustules and shallow ulcers on the genitalia
- Pneumonia (if secondary bacterial infection has occurred).

Epidemiology

- Virus is highly infectious
- Once infected, cattle remain carriers for life
- Major source of virus into a herd is introduction of carrier cattle
- Stressed cattle develop disease - it can be a problem in feedlots
- Differential diagnosis:
  - All disease involving the respiratory system
  - Pneumonic pasteurellosis
  - Allergic rhinitis

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production losses

Trade

Nil

Case Definition

Suspect case

Fever, conjunctivitis, nasal discharge and ulceration of upper respiratory tract and genitalia

Confirmed case

Evidence of seroconversion in paired serum from a clinical case.

Response

Suspect case

- Collect paired blood samples from affected cattle and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to owner including:

- vaccination of herd – vaccinate calves at 4 – 6 months of age
- enhanced biosecurity – only introduce sero-negative cattle.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Serology

Specimens

- Swabs of lesions
- Paired blood samples for serology from affected cattle:
  - the initial sample collected when they have a fever, and
  - the second sample collected about 2 weeks later.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Cattle Diseases

Lumpy skin disease

Introduction

Lumpy Skin Disease (LSD), also known as Knopvelsiekte (Afr.), Exanthema nodularis bovis or Ngamiland Cattle Disease, is an infectious and sometimes fatal viral disease of cattle, characterised by the acute eruption of nodules on the skin and other parts of the body. The disease was first diagnosed in North central regions of Omusati, Ohangwena, Oshana and Oshikoto in 1947 following similar reports in Southern Angola. Since 1956 LSD has been reported throughout the country.

Clinical findings

- Fever (41°C)
- Painful round nodules of 2–5 cm in diameter over the entire body, particularly on the head, neck, udder and perineum. Nodules become necrotic plugs that penetrate the full thickness of the hide (“sit-fasts”)
- Pox lesions in the mucous membranes of the mouth
- Inflammation of the nostrils and discharge from nose, conjunctivitis and excessive salivation
- Depression, not eating, dropped milk production, abortion and emaciation
- Superficial lymph nodes are enlarged
- Limbs oedematous and animal is reluctant to move
- Bulls have inflammation of the testes and testicular atrophy.

Pathological findings

- Nodules involving all layers of skin, subcutaneous tissue, and often adjacent musculature, with congestion, haemorrhage, oedema, inflamed blood vessels and necrosis
- Enlarged lymph nodes with lymphoid proliferation, oedema, congestion and haemorrhage
- Pox lesions of mucous membrane of the mouth, the pharynx, epiglottis, tongue and throughout the digestive tract
- Pox lesions of the mucous membranes of the nasal cavity, trachea and lungs.

Epidemiology

- Lumpy skin disease is a viral disease transmitted by insects
- It is a disease of cattle that can also be carried by wild ruminants
- *Bos taurus* cattle, especially Jersey and Guernsey breeds are more susceptible than *Bos indicus* cattle
- Risk factors include:
  - introduction of infected cattle
  - large numbers of biting insects
  - illegal cattle movements
  - infection on neighbouring farms
  - contact with wild ruminants
- *Bos taurus* cattle, especially Jersey and Guernsey breeds are more susceptible.

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production loss

Trade

Restrictions on movement of animals from farm

Case Definition

Suspect case

Fever, painful round nodules or "sit fasts" over body with oedema of limbs

Confirmed case

Virus isolation from animal with characteristic clinical signs.

Response

Suspect case

- collect laboratory specimens and arrange for testing at the laboratory:
- complete the disease report form to record findings
- prevent movement of cattle from farm

Confirmed case

- Provide advice to farmer on:
  - vaccination
  - enhanced biosecurity
  - insect control
- Collect information on further cases from livestock keepers in the area and key informants
- Notify supervisor to arrange movement controls
- Raise public awareness on how the disease presents, how it spreads, actions they can take to protect their herds.

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Virus isolation
- Histopathology

Specimens

- Skin nodules and nodule fluid, lymph nodes, scabs and skin scrapings for virus isolation
- Samples of lesions including tissue from surrounding area in buffered formalin for histopathology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Cattle Diseases

Parafilariasis

Introduction

Parafilariasis affects cattle and water buffalo. It is caused by infestation with the nematode parasite *Parafilaria bovicola*

Clinical signs

- Small haemorrhages (“bleeding points”) in the skin - blood may trickle from the small wound
- Areas of oedema or nodules in the subcutaneous tissues most commonly on the skin of the back, neck and withers

Pathological signs

- Evidence of bleeding points found on the skin, especially along the neck, back and withers
- Subcutaneous tissues and fascia contain irregular, oedematous lesions that resemble bruises. Muscles may also be involved
- Recent lesions are usually opaque, yellowish–green, and gelatinous. Older lesions are usually greenish dirty brown. As the lesions age, they also develop a characteristic metallic, unpleasant smell.

Epidemiology

- Flies transmit the parasite between animals - flies become infected when they feed on lesions in cattle and ingest parasite eggs or free larvae. These larvae are transmitted to susceptible animals when the fly feeds on wounds or ocular secretions. They migrate under the skin, developing into adults in 5 to 7 months. Gravid female worms break the skin when they deposit eggs, which are shed in the exudates and blood.
- Mature parasites do not appear to survive in lesions from year to year; infestations are newly acquired each year.
- Lesions occur mainly after the rainy season
- Large numbers of cattle can be affected but deaths do not occur

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Economic cost associated with:

- Damaged hides
- Trimming of the carcass during meat inspection – in some cases the entire carcass may be condemned
- Cost of controlling the parasite and its vector

Trade

Buyers may be reluctant to purchase affected cattle

Case Definition

Suspect case

Cattle with bleeding points and carcasses with lesions resembling bruising that may have a distinctive smell.

Confirmed case

Eggs or microfilaria detected in exudates from bleeding points

Response

Suspect case

- Collect samples and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to farmer including:

- Control flies e.g. using insecticides and permethrin– impregnated ear tags
- Use of anti-parasitic drugs to decrease the number of bleeding points during the patent period and improve the quality of meat at slaughter – thought to only be effective when immature worms are present.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Microscopic examination to detect parasite eggs in the sediment produced by centrifuging blood from a bleeding point
- Microscopic examination of Giemsa-stained impression smears to detect the presence of numerous eosinophils
- Serology

Specimens

- Fresh or dried blood from a bleeding point collected into 0.85% saline.
- Biopsy of a skin lesion shipped in 10% formalin
- Serum

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- Parafilariasis at http://www.cfsph.iastate.edu/DiseaseInfo/factsheets.php August 2009

Return to Cattle Diseases

Pasteurellosis

Introduction

Pasteurellosis is an acute bacterial disease caused by *Pasteurella multocida* and *Manheimia haemolytica* (formally *Pasturella haemolytica*), which are commonly present in the nose and throat of healthy animals. *Pasteurella multocida* and *Manheimia haemolytica* can become secondary bacterial invaders and cause disease in cattle that are severely stressed or already infected with a respiratory virus

Clinical signs

- Depression, decreased appetite, reluctance to move
- Lowered head and ears
- Discharge from nose containing mucus and pus
- High fever
- Laboured rapid breathing
- Standing with elbows away from chest wall.

Pathological signs

- Suppurative bronchitis and bronchiolitis
- Lung necrosis
- Lining of the chest wall inflamed.

Epidemiology

- Risk factors include:
  - introduction of healthy carrier cattle
  - infection with respiratory viruses
  - environmental stress e.g. transport, crowding, wet weather
- Differential diagnosis:
  - IBR, BVD, Mucosal disease and BMCF

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production losses

Trade

Nil

Case Definition

Suspect case

Depressed, nasal discharge, lowered head and ears and elbows held out from chest wall

Confirmed case

Culture of organisms from clinically affected cattle.

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to owner including:

- antibiotic treatment
- vaccination of herd if ongoing problem
- minimise stress especially during transport
- enhanced biosecurity.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Culture

Specimens

- Tracheal swabs
- Fresh lung

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
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- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Cattle Diseases

Three day stiffness

Introduction

Three-day stiff-sickness, also called Bovine ephemeral fever or Drie-dae stywesiekte (Afr.) is a viral disease found in cattle and water buffalo. It is a non-contagious disease transmitted by biting insects. The disease is well established in Africa and occurs frequently in Namibia. The disease is reported mostly in the central and northern regions. In very wet years, it is also reported in the southern regions. Most cases are seen from March to April. Severe epidemics are often associated with period cycles of years with high rainfall.

Clinical signs

- Fever (40°C)
- Lack of appetite
- Standing with back arched, head held low and muzzle extended
- Drooling saliva
- Discharge from eyes and nostrils
- Muscular stiffness and shifting lameness
- Lying down – especially heavier animals
- Drop in milk production
- Affected animals have usually largely recovered after 3 days – only a small percentage die
- Abortion.

Pathological signs

- Small amount of fibrin-rich fluid in lung and abdominal cavity and around the heart

Epidemiology

- Cattle are usually immune once they have had the disease
- Bulls and fat cows most affected
- Risk factors include:
  - large populations of mosquitoes and other biting insects
  - many years since last outbreak hence many susceptible cattle present
  - disease occurring in nearby areas

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

- Production losses
- Economic losses due to effect on fertility of bulls and reduction in growth rates of growing animals

Trade

Nil

Case Definition

Suspect case

Number of cattle in herd with fever, drooling saliva, discharge from eyes and nostrils, muscular stiffness and shifting lameness

Confirmed case

Rising titre in paired serum samples from animals displaying characteristic clinical signs.

Response

Suspect case

- Collect samples and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Provide advice to owner including:
  - vaccination of herd
  - calcium injection to cattle which can't get up
  - anti-inflammatory drugs can be used in individual valuable cattle e.g. bulls and high producing dairy cows.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Serology

Specimens

Paired blood samples for serum collected early in the illness and approximately 1 to 3 weeks later

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Cattle Diseases

Trichomonas

Introduction

Trichomoniasis, also known as Bees trichomoniase (Afri.) is a contagious disease of cattle caused by the protozoon *Tritrichomonas foetus*. It is spread at mating. It is characterised by poor fertility in female animals, abortion and pyometra. The disease has since 1972 increasingly been diagnosed in Namibia.

Clinical signs

- Early pregnancy loss
- Abortion
- Pus filled uterus

Pathological signs

- Inflamed vagina
- Inflamed wall of uterus
- Pus in uterus

Epidemiology

- Cows eliminate the infection after a period of sexual rest
- Older bulls may remain chronically infected
- Risk factors include
  - introduction of infected bulls or recently aborted cows
  - use of old bulls not tested.

Surveillance goal

Detection of cases and provision of advice on preventing cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Production loss

Trade

Buyers may require testing of bull prior to purchase

Case Definition

Suspect case

Infertility and abortion in a herd

Confirmed case

Demonstration of *Trichomonas foetus* in a herd with a history of infertility and abortion

Response

Suspect case

- Collect samples and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to owner including:

- slaughter positive bulls
- 3 months sexual rest for cows
- enhanced biosecurity – only introduce tested-negative bulls.

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Examination of exudates

Specimens

Bull

- genital tract; or
- preputial smegma and semen (sheath washings, scrapings, aspirates)

Cow

- genital tract; or
- (cervico) vaginal mucus (aspirates/ washings)
- vaginal or uterine exudates collected 10 to 20 days after service

Foetus

- aborted foetus
- placenta
- foetal stomach contents (selective transport media is required).

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Cattle Diseases

Sheep and Goat Diseases

Brucella melitensis

Introduction

Brucellosis caused by "Brucella melitensis" is a notifiable disease of sheep, goats, humans (Malta Fever) and occasionally cattle. Also called Brucellose van skape (Afr.). It causes abortion storms in sheep and goats. Although there is a official surveillance programme for trade purposes, it has been found to have very low prevalence in Namibia. It is rarely diagnosed in goats. First case of Malta Fever was reported in Windhoek in 1909 and further cases have since been confirmed. In sheep the disease was first confirmed in 1937 in Otjiwarongo-Outjo districts.

Clinical findings

- Abortion - usually in the last two months of pregnancy is the most obvious sign in sheep and goats. Abortion “storms” may occur
- Birth of weak or dead offspring
- Retained placenta
- Mild mastitis
- Enlarged testes
- Lameness

Pathological findings

- Placental cotyledons may be dull grey
- Aborted foetuses swollen with subcutaneous blood-tinged fluid, inflammation of lungs and thickened and swollen umbilical cord
- Swelling of the testicles and thickening of the covering membrane.

Epidemiology

- ’’Brucella melitensis’’ has very low prevalence in Namibia
- ’’Brucella melitensis’’ mostly infects sheep and goats
- Sheep vary in their susceptibility to infection with milking breeds quite susceptible and fat-tailed breeds being relatively resistant
- Aborted fetuses and foetal membranes contain large numbers of organisms and contaminate the environment
- ’’Brucella melitensis’’ can be excreted in vaginal discharges after abortion for up to 3 months for does and 2 months for ewes
- Lambing or kidding in dark, crowded enclosures favours the spread of the organism
- Movement of infected animals is the main method of disease spread

Surveillance goal

- To detect and control outbreaks.
- To prevent human infections.

Surveillance and Monitoring Actions

- ***Brucella melitensis* surveillance details**

Implications

Human health

- *Brucella melitensis* is a serious zoonosis.
- Human infection occurs following exposure to aborted foetuses, placentae and uterine discharges from infected sheep and goats.
- When exposure to infective material is possible, **personal protective equipment**, including gloves, masks and goggles must be worn and personal disinfection must be thorough.
- Carcases should be burned or buried.

Socioeconomic

Significant production losses through abortions

Trade

- Flocks testing positive for "Brucella Melitensis" or those that receive animals from positive holdings or holdings of undetermined status are not eligible for EU slaughter
- Restrictions on animal movements from affected farms

Case Definition

Suspect case

Abortions in a flock following introduction of animals of unknown Brucella status

Confirmed case

Bacteriological confirmation of ”Brucella melitensis” in aborted foetuses or vaginal swabs

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Quarantine premises
- Investigate possible source and spread - trace back and trace forward contact
- Inform your supervisor to organise a test and cull program
- Burn or bury carcasses and placentae

- Decontaminate environment
- Strengthen/ enforce biosecurity
- Raise public awareness on how the disease presents, how it spreads and the need for reporting

Refer to **Circular V3/2013 "*Brucella melitensis* Sampling Protocol and Maintenance of Free Status"** for *Brucella melitensis* free herd certification protocols.

Alert threshold

One confirmed case or positive on serology

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Culture
- Serology
- Microscopic examination of smears

Specimens

- Plain blood
- Whole aborted foetuses, or spleen, lung and stomach contents from foetus
- Foetal membranes
- Vaginal swabs collected within six weeks of birth or abortion
- Milk
- Semen

Keep samples cold without freezing until they reach the laboratory.

Special care should be taken to ensure that transport containers are leak-proof and are well padded with absorbent material

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/
- **Circular V3 of 2013: *Brucella melitensis* surveillance**

Return to Sheep and Goat Diseases

Caseous lymphadenitis

Introduction

Caseous lymphadenitis, also known as “cheesy gland”, is a bacterial disease of sheep and goats caused by the bacteria *Corynebacterium pseudo tuberculosis*. *Corynebacterium pseudotuberculosis* commonly inhabits the alimentary tract of sheep, including some healthy sheep. Caseous lymphadenitis is also called kaasagtige limfklierontsteking (Afr.). It is a common finding in Namibia.

Clinical findings

- Enlarged superficial lymph nodes detected on palpation; most commonly:
  - Prescapular, prefemoral, submaxillary, supramammary and popliteal lymph nodes
- Discharge of cheesy pus with a greenish tinge from some superficial lymph nodes
- General health of most infected sheep or goats is not affected

Pathological findings

- ”Cheesy” abscesses found mostly in the superficial lymph nodes but also in internal lymph nodes and the viscera, particularly the lungs

Epidemiology

- Infection mostly occurs via fresh skin wounds exposed to an environment contaminated with bacteria from either discharging abscesses or the faeces of carrier sheep
- Infection gain entry through grass seeds and biting insects including ticks.
- Animals with unbroken skin can also become infected
- Disease generally occurs in most parts of the country

Surveillance goal

To identify areas of high prevalence so that focused advisory programs promoting vaccination will reduce the number of condemned carcasses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

- *Corynebacterium pseudotuberculosis* infections in humans are rare but can occur, particularly where infected sheep and goats are skinned by hand. Puncturing of the human skin with infected knives is the most common method of human infection.
- Consuming raw milk from infected sheep and goats can also spread the disease to humans.
- Wear gloves to prevent human skin contact with the pus from an abscess or contaminated objects
- Always pasteurize milk prior to consumption.

Socioeconomic

- Economic cost through trimming or condemning of affected carcases and export restrictions on affected carcasses
- Production loss

Trade

Export restrictions on affected carcasses

Case Definition

Suspect case

A number of sheep or goats in a flock with one or more enlarged superficial lymph nodes and a “cheesy” pus discharge

Confirmed case

Clinical diagnosis is usually sufficient.

Response

Suspect case

- Generally clinical diagnosis is sufficient.
- If necessary, collect swabs of abscesses or abscessed lymph nodes and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Surgical drainage and flushing with disinfectants yield good results.
- Disposal of pus to prevent contaminating environment
- Provide advice to farmer including:
  - vaccination. However, this appears less successful in goats
  - isolating animals with discharging abscesses
  - culling of some animals may be considered
  - protecting human health through wearing gloves when handling animals with discharging abscesses, avoiding cuts when skinning sheep or goats and pasteurising milk.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Culture

Specimens

Pus from abscess

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Sheep and Goat Diseases

Chlamydophilia abortus

Introduction

Chlamydophilia abortus (formerly classified as Chlamydia psittaci) is the bacteria which causes Enzootic abortion in sheep and goats. The bacteria is known to cause abortions in cattle too. However, in Namibia it is of particular importance to sheep. Disease is a major problem in Namibia since its first occurrence in 1972. In a flock of sheep affected for the first time, abortions may be as high as 70%.

Clinical findings

- First observation is low lambing percentage as early abortions are often missed
- Late term abortions, stillbirths and the birth of weak, low birth weight or premature offspring
- Birth of premature, weak and small lambs that often die soon after birth
- Shaking syndrome has been noted in otherwise normal lambs
- Retained placenta and metritis commonly follow abortions
- Reddish-brown vaginal discharge

Pathological findings

- inflammation of the placenta - cotyledons and intercotyledonary areas necrotic and oedematous,
- usually foetus is no gross abnormalities and is covered in reddish-brown exudate.

Epidemiology

- Disease is a major problem throughout Namibia.
- Spread is via ingestion or aerosol
- Major source of infection is contact with an aborted foetus, placenta or vaginal discharge from an aborted ewe or doe can spread the disease
- Some ewes and does can become carriers of the bacteria
- Spread between farms can be by introduction of a carrier animal

Surveillance goal

Detection of cases to provide advice to farmers on reducing further losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Chlamydophilia abortus can infect humans and result in pregnancy loss and illness

Socioeconomic

Production losses

Trade

Nil

Case Definition

Suspect case

Flock with abortions and birth of weak, low birth weight or premature offspring

Confirmed case

Isolation of *Chlamydophilia abortus* or rising titre in paired serum samples from aborting ewes or does.

Response

Suspect case

- collect and provide laboratory with well-preserved fresh placenta for culture of agent. It is difficult to demonstrate or isolate agent from foetus.
- collect serum samples from aborted females and arrange for serology testing at the laboratory
- complete the disease report form to record findings

Confirmed case

- Provide advice to owner including:
  - proper hygiene of lambing area and aborted materials
  - annual vaccination of all ewes before breeding season is recommended. However, some vaccinated ewes may still abort
  - antibiotic treatment (tetracycline) may be given to ewes in early pregnancy to reduce abortions
  - enhanced biosecurity (only introduce stock from negative flocks).

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- culture
- serology

Specimens

- placenta and placental membranes
- aborted foetus (foetal lung or liver)
- vaginal swabs taken from female within 3 days of the abortion
- whole blood in EDTA
- paired blood samples for serology collected 3 weeks apart.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
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Return to Sheep and Goat Diseases

Haemonchosis

Introduction

Haemonchosis is a highly significant disease of sheep and goats caused by *Haemonchus* species of intestinal parasites. Disease occurs in most parts of Namibia. Haphazard use of worm remedies can result in parasites that are resistant to most remedies.

Clinical findings

- acute - sudden death, anaemia
- chronic - wasting, anaemia
- anaemia – pale gums and conjunctiva
- oedema swelling under jaws
- weight loss
- death

Pathological findings

- the inside lining of the abomasum is reddish
- many red of worms visible in the abomasum
- watery blood.

Epidemiology

- Hemonchosis is an important disease of sheep and goats in most parts of Namibia
- Mostly of significance to Central & Northern parts especially between December and February
- Infestation of the host occurs through eating pastures contaminated with infective larvae
- The infective larvae survive best in humid warm conditions - they do not survive well under hot dry conditions
- Young animals on poor nutrition are more vulnerable to infection
- Differential diagnosis:
  - Other causes of sudden death
- Risk factors include:
  - intensively grazed stock
  - in goats – being forced to graze because of lack of browse fodder
  - no pasture management or worming program
  - overuse of drenches

Surveillance goal

- To detect cases and provide advice to farmers on reducing haemonchus infestations without promoting drench resistance

Surveillance and Monitoring Actions

- Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Production loss

Trade

Nil

Case Definition

Suspect case

Flock of sheep or goats with a number of animals showing anaemia, oedema under the jaw and weakness

Confirmed case

- High faecal egg-count in sheep and goats with severe anaemia
- High numbers of parasite in abomasum of a dead animal that was anaemic and weak

Response

Suspect case

- collect faecal samples and arrange for testing at the laboratory
- complete the disease report form to record findings

Confirmed case

Provide advice to owner including:

- developing a strategic worm treatment program that minimises risk of drench resistance – as per FAMACHA program (http://www.scsrpc.org/SCSRPC/FAMACHA/famachainfoguide.htm)
- pasture management
- improving nutrition
- culling highly susceptible stock

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- worm egg counts
- microscopic examination of worms

Laboratory specimens

- faecal samples for worm egg counts
- parasite itself

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Sheep and Goat Diseases

Orf

Introduction

Orf is also called Contagious Ecthyma, Contagious pustular dermatitis, Vuilbek (Afr.), Sore Mouth or Scabby Mouth, is a contagious viral disease of sheep and goats. It commonly affects young lambs and kids. It occurs in most parts of Namibia. However, it is most commonly found in goat kids.

Clinical findings

- Vesicles, pustules, and thick scabs on the lips, nostrils, face, eyelids, teats, udder, feet, and occasionally, inside the mouth

Epidemiology

- Disease commonly occurs in most parts of Namibia.
- Often spreads rapidly by direct or indirect contact
- Virus remains viable for months and possibly years on pastures, in yards and in dust
- A break in the skin is needed for the virus to set up an infection so outbreaks are often associated with rough dry feed, thistles or burrs
- Usually seen in young animals
- Risk factors include:
  - introduced animals
  - unvaccinated animals
  - extremely hot temperatures.

Surveillance goal

To detect cases and provide advice to farmers on reducing spread of the disease

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Humans can become infected from sheep or goats and develop localized vesicles and pustules. Transmission between humans does not usually occur.

Socioeconomic

Lost production

Trade

Buyers may be unwilling to purchase affected sheep or goats

Case Definition

Suspect case

A number of lambs or kids in a flock with vesicles, pustules, and thick scabs on the lips, nostrils and face

Confirmed case

Characteristic lesions.

Response

Suspect case

- no need to collect samples as clinical diagnosis is usually sufficient
- **wear gloves** when handling sick animals and vaccines as humans can contract the disease.
- complete the disease report form to record findings

Confirmed case

Provide advice to owner including:

- although this may delay healing, removal of scabs and applying ointment is recommended
- vaccination using commercially available vaccines or make arrangements with CVL to prepare autogenous vaccine
- minimise transport stress
- enhanced biosecurity - quarantine new animals before introducing them to the rest of the flock
- in case of an outbreak, separate sick animals in a pen for treatment and feed and treat sick animals after feeding the flock
- wear gloves when handling sick animals and vaccines as humans can contract the disease
- avoid the consumption of milk from does that have lesions on the teats and udder.

Alert threshold

Suspect case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

No diagnostic tests are conducted in Namibia. Electron microscopy is done elsewhere.

Laboratory specimens

Scabs are required for production of autogenous vaccine at CVL

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
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Return to Sheep and Goat Diseases

Pasteurellosis - sheep

Introduction

Pasteurellosis refers to the severe secondary infection caused by the bacteria *Mannheimia haemolytica* and *Pasteurella trehalose* in stressed sheep with pre-existing viral and bacterial respiratory diseases.

Clinical signs

- Fever
- Dullness, not eating,
- Difficult rapid breathing
- Coughing, frothing at the mouth and nose
- Sudden death in about 5% of young sheep

Pathological signs

- Haemorrhages under the skin of neck and chest
- Straw coloured fluid in the chest cavity and around the heart
- Lungs are plum coloured and oedematous
- Pin point haemorrhages in the liver, spleen and heart muscle
- Lymph nodes around lungs enlarged with pin point haemorrhages
- Tonsils inflamed
- Ulcers in throat, oesophagus and abomasum

Epidemiology

- *Manheimia haemolytica* (formally *Pasturella haemolytica*) and *Pasteurella trehalose* are commonly present in the nose and throat of healthy animals
- *Manheimia haemolytica* and *Pasteurella trehalose* can become secondary bacterial invaders and cause disease in sheep that are severely stressed or already infected with a respiratory virus
- Risk factors include:
  - management stresses e.g. dipping, castrating, shearing, drenching
  - environmental stresses e.g. very wet weather
  - infection with other non-fatal diseases e.g. respiratory diseases.

Surveillance goal

To detect cases and provide advice to farmers on reducing the impact of the disease

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Production loss

Trade

Nil

Case Definition

Suspect case

Flock with sudden death in some sheep and fever, dullness, difficulty breathing and frothing from the mouth and nose in other sheep

Confirmed case

Culture of *Mannheimia haemolytica* or *Pasteurella trehalose* from clinically affected sheep

Response

Suspect case

- collect laboratory samples and arrange for testing at the laboratory
- complete the disease report form to record findings

Confirmed case

Provide advice to owner including:

- antibiotic treatment
- vaccination of herd if ongoing problem
- minimise stress
- enhanced biosecurity.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Culture

Specimens

Fresh lung samples

Return to Sheep and Goat Diseases

Pulpy kidney

Introduction

Pulpy kidney, also called Bloednier (Afr.) is an acute toxaemia of ruminants (mainly sheep and goats) caused by the toxin of the bacterium *Clostridium perfringens* (Type-D) when it is absorbed from the intestinal tract following bacterial multiplication associated with a change to a low- fibre, high-carbohydrate diet. In Namibia mostly sheep are affected. First cases in Namibia were described in 1948 in all sheep farming areas. Drastic dietary changes in Namibia are a major predisposing factor; change-over from dry fodder to green grass after the early rains.

Clinical findings

- Course of illness is very short, never more than 12 hours in lambs or kids
- Lambs or kids found dead in good condition - often on their side with limbs extended and head thrown back
- Dullness, depression and lost of interest in food
- Die quickly following incoordination, circling movements and convulsions.
- Adult sheep may stagger and have diarrhoea before death
- Severe diarrhoea is prominent in animals which survive for a few more days
- In goat kids high fever is followed by convulsions, severe abdominal pain

Pathological findings

- Body condition usually good, often with fecal staining of the perineum
- Haemorrhages under the skin and on the heart and kidney
- Straw-coloured or blood-tinged fluid around heart, sometimes with clots
- Small intestines tear easily and their contents are sparse and creamy
- Rapid decomposition of carcass
- Dark, soft, pulpy kidneys
- Liver is dark and congested

Epidemiology

- It is most commonly seen in lambs which are in good condition and are grazing lush pastures
- Risk factors include:
  - sudden changes in diet e.g. grazing lush, rapidly growing pastures or young cereal crops, or heavy grain feeding
  - sheep or goats not vaccinated
  - often in recently dewormed sheep or goats
- Differential diagnosis:
  - Lambs - acute pasteurellosis, rumen overload
  - Kids - acute salmonellosis or coccidiosis

Surveillance goal

To detect cases and provide advice to farmers on minimizing further losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Production loss

Trade

Nil

Case Definition

Suspect case

Sudden death in unvaccinated well-conditioned sheep or goats on good feed with dark soft pulpy kidneys

Confirmed case

- Characteristic gross findings in freshly dead sheep or goats are sufficient to make a definitive diagnosis

Response

Suspect case

- complete the disease report form to record findings

Confirmed case

Provide advice to owner including:

- reduce feed intake
- vaccinate flock
- long acting tetracycline treatment to protect animals until vaccine becomes effective

- give booster vaccinations before greatly improving feed quality.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Microscopy
- Toxicology
- Histopathology

Specimens

- At least 20 smears from the intestinal mucosa at sites from the abomasum to the colon with particular attention to the ileum. Sites selected should be from areas showing haemorrhages and also from nearby non-inflamed areas which may show a heavier flora. 4-5 sites can be smeared on one slide.
- Samples of small intestinal content (at least 10 ml) should be collected from several sites in the small intestine, particularly from areas where the contents are a yellow colour and creamy consistency. Submit chilled for toxicology (CIEP).
- Sections of liver and kidney, and whole brain in buffered formalin for histopathology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
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Return to Sheep and Goat Diseases

Horse Diseases

African Horse Sickness

Introduction

African Horse Sickness, also called Perdesiekte (Afr.) is an acute to subacute, infectious and non-contagious arthropod-borne disease of horses, donkeys and mules. It is endemic in sub-Saharan Africa and occurs as sporadic outbreaks in Namibia. Disease has been known to occur in Namibia since earliest times and is prevalent in all areas. Epidemics causing high mortalities were reported in the early 1900s. However, since 1934 after vaccines became available, only sporadic outbreaks are reported. In 1987, the disease was suspected to have caused very high mortalities in donkeys in Karasburg district.

Clinical findings

Disease can occur in respiratory, cardiac, mixed or subclinical forms.

Respiratory form

- Fever (41°C)
- Difficult breathing, rapid abdominal breathing, coughing, dilated nostrils with copious frothy fluid oozing out
- Profuse sweating
- Forelegs spread apart, head extended and ears drooping
- Death within 4-24 hours of onset of signs with mortality rate about 95%.

Cardiac form

- Fever (39-41°C)
- Swelling above the eyes, eyelids, face, neck, chest brisket and shoulders
- ~50% mortality within 1 week of onset.

Mixed form

- Breathing difficulties, oedematous swellings and discharge of frothy fluid from the nose
- ~70% mortality with death within 3-6 days.

Subclinical form (Horse sickness fever)

- Fever
- General sickness for 1–2 days
- Inflamed conjunctiva with some difficulty breathing.

Pathological findings

Respiratory form

- oedema of lungs – lungs are not elastic
- clear yellow fluid between the lobes of the lungs, around heart, within chest cavity and under chest lining
- oedema of lymph nodes in chest
- pin point haemorrhages in sac enclosing the heart
- the mucosa of the small and large intestines reddened and oedematous.

Cardiac form

- gelatinous oedema under the skin and between muscles

- extensive haemorrhages and inflammation in and around the heart
- pin point haemorrhages in the gut lining.

Epidemiology

- Sporadic outbreaks occur in Namibia
- Incidence of the disease is often seasonal due to numbers of biting flies. Outbreaks usually occur in late summer to early autumn when insects are abundant.
- Cases disappear after the first frost
- AHS is a viral disease of horses, mules and donkeys
- The virus is transmitted between horses by biting insects, principally midges.
- Insects are active at dusk especially in the low lying areas like valleys and riverbeds, and around dams and pans
- Recovered horses are immune to the serotype which infected them but remain susceptible to other serotypes
- Risk factors include:
  - above average rainfall leading to increased biting insect (midge) numbers
  - disease occurring in nearby areas – spread via wind dispersal of infected insects is possible
  - introduction of infected horses
  - Unvaccinated horses

Surveillance goal

To detect cases and provide advice to farmer on minimizing further losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Social impact through death of horses

Trade

Restrictions on export of horses from infected areas

Case Definition

Suspect case

Horses dying after showing breathing difficulties, oedematous swellings and discharge of frothy fluid from the nose

Confirmed case

Virus isolation or rising titre in paired serum samples from a clinical case.

Response

Suspect case

- collect samples and arrange for testing at the laboratory
- complete the disease report form to record findings

Confirmed case

- Notify supervisor
- Provide advice to owner including:
  - No specific treatment is available
  - insect proof housing for horses between dusk and dawn
  - vector control
  - annual vaccination is recommended to give a good and stable immunity
  - enhanced biosecurity.

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- virus isolation
- histopathology

Specimens

- whole blood in heparin collected during febrile stage
- fresh spleen, lung and lymph nodes for virus isolation
- spleen, brain, heart, liver and kidneys in buffered formalin for histopathology.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Horse Diseases

Equine Influenza

Introduction

Avian Influenza also called Perdegriep (Afr.) is a worldwide viral disease of horses. It is an acute, highly contagious, febrile respiratory disease caused by Influenza A-Equi virus types 1 and 2. It was first diagnosed in RSA in 1986 and the following year in the Karasburg district of Namibia. Recent outbreaks have been reported in South Africa. Although no recent occurrence has been reported, outbreaks have been reported in Namibia. The disease can be regarded as endemic in Namibia. Compulsory pre-importation immunisation has been a condition for importation of horses since 1987.

Clinical signs

- Fever (41°C)
- Coughing
- Discharge from nose – initially watery then with mucus and pus
- Horses depressed, easily exhausted, decreased appetite.
- Deaths from equine influenza are rare

Pathological signs

- Inflammation of mucosa of upper respiratory tract

Epidemiology

- Equine Influenza (EI) is a highly infectious viral disease of horses, donkeys and other equine species
- Risk factors include:
  - introduction of infected horses
  - horses not vaccinated
  - gatherings of large numbers of horses

Surveillance goal

To detect cases and provide advice to farmer on limiting the impact of the disease

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Nil

Socioeconomic

Social impact of horses unable to be worked for several weeks

Trade

Nil

Case Definition

Suspect case

Many horses in group depressed with fever and discharge from nose

Confirmed case

Virus isolation or rising titre in paired serum samples from a clinical case

Response

Suspect case

- collect samples and arrange for testing at the laboratory
- complete the disease report form to record findings

Confirmed case

- Advise supervisor
- Provide advice to owner including:
  - vaccination
  - enhanced biosecurity.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- virus isolation
- serology

Specimens

- nasal swab
- paired blood samples for serology collected 3 weeks apart.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
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Return to Horse Diseases

Pig Diseases

Porcine reproductive and respiratory syndrome

Introduction

Porcine reproductive and respiratory syndrome (PRRS) is a serious viral disease of pigs.

Clinical signs

- Reproductive failure - infertility, late foetal mummification, abortions, stillbirths
- Birth of weak piglets that often die soon after birth from respiratory disease and secondary infections
- Respiratory disease, (difficulty breathing [thumping]), fever, not eating, and listlessness
- Short term discoloration (blueing) of the ears

Pathological signs

- Lungs are mottled, tan and red, and fail to collapse
- Lymph nodes enlarged and tan in colour.

Epidemiology

- PRRS spreads rapidly through intensive pig herds by aerosol transmission
- Windborne spread and movement of infected pigs is the main method of disease spread between herds
- The virus can contaminate materials and equipment and these may also be a method of spread between farms

Surveillance goal

To detect cases and provide advice to farmers on minimizing impact of disease

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Production losses and economic and social impacts through restrictions on pig movements

Trade

Restrictions on movement of pigs from farm

Case Definition

Suspect case

Infertility, abortions, stillbirths, birth of weak piglets and respiratory disease occurring in a pig herd

Confirmed case

Isolation of virus and positive serology in herd with characteristic clinical signs.

Response

Suspect case

- Collect samples and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

- Quarantine premises
- Undertake disease investigation to identify possible source of disease – traceback and traceforward
- Complete the disease report form to record findings
- Collect information on further cases from livestock keepers in the area and key informants
- Inform your supervisor to arrange:
  - movement controls
  - salvage slaughter-out
  - disinfection
  - enhanced biosecurity.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- virus isolation
- serology

Specimens

- fresh lung, spleen and tonsils
- blood samples for serology.

References

- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Pig Diseases

Swine erysipelas

Introduction

Swine erysipelas is an acute infectious, septicaemia or chronic, arthritic disease of pigs. It is caused by the bacteria *Erysipelothrix rhusiopathiae*. Acute disease is often seen in young, growing pigs. Disease was notifiable from 1901 to 1982. It was first reported in 1927 in Okahandja district and in 1984 found at a piggery in Katima Mulilo. Namibia is relatively free of this disease. However, it may become important as the pig population is increasing.

Clinical signs

Disease occurs in acute, subacute, and chronic forms.

Acute form

- Pigs may die suddenly without showing any clinical signs
- Fever
- Walk stiffly on their toes, spend a lot of time lying down separate from other pigs, and resent being disturbed
- Thirsty but not eating
- Skin lesions vary from red to purple widespread discolouration of the ears, snout, and abdomen to diamond-shaped skin lesions almost anywhere on the body.

Subacute form

- Diamond-shaped skin lesions almost anywhere on the body – these skin lesions may not persist for more than a few days
- Mild fever
- Decreased appetite

Chronic form

May follow acute, subacute or subclinical infection

- Arthritis
- Heart problems - most obvious after exertion, which may lead to sudden death.

Pathological signs

Acute and subacute forms

- Oedema and haemorrhages in lymph nodes
- Pinpoint haemorrhages in kidney and around heart
- Liver and spleen swollen

Chronic form

- One or more joints swollen and inflamed
- Patches of dry, necrotic skin
- Irregular masses on heart valves

Epidemiology

- It is seen mostly in growing pigs
- The bacteria is often carried in the tonsils of healthy pigs and can be excreted via saliva, nasal secretions, faeces, and urine resulting in contamination of the environment where the bacteria can survive for weeks
- Stress factors such as overstocking, mixing pigs after weaning, and sudden changes in temperature can trigger clinical erysipelas

Surveillance goal

Detection of cases and provision of advice to farmer to reduce further losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

- Humans can become infected with *Erysipelothrix rhusiopathiae* through contamination of skin wounds with the bacteria when they have contact with infected animals
- Veterinarians and abattoir workers are the people most commonly infected
- Good hygiene should be used with working with infected animals or potentially contaminated environments

Socioeconomic

Significant production losses

Trade

Nil

Case Definition

Suspect case

Diamond-shaped skin lesions or, in acute cases, sudden death in previously normal pigs, fever, walking stiffly, and a reluctance to move, but quite responsive to humans

Confirmed case

- Diamond-shaped skin lesions

- Culture of *Erysipelothrix rhusiopathiae* from clinical cases

Response

Suspect case

- Collect samples and arrange for testing at the laboratory
- Complete the disease report form to record findings

Confirmed case

Provide advice to farmer including:

- treatment with Penicillin
- vaccination
- improved hygiene - consider changing to all-in-all-out production system.

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Culture
- Histopathology

Specimens

Acute and subacute cases

- Fresh, aseptically collected sections of liver, kidney, lung and spleen for culture
- Sections of liver, kidney, lung and spleen for culture in buffered formalin for histopathology

Chronic cases

- Whole joint submitted unopened and chilled for culture
- Fresh section of mass from heart valve and skin lesions collected aseptically
- Section of mass from heart valve and skin lesions in buffered formalin

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Pig Diseases

Multiple Species Diseases

Botulism

Introduction

Botulism, also called Lamsiekte (Afr.), Oshinambuda (Oshiwambo) or Omutjise wombindu (OtjiHerero) is a disease caused by a neurotoxin produced by the bacteria *Clostridium botulinum*. Botulinum toxin is a potent neurotoxin that affects humans, cattle, dogs, horses, birds, and other animals. It is usually fatal. It has no geographic limitations. Isolated cases and outbreaks occur in most countries. Botulism commonly occurs in Namibia as a result of phosphorus deficient animals eating preformed toxin in bones and other rotten carrion.

Clinical findings

- Early muscle tremor
- Progressive symmetrical weakness and motor paralysis, leading to recumbency
- Difficulty chewing and swallowing, tongue may protrude
- Weakness and incoordination
- Floppy paralysis in birds.

Pathological findings

No specific changes detectable

Epidemiology

- *Clostridium botulinum* proliferates in decomposing animal matter and sometimes in decomposing plant material
- Cases occur when there is:
  - bone chewing by livestock due to low soil phosphorus levels or low protein diets
  - spoiled hay or silage
  - dead rodents in livestock feed
  - dead animals in drinking water
- Differential diagnosis:
  - Paralytic rabies
  - Tick paralysis
  - Organophosphate poisoning

Surveillance goal

To identify cases and provide advice to farmers to prevent further cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

- Affected livestock should not be used for human consumption

Socioeconomic

- Large numbers of stock can be affected and die when spoiled stock feed has been fed to livestock

Trade

Nil

Case Definition

Suspect case

- Progressive muscular paralysis affecting particularly the limbs and the muscles of the jaw and throat in animals that have been bone chewing or have eaten spoiled stock feed

Confirmed case

- Clinical diagnosis is often sufficient
- However, feed, serum/blood, stomach, crop or intestinal contents, vomitus, faeces or tissues samples may be collected to identify the bacteria

Response

Suspect case

- remove animals from source of toxin
- collect laboratory specimens and arrange for testing at the laboratory

Confirmed case

- supportive treatment
- recommend vaccination of herd/ flock

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- ELISA to detect toxin

Specimens

- feed samples
- serum/blood
- stomach, crop or intestinal contents.

Results

ELISA positive results are more likely to be detected in contaminated food material than in animal samples

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Multiple Species Diseases

Bluetongue

Introduction

Bluetongue, also known as Bloutong (Afr.) is an acute insect-borne viral disease of ruminants with sheep the most severely affected species. Disease mostly occurs during late summer and autumn. Goats and cattle seldom show any signs. The disease is endemic in all parts of Namibia. First cases were reported in 1908 along the Fish River. Karakul sheep are known to be less susceptible.

Clinical signs

- Fever (42°C)
- Salivation, depression, difficulty breathing and panting
- Discharge from nose – initially clear then contains mucus and pus and forms crusts around the nostrils
- Redness and swelling of the muzzle, lips, face, eyelids and ears; leading to oedema
- Ulceration and necrosis of the mucosae of the mouth
- Tongue reddened and oedematous; later (in some cases) the tongue is blue and protrudes from the mouth
- Redness of coronary band, groin, axilla and perineum
- Lameness
- Abortion or birth of malformed lambs.

Pathological signs

- Mucosa in mouth is oedematous, reddened or blue with abrasions of lips, dental pad, tongue and cheeks that may be covered with grey necrotic material
- Redness, oedema, haemorrhages and ulcerations of mucosa of rumen, small and large intestine
- Haemorrhages at base of pulmonary artery
- The lymph nodes and spleen are moderately enlarged and haemorrhagic.
- Pale areas of necrosis are scattered through the heart and muscles of the body
- Inflammation of the upper respiratory tract, with excessive mucus and oedema of the lungs.

Epidemiology

- Bluetongue is transmitted by biting midges
- Midges blown from neighbouring areas can spread the virus
- Spread can occur through the introduction of cattle from infected areas – cattle can carry the virus without showing disease

Surveillance goal

- To identify areas with endemic infection
- To detect spread of the virus to previously uninfected areas

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

- Significant production loss and deaths in sheep flocks

Trade

- Bans on export of animals from bluetongue endemic areas to certain countries

Case Definition

Suspect case

- Swelling and oedema of lips, tongue and head with lameness in numerous sheep within a flock and presence of large numbers of biting midges
- Cases occurring either in an endemic area or where disease is occurring in a neighbouring area or where cattle have been introduced from an endemic area

Confirmed case

- Isolation of virus of pathogenic serotype from sheep with characteristic clinical and post mortem signs
- Rising titres in paired samples from clinical cases

Response

Suspect case

Collect the following specimens and submit to laboratory:

- whole blood in EDTA from clinical cases
- fresh spleen, liver, bone marrow, lung and lymph nodes for virus isolation
- paired serum samples from sick and recovered sheep.

Confirmed case

- Collect information on further cases from livestock keepers in the area and key informants
- Inform your supervisor to arrange:
  - movements controls
  - vaccination - sheep should be vaccinated between August and October
  - exercise precautions during Bluetongue season, avoid low lying areas, rivers, valleys, open water like dams and pans
- raise public awareness on how the disease presents, how it spreads and the need for reporting.

Alert threshold

- Confirmed case in non-endemic area

Information management

Data collection

- Complete the disease report form to record findings
- Send completed form to supervisor

Laboratory confirmation

Diagnostic tests

- virus isolation
- serology

Specimens

- whole blood in EDTA
- fresh spleen, liver, bone marrow, lung and lymph nodes for virus isolation
- paired serum samples from sick and recovered sheep.

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

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Return to Multiple Species Diseases

Heartwater

Introduction

Heartwater, also known as Hartwater (Afr.) is a rickettsial disease of domestic and wild ruminants particularly cattle, sheep and goats transmitted by bony ticks (Amblyomma variegatum). It is caused by the rickettsial organism Cowdria ruminantium. Different strains vary in pathogenicity. Occurs only in Zambezi region where the bony tick is found. Bont ticks are a notifiable disease

Clinical signs

The disease can occur in peracute, acute, subacute, mild or subclinical forms.

- characterised by high fever, nervous signs and high mortality
- sudden death preceded by terminal convulsions
- fever (41°C)
- respiratory distress and watery eyes
- diarrhoea
- not eating, listlessness,
- nervous signs:
  - restlessness
  - walking in circles
  - sucking movements
  - standing rigidly with tremors of the superficial muscles
  - Cattle may push their heads against a wall or present aggressive or anxious behaviour.
- just before death the animal falls to the ground onto its side, pedalling and arching back its head and neck, rapid involuntary eye movements, very sensitive to stimulation, chewing movements, and frothing at the mouth.

Pathological signs

- fluid around heart
- fluid in chest cavity
- oedema of lungs
- reddening of intestines
- oedema of the lymph nodes near intestines and lungs
- pin point haemorrhages in the heart
- congestion of the brain
- spleen moderately enlarged
- reddening and/or oedema of the folds in the abomasum.

Epidemiology

- Heartwater is present in most of sub-Saharan countries in Africa
- Recovered animals become carriers of infection
- Goats and sheep are more susceptible than cattle, and European breeds are generally more susceptible than indigenous African breeds
- Certain wild ruminants can play a role as reservoir
- Risk factors for disease include:
  - presence of ticks
  - contact with wild ruminants
  - introduction of carrier animals
  - introduction of animals carrying ticks
  - illegal movement of animals.

Surveillance goal

Identification of cases so advice can be provided to farmers to reduce losses

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

None known

Socioeconomic

Can cause up to 90% mortality in susceptible domestic ruminants

Trade

May be reluctance to purchase stock from endemic areas

Case Definition

Suspect case

Fluid around heart and in chest in animals which showed nervous signs before death in a Bont tick infested area

Confirmed case

Laboratory identification of organisms from a clinical case

Response

Suspect case

- Collect laboratory specimens and arrange for testing at the laboratory
- Recommend antibiotic (tetracycline) treatment for affected animals

Confirmed case

- Undertake disease investigation noting tick treatment history, livestock introductions and compliance with dip management as per Part 9 of “Animal Health Regulation: Animal Health Act 2011”

- Complete the disease report form to record findings
- Collect information on further cases from livestock keepers in the area and key informants
- Treatment with long-acting tetracyclines or imidocarb can be attempted.
- Inform your supervisor to arrange:
  - movements controls
  - notice to treat stock
  - dipping of stock
- Raise public awareness regarding dip maintenance and stock dipping requirements as per “Animal Health Regulation: Animal Health Act 2011”.

Alert threshold

Confirmed case

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

- Microscopic examination of Giemsa stained brain smears
- PCR

Specimens

- whole blood collected during 2nd or 3rd day of fever
- fresh brain and spleen
- samples of brain, lungs and kidneys in formalin
- ticks collected from clinical animals.

Results

Serology can have cross-reactions with other rickettsia and is not an effective test for imports

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/
- OIE Terrestrial Animal Health Code (2013) - www.oie.int/en/internationalstandard-setting/terrestrial-code/access-online/

Return to Multiple Species Diseases

Mange (Psoroptes) – cattle and goats

Introduction

Psoroptic mange is caused by non-burrowing mites that infect domestic and wild ungulates including sheep, goats, cattle and horses. Different species of mite infect different animal species i.e. the sheep scab mite (see **Sheep scab** for details) does not infect cattle and goats.

Clinical signs

- Intense itchiness, damaged moist skin
- Papules and sticky yellow crusts on skin
- Scabs along back, shoulders and tail head
- Secondary lesions from self trauma
- Severe weight loss if extensive skin lesions

Epidemiology

- Contact between animals results in spread
- Mites can remain viable for up to 2 months off the host under favorable conditions
- Risk factors include:
  - introducing infected stock
  - animal contact with markets or livestock lorries that have transported infected animals
  - breakdown of biosecurity.

Surveillance goal

To identify cases and provide advice to farmers to prevent further cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases.

Implications

Human health

Nil

Socioeconomic

Production loss in heavily infested herds

Trade

Buyers may be reluctant to purchase heavily infested animals

Case Definition

Suspect case

Intensely itchy animals

Confirmed case

Laboratory identification of Psoroptic mite identified from intensely itchy animal

Response

Suspect case

- collect samples and arrange for testing at the laboratory
- complete the disease report form to record findings

Confirmed case

Provide advice to farmer including:

- insecticide treatment
- improved biosecurity

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Diagnostic tests

Microscopic examination

Specimens

- skin scrapings

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Multiple Species Diseases

Tetanus

Introduction

- Tetanus also known as Klem-in-die-kaak (Afr.) is caused by the bacteria *Clostridium tetani* which produces an exotoxin tetanoplasmin that affects the nervous system. Occurs as isolated cases but outbreaks have been reported in young animals following castration or docking.

Clinical signs

- General muscle stiffness developing to unsteady walking with the head and tail stiffly extended
- Muscular spasms and tremors
- Protrusion of the nictitating membrane (third eyelid)
- Lockjaw – animal can't eat or drink and saliva may drool from its mouth
- Extreme response to stimuli – sudden noise or touch induces a spasm
- Progresses to convulsions and animal falls to ground and cannot rise - has limbs stiffly extended and head and neck thrown back

Pathological signs

Nil

Epidemiology

- Case fatality rate is high
- All domestic animals are susceptible to tetanus with horses the most susceptible and dogs and cats comparatively resistant
- The organism grows and produces toxin in anaerobic conditions in the body such as stab wounds, burns, deep wounds with tissue damage and those contaminated with soil or wounds produced by castration, tail removal, shearing and dehorning. The umbilicus of the newborn and the female genital tract at parturition can also be places of bacterial growth. Grass seeds penetrating the skin of animals can lead to tetanus.
- *Clostridium tetani* is often present in human and animal faeces
- Wounds contaminated with soil or faeces are the most likely to lead to tetanus
- Tetanus spores can survive for long periods in the soil

Surveillance goal

To identify cases and provide advice to farmers to prevent further cases

Surveillance and Monitoring Actions

Passive surveillance based on owner reporting and investigation of suspect cases

Implications

Human health

Humans can develop tetanus when they have wounds contaminated by spores. Humans do not become infected by handling an animal with tetanus.

Socioeconomic

Production loss

Trade

Nil

Case Definition

Suspect case

Spasms with limbs stiffly extended, head and neck thrown back and protrusion of the nictitating membrane.

Response

Suspect case

- Complete the disease report form to record findings
- Advise farmer to vaccinate livestock
- Other advice to farmer will vary with the species affected and the value of individual animals but may include:
  - local treatment of wound to reduce production of further toxin e.g. debridement, irrigation with hydrogen peroxide and local application of penicillin
  - treatment with penicillin
  - treatment with antitoxin
  - treatment with muscle relaxants
  - keeping animal as quiet as possible

Information management

Data collection

- Complete the disease report form to record findings
- Submit report to supervisor

Laboratory confirmation

Not used

References

- Schneider HP (1994) Animal Health & Veterinary Medicine in Namibia, AGRIVET
- Radostits OM et al (2005) Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Edition, W.B. Saunders
- The Merck Veterinary Manual Online (2013) - http://www.merckmanuals.com/vet/

Return to Multiple Species Diseases

Physiological Parameters

Disease Investigation - Normal Physiological Parameters

Normal Rectal Temperature (degrees Celsius)

Cattle: Beef cow	36.7–39.1
Cattle: Dairy cow	38.0–39.3
Cat	38.1–39.2
Chicken (daylight)	40.6–43.0
Dog	37.9–39.9
Goat	38.5–39.7
Horse: Mare	37.3–38.2
Horse: Stallion	37.2–38.1
Pig	38.7–39.8
Rabbit	38.6–40.1
Sheep	38.3–39.9

Resting Heart Rate (beats per minute)

Cat	120–140
Chick	350–450
Chicken (adult)	250–300
Dairy cow	48–84
Dog	70–120
Goat	70–80
Horse	28–40
Ox	36–60
Pig	70–120
Rabbit	180–350
Sheep	70–80

Resting Respiratory Rate (breaths per minute)

Cat	16–40
Dairy cow	26–50
Dog	18–34
Horse	10–14
Pig	32–58
Sheep	16–34

Important Contact Numbers

DVS Offices

Contact Details of DVS offices

Name / Locality	Post address	Tel	Fax
DVS Head Office Windhoek	Pr. Bag 12022, Windhoek	061-208 7512/3	061-208 7779
DVS CVL Windhoek	Pr. Bag 13187, Windhoek	061- 237 684	061-221 099
Bergvlug Quarantine farm	Pr. Bag 13187, Windhoek	061-236 086	061-221 962
Katima Mulilo	PO Box 116, Katima Mulilo	066-253 142	066-253 763
Rundu	Pr. Bag 2105, Rundu	066-255 016	066-256 254
Ondangwa	PO Box 245, Ondangwa	065-240 833/1	065-240 675
Eenhana		065-263203	062-263164
Oshikoto		065-240831	065-240675
Ombalantu Outapi		065-251 080	065-251 089
Opuwo	PO Box 27, Opuwo	065-273 012	065-273 145
Outjo	PO Box 102 Outjo	067-313 050	067-313 480
Otavi	PO Box 205 Otavi	067-234 085	067-234 363
Grootfontein	PO Box 81, Grootfontein	067-242 000	067-243 389
Otjiwarongo	PO Box 6, Otjiwarongo	067-302 131	067-302 978
Okahandja	PO Box 27, Okahandja	062-501 151/2/3	062-502 591
Omaruru	PO Box 28, Omaruru	064-570 018	064-570 496
Windhoek	Pr. Bag 12022 Windhoek	061-276 580	061-276 582
Windhoek Import & Export Office		061-276592	061-303151
Gobabis	PO Box 27 Gobabis	062-562 441/2	062-563 533
Mariental	PO Box 28 Mariental	063-242 171	063-242 578
Keetmanshoop	PO Box 30 Keetmanshoop	063-223 003	063-223 190
Walvis bay	PO Box 1111 Walvis Bay	064-205 313	064-205 313

Animal Health Inspector Offices

Animal Health Inspector Offices

Name/Locality	Post address	Tel	Fax
Aranos	PO Box 42 Aranos	063 272066	
Kamanjab	PO Box 61 Kamanjab	067 330014	
Karasburg	PO Box 112, Karasburg	063 270109	063 270342
Khorixas	PO Box 120, Khorixas	067 331128	
Maltahohe	PO Box 86 Maltahohe	063 293165	
Rehoboth	PO Box 3335 Aranos	062 522609	
Tsumeb	PO Box 272 Tsumeb	067 220870	067 220323
Okondgatu	PO Box 6 Otjiwarongo	062519052	
Okakarara	PO Box 151 Okakarara	067-317143	
Okamatapapti	PO Box 6 Otjiwarongo	318042	
Otjituo	PO Box 6 Otjiwarongo	067240079	

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DVS Offices

Export abattoirs

Veterinary Rural Extension Centres

Quarantine Farm

Central Veterinary Laboratory

The address and contact details for the Central Veterinary Laboratory are:

Central Veterinary Laboratory
24 Goethe St,
Pr. Bag 13187,
Windhoek

Tel: 061-237 684
Fax: 061-221 099

Export abattoirs

Export Abattoirs under Veterinary Supervision

Name/Locality	Post address	Tel	Fax
MeatCo, Katima Mulilo	Pr. Bag 1008, Katima Mulilo	066-253 662	066-253 830
MeatCo, Oshakati	Pr. Bag 5508, Oshakati	065-220 241	065-221 596
MeatCo, Okahandja	PO Box 144, Okahandja	062-501 061	062-501 449
MeatCo, Windhoek	PO Box 2166, Windhoek	061-261 361	061-263 320
Farmers Meat Market	Pr. Bag 2122, Mariental	063-241 001	063-242 722
!Uri !Kubis	Closed		
Ostrich Production Namibia	PO Box 1801, Keetmanshoop	063-222 807	063-222 433
Aranos Abattoir	PO Box 42 Aranos	063-272490	063-272465

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DVS Offices

Animal Health Inspector Offices

Veterinary Rural Extension Centres

Quarantine Farm

Veterinary Rural Extension Centres

Veterinary Rural Extension Centres (VREC)

VREC	Telephone number
Erwee	067 333022
Etanga	065 274401
Nkurunkuru	066 258075
Okakarara	067 317143
Okongo	065 695006
Otjinene	062 567518
Sesfontein	065 275500
Tallismanis	062 560709
Werda	067 232618

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Export abattoirs

Quarantine Farm

Quarantine Farm

Mangetti Quarantine Farm

Quarantine farm	Telephone number
Mangetti Quarantine farm	067 232335

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DVS Offices

Animal Health Inspector Offices

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Veterinary Rural Extension Centres

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