



Animal &
Plant Health
Agency

Anthrax Investigations

Training for Collection of Samples by Official Veterinarians



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Purpose of Training

- Previously, Official Veterinarians (Ovs) carrying out veterinary enquiries and taking samples where Anthrax is suspected have been required to hold the Official Controls Qualification (Veterinarian) Statutory Surveillance (OCQ(V) - SS).
- The purpose of this training is to enable any OV holding the Essentials Skills (OCQ(V) - ES) qualification to undertake these veterinary enquiries and take samples, under the instruction of a named OCQ(V) - SS.
- The aim of this change is to give the OCQ(V) - SS access to more resource when faced with a request for an enquiry.
- The named OCQ(V) - SS holder will still be ultimately responsible for the investigation, they will continue to examine the slides, confirm or eliminate suspicion, and sign the Certificate: Non-existence of Anthrax (AN02)/report suspicion of disease.

Roles and Responsibilities

OCQ(V) - SS

- To cascade this training to OCQ(V) - ES OV's where there is a need for additional support in the undertaking of Anthrax investigations.
- To supervise the overall quality of the investigation and examine blood smears to confirm or eliminate suspicion of Anthrax.
- To sign the AN02 and return it to APHA.

OR

- To report suspicion of disease to APHA immediately if Anthrax is suspected.

Roles and Responsibilities

OCQ(V) - ES

- To attend this training and make themselves familiar with the instructions and techniques required for Anthrax veterinary inquiries on the OV Gateway.
- When requested, to conduct an enquiry into suspicion of Anthrax on behalf of, and under the instruction of, the OCQ(V) - SS - to include history taking and consideration of differential diagnosis.
- If samples are required, to collect these as per the OV guidelines and present them to the OCQ(V)- SS on completion of the enquiry.

Disease Overview

- Anthrax is a disease caused by the bacteria *Bacillus anthracis*.
- It can affect all mammals including humans but ruminants are most susceptible.
- Clinical presentation can be peracute, acute or chronic.
- *Bacillus anthracis* spores are infectious and can survive for years in the environment.
- The vegetative form is more susceptible to cleansing and disinfection.
- **SUSPICION OF ANTHRAX MUST BE NOTIFIED TO APHA IMMEDIATELY.**

Disease Overview

- *Bacillus anthracis* may be present in the products of abortion.
- The bacteria can be shed in fluids from the carcass and may, in the right conditions, sporulate in the environment.
- *Bacillus anthracis* will not sporulate inside a carcass and is likely to be eliminated by other bacteria one to three days post mortem (depending on temperature).
- Thus, examination several days after death may not reveal the bacilli in the carcass.



Clinical Signs in Cattle and Sheep

- **Usually rapidly fatal**, however animals may be unwell for several days before death.
- Ill animals may show any of the following signs:
 - high temperature
 - shivering/twitching or fits
 - harsh dry coat
 - staring eyes
 - abdominal discomfort/inappetence
 - milk drop
 - subcutaneous oedema
 - epistaxis and/or blood in faeces
- May also see signs of a toxaemia/septicaemia including congested mucous membranes and dehydration.



Clinical Signs in Horses and Pigs

- Usually fatal though death less rapid than in cattle and sheep.
- Hot and painful swelling of the throat is often, but not always, seen.
- Acute colic is seen in horses.
- Pigs may be 'off colour' and then recover completely - they may later relapse and die.



Anthrax should be suspected in any carcase where the animal died suddenly, and there is no reasonable alternative diagnosis or explanation.



Possible Alternative Diagnoses

- Pneumonia/diarrhoea - in young animals where there is a concurrent disease outbreak.
- Known ongoing acute or chronic disease.
- Bloat - a fresh carcass may appear bloated.
- Hypomagnesemia - may see signs of convulsions - often grazing on lush grass.
- Dystocia - may see signs of attempted calving/dead foetus.
- Poisoning - for example Yew or Hemlock/Water Dropworts in fields.
- Botulism - other animals may be affected with flaccid paralysis.
- Lightning strike - scorch marks may be apparent.
- Electrocutation - especially in the milking parlour.

Indicators of Increased Risk of Anthrax

- History of anthrax on the premises.
- Multiple sudden deaths with no other explanation (consider a contaminated feed source).
- Recent ditching/dredging or flooding in area (increased exposure).
- Black 'tarry' blood at nose or rectum.
- Live animals with fever on a premises where others have recently died of Anthrax.

Pathological Findings

No carcase suspected of being infected with *Bacillus anthracis* should be cut into or opened.

- The unopened carcase *MAY* be bloated and have blood oozing from the nostrils or other orifices. This is not this is not seen in all cases and absence of these signs does not indicate absence of Anthrax.
- Pigs may show a marked swelling of the throat.
- Horses may show a marked swelling of the throat or the ventral thorax.



Report of Suspicion

- Any veterinary surgeon that suspects Anthrax in any animal should report this to APHA.
- On initial suspicion the veterinary surgeon should inform the keeper that the following restrictions in Article 5 and Part 1 of Schedule 1 of The Anthrax Order (1991) apply until a veterinary inquiry is completed. Briefly:
 - no animal or carcase should be move off the premises
 - drainage systems in the vicinity of the carcase/animal should be blocked to prevent spread
 - access of other animals to the carcase/its dung/any discharge should be prevented
 - if a carcase has to be moved (do not move unless absolutely necessary) the area it is moved from should be thoroughly disinfected with an approved disinfect
 - any milk produced by the suspected animal, and any container/utensil that has been in contact with it should be sterilised. The milk should not be mixed with milk from other animals
 - do not cut, or permit to be cut (except by OV during investigation), the skin of the suspect animal
- APHA will assess the case and, if warranted initiate a veterinary enquiry via the Veterinary Delivery Partner (VDP).

Veterinary Enquiry

- APHA will issue an authorisation number and instruction to carry out an investigation via the VDP.
- The investigation must be carried out as soon as is reasonably possible **on the same day** as the decision to investigate is made.
- The aim of the veterinary inquiry is to ascertain whether disease exists or has existed within the last 56 days.
- A carcass suspected of being infected with *Bacillus anthracis* **must not be opened** and every reasonable effort must be made to reduce contamination of the environment with fluid leaking from the carcass.

Veterinary Enquiry

- OCQ(V) - SS or OCQ(V) - ES
 - Visit farm.
 - Examine carcass and, where appropriate, immediate surrounding area.
 - Take samples.
- OCQ(V) - SS
 - Examine stained smear (OCQ(V) - ES should be encouraged to do this also, as training).
 - Report suspicion of disease to APHA or sign and submit Certificate: Non-existence of Anthrax (AN02).



Biosecurity

- Ensure on arrival that the vehicle, protective clothing and footwear are clean and disinfected in order to minimise the risk of transmission of disease between premises.
- Before leaving the farm, thoroughly clean and disinfect all protective clothing and footwear.
- Carry sufficient disinfectant. Use an approved disinfectant at the appropriate dilution for this purpose from the list on GOV.UK.
- Minimise the risk of potential disease spread, particularly through infected blood, by using minimally invasive techniques for sample collection.
- Before leaving the premises ensure that orifices of the carcass are sealed with cotton wool or other cotton based cloth soaked in disinfectant and that the carcass is secured from predation or inadvertent access by people.

Health and Safety

- Anthrax is a lethal zoonotic disease.
- Disposable waterproof gloves must be worn when handling the carcass and taking samples.
- Manage potential exposure while taking samples appropriately to risk.
- Advice should be given to owners regarding appropriate precautions required to minimise the risk of infection.



Veterinary Enquiry - Farm Visit

- Equipment required:
- Personal protective equipment and approved disinfectant (refer to list on GOV.UK).
- To confirm identification a microchip/EID reader may be required.
- To take samples: scalpel handle and blades, plain swabs (maximum length of swab container 12cm), disposable gloves, microscope slides and microscope slide mailers or storage boxes.
- Clinical waste container.
- Cotton wool and tape.



Veterinary Enquiry - Farm Visit

- Record individual animal identification numbers (where applicable), species, age, and breed.
- Check ear tags or microchip.
- Review the clinical history and inspect the carcass and surroundings to assess whether Anthrax can be ruled out prior to sampling.
- If anthrax can be ruled out, inform the keeper that no further anthrax precautions need to be taken.
- The farmer should dispose of carcasses in line with the Animal By-Product Regulations (ABPR).
- **If the suspicion of Anthrax remains**, then proceed to sampling.

Veterinary Enquiry - Sample Collection

- **Do not** send whole carcasses or tissues to a laboratory for post mortem, if Anthrax cannot be ruled out as a differential.
- **Do not** collect samples of blood or body fluids using evacuated blood tubes or disposable syringes. There are risks associated with this method of sample collection and handling.
- For a live animals **do** collect a blood sample (one to two drops) by nicking a superficial vein (preferably an ear vein) with a disposable fine needle or blade.
- Once sufficient blood has been collected, firm pressure should be applied with a cotton swab to prevent further bleeding.
- Instruments and materials should disposed of into a biohazard sharps container.
- Clean and disinfect any blood spillages using an approved disinfectant at the appropriate dilution for this purpose from the list on GOV.UK.



Sample Collection - All Carcasses

- Collect one blood smear from a superficial vessel (as for live animals) for preparation of a slide for location examination.
- In addition collect two extra blood smears and impregnate two plain swabs with blood from the same source (the swab must be a maximum of 12cm in length to fit into the packaging). These are to be sent to Public Health England (PHE) Porton Down if the disease cannot be ruled out from the initial local examination.
- Use a vein in the dependent ear where possible and clear the ear before sampling.
- Make a small nick in the vein and collect drops of blood onto the end of glass microscope slides before making a smear.
- In older carcasses several nicks may be required to extract enough drops of blood.

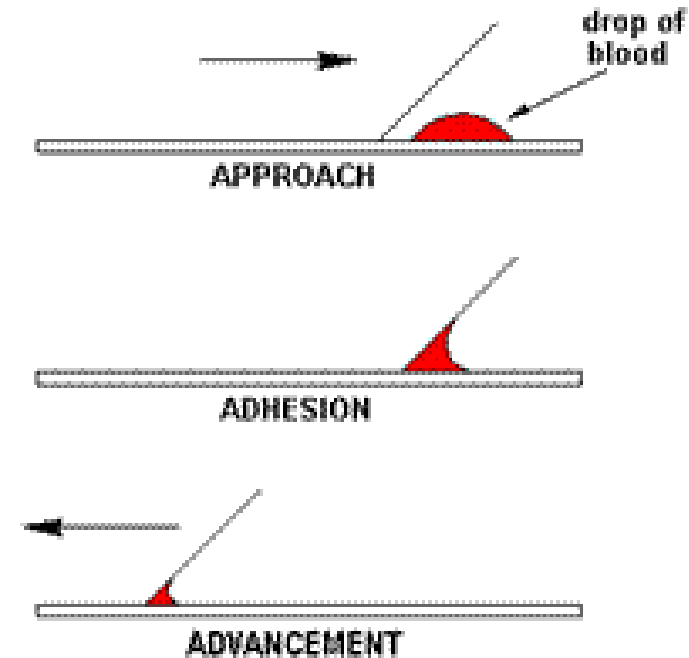


Sample Collection – Non-ruminants

- **In addition for Pigs** where there is a swelling of the throat, take two plain swabs and three smears from the cut surface of an associated lymph node, or the cut surface of the throat swelling - one smear should be stained and analysed locally.
- Where there is no swelling of the throat, two plain peritoneal swabs and three smears (one for local staining and analysis) should be taken.
- For Horses, dogs and other carnivores, where there is a swelling of the throat, take two plain swabs and three smears from the cut surface of an associated lymph node, or the cut surface of the throat swelling - one smear should be stained and analysed locally.

Making a Blood Smear

- Place a drop of blood on one end of a microscope slide.
- Using the edge of another slide at an angle of approximately 30°C, draw the blood droplet across the slide to create a blood smear.



Lymph Node Sample/Oedematous Fluid

- To create a smear from a lymph node make a direct impression of the cut surface of a lymph node onto the slide or draw a drop of fluid across a slide as for a blood sample.
- Alternatively or a plain swab can be used to collect material and a smear made by rolling it across the microscope slide.
- The same methods can be used for oedematous or peritoneal fluid.
- Any incisions made to collect these samples must small and made with care. They must be plugged to prevent further leaking after samples have been taken.

Examination of Slides

- Smears must be prepared on the premises as samples are taken. No parts of the carcass should be removed to facilitate the creation of smears on another premises.
- Slides must always be stained and examined by an OCQ(V) - SS holder. Ideally this will be on the premises but, if this is not possible, they may be taken back to the practice for completion of this stage.
- The microscope slides and swabs must be transported in an appropriate leak-proof container, where the slide surfaces are protected e.g. plastic microscope slide mailer.

Reference Material

- APHA Vet Gateway for OV instructions:
http://apha.defra.gov.uk/External_OV_Instructions/Anthrax/Updates/index.htm
- Improve International for OV training: <https://improve-ov.com/home/>
- Defra Approved Disinfectants:
http://disinfectants.defra.gov.uk/DisinfectantsExternal/Default.aspx?Module=ApprovalsList_SI