

Manual 7

Sample collection and transport



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Background

Achieving an accurate and timely diagnosis is a vital component of FMD surveillance and control. In addition, detailed laboratory analysis of virus isolates can provide valuable epidemiological data that can be used to monitor transmission pathways and support appropriate vaccine selection, both nationally and regionally. In order to achieve this, it is essential that the correct samples are selected for submission, and that these are collected, handled and transported in a manner which maximises the chance of identifying FMD virus (or antibodies) if they are present.

Although clinical signs can provide a high index of suspicion for FMD infection, a positive diagnosis cannot be made without laboratory confirmation. In addition, not all animals infected with FMD will exhibit clear clinical signs (vaccinated animals, animals at incubating or subclinical phases, animals with some natural immunity, certain species such as small ruminants and some wildlife species). Therefore, sample collection forms an essential part of a response to a suspected outbreak of FMD and for serological surveillance programs.

This manual provides information on selection of samples (selecting the animals from which to take samples and the type of samples to take from those animals), together with information on collecting, handling and transportation of samples. Details and references are provided as a guide for packaging, labelling and other requirements for sample submission to the OIE Reference Laboratories (RL) for Foot-and-Mouth Disease in Pakchong, Thailand, and in Lanzhou, China, and the FAO World Reference Laboratory / OIE Reference Laboratory for Foot-and-Mouth Disease (WRLFMD) in Pirbright, UK. Detailed requirements for domestic shipping and submission to national laboratories is not included here, but this information should be made available to personnel responsible for sample collection and submission.

This manual should be used alongside Manuals 6, 8 and 10 as these are highly related and with the chapters 1.1.2. and 1.1.3. of the *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*.

Sample collection and emergency preparedness

Preparations for successful sample collection and submission should be in place in readiness for possible disease

outbreaks, rather than starting at the time of an outbreak. When samples are collected in an outbreak situation there will be little warning and it is therefore important to have trained personnel and suitable equipment prepared in advance. It is also important that field veterinarians are able to make contact with laboratories for advice if needed. Therefore, current contact details for local, national and reference laboratories should be made available to field staff at all times.

Why are samples collected?

There are several reasons why samples may need to be collected for detection of FMD virus or antibodies, including but not restricted to the following:

- Outbreak investigation – diagnosis of FMD in suspected cases or possible contacts
- Serological surveillance programs to estimate prevalence of disease in an endemic setting
- Serological surveillance programs to demonstrate freedom from FMD infection or transmission
- Post-vaccination monitoring
- Research purposes

The types of samples that should be collected will depend on the purpose of the investigation, the timing of sample collection in relation to any clinical disease, and the FMD- and vaccination-status of the population under investigation. Recommendations regarding types of samples that may be collected are included in the section on Sampling Plans.

Who should collect samples?

In an outbreak situation, samples will generally be collected by the veterinary officers appointed to investigate the outbreak. Whoever is appointed to collect samples should be aware of this responsibility before the outbreak occurs and be adequately trained to carry out this role. The information provided in this manual can be used for preparing suitable equipment, training staff and improving sample selection and quality. However, it is important that details of sample collection, storage, transport and submission are also checked with the laboratory to which the samples will be submitted in case of any specific requirements.

What equipment is needed?

The equipment needed for collection of samples for diagnosis of FMD should be accessible to those veterinarians who will be responsible for investigating an outbreak. A minimum set of equipment is provided below:

- Equipment for restraint of livestock (see later section on restraint)
- Equipment for biosecurity relating to veterinary officers responsible for taking samples or assisting with sample collection (adapted from USDA APHIS, 2013):
 - 2 Tyvek or similar suits
 - disposable boots
 - disposable gloves
 - Bucket and brush for cleaning boots and equipment
 - Broad-spectrum surface disinfectant
 - Fingernail brush
 - Hand sanitizers
 - Garbage bags
 - Re-sealable bags (zip-lock)
 - Fresh/clean Water supply where water is unavailable or possibly contaminated
- Supply of plain blood tubes/vacutainers (no anti-coagulant) and sample pots
- Suitable needles for blood collection
 - 18-gauge, 1 ½ inch needles for blood collection from cattle and pigs (jugular collection) (either to fit a syringe or for direct collection into a vacutainer)
 - 20-gauge, 1 inch needles for blood collection from small ruminants (either to fit a syringe or for direct collection into a vacutainer)
- Vacutainer blood collection tube holders (for needle attachment)
- Narrow (e.g. 23) gauge needles for collection of vesicular fluid
- Sterile forceps and surgical scissors
- Swabs
- Probang equipment if necessary (see below)
- Alcohol and swabs/cotton wool for preparation of blood collection site
- Syringes (range of sizes: 5ml and 10ml should be sufficient)
- Suitable transport media (as advised by the laboratory to which samples will be submitted)

- Suitable containers for transportation of samples (see later section on laboratory sample submission requirements)
- Copies of submission forms (if available) from diagnostic laboratories
- Contact details for relevant laboratories (local, national, RL and WRL)

Which samples to take and when?

Selecting the most suitable animals to sample, and the tissues to take for sampling, is an important component of sample collection as this will maximise the chances of identifying FMD virus or detecting antibodies if they are present as well as preserving the scientific validity of conclusions that may be drawn, such as part of a serological surveillance. Which samples are collected will depend upon the purpose of the sampling and the stage of infection of the animals to be sampled.

For surveillance to determine the level of immunity in a population, following vaccination, or where animals are tested for previous exposure to FMDV, samples will need to be collected for antibody detection. Alternatively, in an outbreak situation there are likely to be some animals which are displaying clinical signs of disease while some

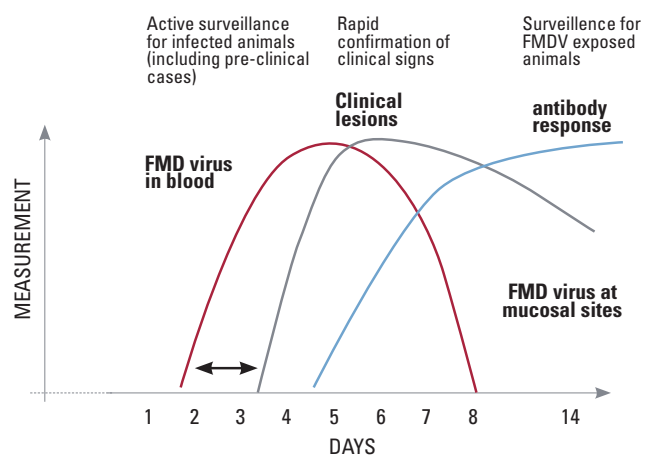


Figure 1: This graph indicates the presence of virus in different tissues or fluids in an animal infected with FMDV and the presence of antibodies, relative to the onset of clinical signs (Paton and King (date unknown)). The type of testing applied at different times in the course of infection is indicated at the top of the graph

may not be infected at all, others may be infected but not yet showing clinical signs (incubating) and still others have recovered from the acute signs of disease. The virus (or antibodies to the virus) will be detectable in different tissues/fluids depending on the stage of infection (see Figure 1) and therefore, the most appropriate tissue to sample will differ.

If animals are clinically affected, the preferred areas to sample are material from the lesions on the mouth, feet or teats. For animals not showing obvious clinical signs (non-infected, infected but sub-clinical/subtle clinical signs, incubating or recovered) serum may be useful as this can be tested for virus (present in early stages of infection) or antibody (present from approximately 3-4 days after the appearance of clinical signs).

Sampling Plans

The following plans are intended as a guide to which samples to collect and which laboratory tests to apply depending upon the purpose of the investigation and the timing of sampling in relation to any clinical disease present. The purpose of investigations and sampling/diagnostic approaches may differ depending upon the FMD status of the country or zone, thus a separate plan is provided for each of the following:

- FMD-free country or zone (without vaccination)
- FMD-free country or zone (with vaccination)
- FMD-endemic country

FMD-free country or zone (without vaccination)

PURPOSE	LABORATORY INVESTIGATION REQUIRED	SOURCE OF SAMPLE	TYPES OF ASSAY	COMMENTS
Investigation of a suspect case	Agent Identification	Lesions in the mouth or on feet (vesicular fluid, epithelium)	Virus isolation, PCR, Antigen ELISA	Dependent on fresh lesions to optimise detection
		Blood (Serum)		Potential source of FMDV during the viraemic phase
		Milk		Milk may be easily collected from dairy animals, and can be a source of FMDV during the viraemic phase
	Serological Tests	Blood (Serum) from multiple animals reported to have shown clinical signs	Antibody assay	NSP to detect infection. May need to be repeated at least 2 weeks after onset of clinical signs if the investigation is early in an outbreak. Serotype specific antibody (SP or VNT assays) may be used to investigate the serotype of FMDV if isolation of virus from lesions is not possible, but is only useful in unvaccinated animals.
Surveillance to demonstrate no evidence of infection	Serological Tests	Blood (Serum)	Antibody assay	NSP only. Should be part of a defined surveillance plan. See Code Article 8.8.42.

FMD-free country or zone (with vaccination)

PURPOSE	LABORATORY INVESTIGATION REQUIRED	SOURCE OF SAMPLE	TYPES OF ASSAY	COMMENTS
Investigation of a suspect case or outbreak	Agent Identification	Lesions in the mouth or on feet (vesicular fluid, epithelium)	Virus isolation, PCR, Antigen ELISA	Dependent on fresh lesions to optimise detection
		Blood (Serum)		Potential source of FMDV during the viraemic phase
		Milk		Milk may be easily collected from dairy animals, and can be a source of FMDV during the viraemic phase
	Serological Tests	Blood (Serum) from multiple animals reported to have shown clinical signs	Antibody assay	NSP only. May need to be repeated at least 2 weeks after onset of clinical signs if the investigation is early in an outbreak. Measurement of specific antibody (SP or VNT assay) is not useful in a vaccinated population, except for PVM (see below).

Surveillance to demonstrate no evidence of infection in unvaccinated animals, and no evidence of transmission in vaccinated animals	Serological Tests	Blood (Serum)	Antibody assay	NSP only. Should be part of a defined surveillance plan. See Code Article 8.8.42.
Post Vaccination Monitoring	Serological Tests	Blood (Serum)	Antibody assay	Monitor the prevalence of infection, response to vaccination, and the efficacy of a vaccination programme, via NSP and serotype specific assays (SP or VNT) as per the Global PVM Guidelines.

FMD-endemic country

PURPOSE	LABORATORY INVESTIGATION REQUIRED	SOURCE OF SAMPLE	TYPES OF ASSAY	COMMENTS
Investigation of a suspect case or outbreak	Agent Identification	Lesions in the mouth or on feet (vesicular fluid, epithelium)	Virus isolation, PCR, Antigen ELISA	Dependent on fresh lesions to optimise detection. Where there are delays in reporting and/or investigation, fresh lesions may not be available. Collection of probang samples may be useful to identify chronically-infected animals.
		Blood (Serum)		Potential source of FMDV during the viraemic phase
		Milk		Milk may be easily collected from dairy animals, and can be a source of FMDV during the viraemic phase
	Serological Tests	Blood (Serum) from multiple animals reported to have shown clinical signs	Antibody assay	NSP only. May be of limited value in an endemic setting, as NSP titres may persist for more than one year, so establishing the link between positive NSP titres and a specific infection may not be possible. Collection of samples from animals aged under 1 year may be useful to confirm an infection where there are delays in reporting and/or investigation, but note that the presence of maternal antibody may complicate analysis of results in young animals.
Surveillance to investigate FMD prevalence	Serological Tests	Blood (Serum)	Antibody assay	NSP only. Should be part of a defined surveillance plan. See OIE Terrestrial Animal Health Code Article 8.8.42. Measurement of serotype specific antibody is of limited value in an endemic setting, (except for PVM; see below).
Post Vaccination Monitoring	Serological Tests	Blood (Serum)	Antibody assay	Monitor the prevalence of infection, response to vaccination, and the efficacy of a vaccination programme, via NSP and serotype specific assays (SP or VNT) as per the Global PVM Guidelines.

Sample collection methods

Sampling lesions

Lesions represent the richest source of FMDV, so the sample of choice for detection of the virus is vesicular fluid or epithelium from vesicles. It is important that animals are restrained well for sample collection (and sedated if considered necessary for personnel safety and animal welfare), as the lesions will be painful and the animal will resist handling of affected areas. Methods of restraint are outlined later in this manual.

The following principles should be followed for collection and handling of samples from lesions:

- Samples should be as fresh as possible when received by the laboratory and should be sent urgently and by the most direct route
- Always contact the laboratory before sending to inform them that the samples are being sent and the estimated time of arrival
- Ensure they are suitably labelled as hazardous biological material (see below)

- Keep cool but not frozen (unless advised by the laboratory) from collection until delivery at the laboratory
- Use buffered media (as described below)
- Adequate quantities of tissue/fluid should be collected and submitted
- Use a separate tube/container for each animal
- Ensure that the samples are appropriately and clearly labelled (see section below on Labelling)
- Complete a laboratory submission form with all required and relevant information
- Labelling, packaging and transport recommendations are provided below

Epithelium

Epithelium can be taken from vesicles (either un-ruptured or recently ruptured) or from around the edges of erosions. Fresher vesicles are the preferable sites for sample collection.

Up to 2cm² or 1g of epithelium is ideal from foot, mouth or teat lesions. If this is not available, then as much as possible should be collected for submission. Samples from fresh lesions may rub off or you may need to gently grasp the epithelium with forceps before cutting a section away (Britton, 2015).

Figure 2 shows an example of epithelium from a ruptured vesicle on the tongue.



Figure 2: A ruptured vesicle on the tongue of a cow. (Photo: Emma Roffey, Mekong Livestock Research <https://mekonglivestock.wordpress.com/photos/>)

When collecting epithelium samples, it is important not to confuse epithelium with a fibrin clot (Figure 3). Fibrin forms over ruptured vesicles during the healing process

and may appear similar. However, fibrin tends to break down more easily and crumble when handled compared to epithelium.



Figure 3: Four-day old lesions with extensive fibrin clots (DEFRA)

On collection, the epithelial samples should be placed in a suitable transport media which maintains the epithelium within the required pH range. Kitching and Donaldson (1987) recommend that the specimens are suspended in a mixture of equal amounts of glycerine and 0.04 M phosphate buffer pH 7.2.-7.6, preferably with added antibiotics. There will be considerable loss of viability if samples are sent in buffer outside of this pH range. Details of this buffer and antibiotics can be found in the paper by Kitching and Donaldson (1987) but advice on suitable transport media should also be sought, prior to collection of the samples, from the laboratory to which the samples will be submitted.

Vesicular Fluid

If an un-ruptured vesicle is available (Figure 4), fluid can be withdrawn from within the vesicle and submitted in a plain tube or sterile sample container. Up to 5ml fluid may be collected and should be placed in a container that is suitable for the volume of fluid to allow for easier recovery of the fluid from the container at the laboratory (Britton, 2015). The fluid should be collected using a sterile needle (narrow gauge e.g. 23g) and syringe.

Sampling Blood (for serum)

Serum may be used for identification of the agent during an active outbreak, and for detection of antibody following a suspected outbreak. It is also used in serological surveillance studies and post-vaccination monitoring (PVM) for detection of antibodies resulting from exposure to FMD virus or vaccination.



Figure 4: an un-ruptured vesicle in the interdigital space (The Cattlesite)

For specific details on methods of blood collection from small ruminants and cattle refer to Shabbir, *et al.*, 2013 and for blood collection in pigs refer to the following link: (<http://www.dpi.nsw.gov.au/agriculture/livestock/animal-welfare/general/livestock/sop/pigs/blood-collection>) and the New South Wales Department of Primary Industries website.

- Serum should be collected using a sterile needle and syringe or a plain vacutainer (no anti-coagulant)
- At least 4ml of serum should be submitted. Therefore, it is preferable to collect at least 5-10ml whole blood
- Ensure that the area from which the sample is collected is clean (free from gross contamination)
- Sterile technique should be used during sample collection
- The blood is usually collected from the jugular vein under South-East Asian conditions, based on the restraint methods generally available
- Once collected allow the sample to stand (in a cool area, out of direct sunlight) for at least 15 minutes to allow clot formation
- Serum should be separated before submission to the laboratory. The sample should be centrifuged or, if this is not available, stand the sample in an upright position overnight
- During this time, the samples should be kept in a refrigerator or a cool box. If a cool box is used, the ice-packs should be sealed to prevent wetting of sample packaging which could result in spoilage of sample labels
- Place serum into a plain, sterile tube and send to the laboratory

- If dispatch to a laboratory is delayed, serum samples should be frozen and stored at -20°C
- Samples from different animals should not be mixed
- Labelling, packaging and transport recommendations are provided below

Probang samples and pharyngeal swabs

Where epithelial samples are not available from ruminant animals (in advanced or convalescent cases), or where infection is suspected in the absence of clinical signs (carrier animals), probang samples (ruminants) or pharyngeal swabs (pigs) can be collected. These samples are used for detection of virus from the oropharyngeal area, from where virus may be present during the acute stage of disease and for a variable period after recovery from the clinical stage of FMD. Probang sampling is also used for identification of persistently infected individuals.

Laboratories to which samples will be submitted should be contacted prior to collection of probang samples as not all laboratories will have the capacity to run the necessary tests on this material. Probang sampling is a method which requires some skill and should only be carried out by someone competent in this method.

For more information on collection of probang samples, the reader should consult the laboratory to which the samples will be sent, and can access some additional information within the following references (Kitcing and Donaldson, 1987; Institute for Animal Health, 1998; USDA APHIS, 2008).

The following instructions on how to perform a probang on ruminants are taken from USDA APHIS, 2008:

1. Restrain the animal and open the mouth
2. Pass the probang cup (figure 5) over the root of the tongue
3. Place one hand on the skin over the pharyngeal area and continue to introduce the probang cup until it can be palpated through the skin in the upper part of the oesophagus
4. Pass the probang cup backwards and forwards several [5-10] times, each time pushing far enough forward to push the cup into the cranial oesophagus as evidenced by slight resistance to forward movement
5. Gently withdraw the probang cup, keeping it upright to ensure that the OP fluid remains inside
6. Visually inspect the material

7. Add equal (to the amount of OP fluid) volume of transport media (tris buffered tryptose broth (TBTB) or other recommended by the laboratory)
8. Gently shake the mixture. If TBTB is used, this should have a pink to orange colour as an indication of the neutral pH. Yellow colouration indicates unfavourable pH for the FMD virus to survive
9. Collected sample that is contaminated with ruminal contents will be acidic and must be discarded
10. In these cases, sampling should be repeated once the mouth of the animal has been rinsed with water or phosphate buffered saline
11. Samples seen to contain blood are not desirable but may be suitable for testing
12. Label each tube with date of collection, sample type and animal ID, and immediately place in a cooler containing ice packs

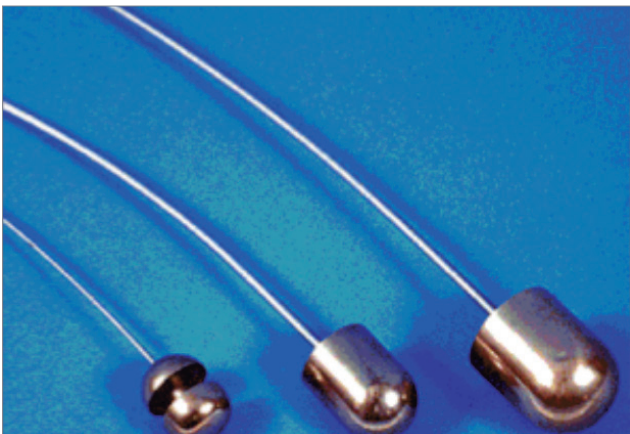


Figure 5: Probang cups (AVIS consortium)

Restraint for sample collection

It is important that livestock are well restrained for collection of samples, particularly blood samples which require close contact with the animal for several seconds to minutes while the sample is collected. In a field situation, achieving adequate restraint can be challenging. Readers are referred to information provided by Cameron, 1999 on restraint of livestock where advanced handling facilities are not available.

The 'bleeding pole' as described by Cameron (1999) enables good restraint of cattle for blood collection. Figure 6 shows the use of a bleeding pole for blood collection. This may also be used for restraining an animal for collection of

tissue/vesicular fluid samples from the mouth. The animal would be haltered in order to restrain the head and nose-grips may be used if additional restraint is required.



Figure 6: An illustration of the 'bleeding pole' being used (Source: Illustration by Kongphat Luangrath (Cameron, 1999))

For animals which are permanently haltered with the halter passing through the nasal septum, these can be restrained relatively well by passing the rope attached to the halter around a solid post or tree (Figure 7). Note that the rope should be held and not tied, once it has been passed around the tree. This allows for rapid release of the animal if required.



Figure 7: A buffalo being restrained using a permanent halter for blood sampling in Myanmar (photo: Polly Smith)

Small ruminants can generally be restrained adequately by another person holding the animal in a suitable position, without the need for additional aids (Figure 8).

For piglets and small pigs, adequate restraint may be achieved by simply holding them. However, larger pigs may be restrained using a pig snare (Figure 9). If this is not available, a simple length of rope with a sliding loop in one

end can be used. For details on how to restrain different sized pigs, including the use of a pig snare, refer to Cameron (1999) and The Pig Site (2008).



Figure 8: Manual restraint of a goat for blood collection from the jugular vein (photo: Polly Smith)



Figure 9: A pig snare (source: www.farmerboyag.com)

Biosecurity

When visiting outbreak areas for the purposes of sample collection, or even when samples are collected from apparently healthy animals for routine monitoring purposes, strict biosecurity precautions should be taken by personnel involved. It is very important that all people implement good personal biosecurity measures as well as thorough cleaning and disinfection of any vehicles or equipment used so that they do not transmit FMD virus to other areas. Refer also to Manuals 8 and 11 for details.

Sample collection and transport

Labelling, packaging and dispatch of materials to laboratories

For each of the SEACFMD Member Countries, field veterinary officers (those responsible for surveillance or disease investigation) should be provided with clear instructions on the collection of samples in different situations (this can be copied from this manual) and where the samples should be sent. This should include details on:

- Which laboratory to send specific samples to (if there is capacity locally for running rapid testing in times of an outbreak, then this information should be provided to veterinary officers)
- Contact details for the national laboratory so that field officers can clarify information about sample collection and submission requirements
- Details of requirements for packaging and labelling for transportation to the laboratory

Labelling of Samples

Each sample should be individually labelled, to include at least the following information:

- Date of sample collection
- Sample number, that can be linked to more detail that is included on the submission form, such as animal ID etc)
- Type of tissue (eg epithelium, vesicular fluid, blood)
- All labelling of the sample should be made in indelible ink

Completion of Laboratory Submission Form

The laboratory submission form should be completed accurately, and should include at least the following information:

- Date of sample collection and submission
- Location of the premises
- Diseases suspected and tests requested
- The species, breed, sex, age and identity (if available) of the animals sampled
- The vaccination status of the animals (if known)
- List of samples submitted with transport media used (if relevant)

- A complete history of the disease investigation
- All paper records should be placed in a sealed plastic sleeve to prevent wetting of paper documents
- Where available, officers should consider the use of Smartphone technology to accurately identify the location of sample collection. With location Apps activated, take a photo of the completed submission form and email this to the laboratory. This photo will have GPS coordinates attached to the photo, which can then be input by the laboratory to the submission records
- **Blood:** Blood samples should be collected under sterile conditions. The serum should be separated by centrifugation soon after collection (where centrifugation is not available, blood samples should be allowed to stand overnight before separating the serum from the sample) and kept in screw cap vials with O-rings. Serum samples should be kept at -20 °C before dispatch

Packaging of samples

Samples must be packed in a primary and secondary IATA approved container so that the samples arrive in good condition and do not present any hazard to persons or animals during shipment. It is essential that the contents of containers which break or leak during transit do not contaminate the outside layer of the package. To find out about ordering these containers, interested parties should contact staff at RL or OIE SRR-SEA. The recommended procedure for packing samples is as follows:

- Samples must be put a primary container (glass or plastic tubes or bottles) with screw caps and wrapped with paraffin film or adhesive tape individually in order to prevent leakage of fluid. The wrapping of bottles or primary containers should be carried out in clean surroundings
- The primary container must be packed in watertight secondary packaging, which should be a strong crushproof and leak-proof metal container. The container should contain absorbent cotton wool sufficient to absorb the entire contents of the primary container
- The secondary packaging must be placed in an outer container. This should be a polystyrene foam box covered with a hard box or IATA approved container
- Sufficient information and a list of samples or materials should be enclosed in an envelope, enclosed in a plastic bag and placed between the secondary packaging and outer box
- It is recommended that a freezer box is put outside the secondary packaging to ensure that all materials are kept cool during shipment. These packs should be pre-frozen at -20 degrees centigrade before packaging
- If dry-ice is used for packaging, it must be placed outside the secondary packaging. Dry ice must not be placed within the primary packaging as it may cause breakage of the sample tubes

Packaging and dispatch of materials to reference laboratories

Reference laboratory (Pakchong, Thailand)

The following information relates to collection, packaging and dispatch of samples to RL Pakchong and is based on information produced by RL Pakchong. When collecting and submitting samples to be sent to RL Pakchong, the following guidelines should be followed. It is imperative to ensure that laboratories are contacted prior to samples being collected to ensure that samples are collected, processed and packaged in accordance with the requirements of individual laboratories. It is also essential that the submitting institution contacts the laboratory prior to dispatching samples to ensure that samples can be cleared when they arrive.

For further information on packaging and dispatch of samples to RL Pakchong, contact the laboratory at: Tel: +66 44 279112 or Fax: +66 44 314889.

Sample collection and primary containers

- **Epithelium:** A minimum of 2cm x 2cm piece of epithelial tissue should be collected. The tissue should then be placed in a strong container or bottle with a screw cap, suspended in a mixture of 50% glycerin with 0.04 phosphate buffer pH 7.2 – 7.6 with added antibiotics. There will be considerable loss of infectivity if samples are sent in a buffer outside of this pH range
- **Vesicular Fluid:** At least 1 mL of vesicular fluid must be collected and packed, as it is, in a tightly closed, screw-cap vial. The vial must be kept at freezing temperature if immediate transport to the FMD laboratory is not possible

Labelling

The outer surface of the package must be clearly labelled with the following details:

- The name of submitter and address of institute submitting the samples
- Contact telephone numbers
- Infectious substance hazard label - Category B UN3373 labelling or UN2900 labelling (infectious substance) as appropriate
- Flight number and estimated arrival time
- Airway bill number
- Dry ice label (if necessary)
- The package should be addressed as follows:

PATHOLOGICAL MATERIAL OF NO
COMMERCIAL VALUE

Department of Livestock Development
Reference Laboratory for FMD in South East Asia
Pak Chong, Nakhonratchasima, 30130
THAILAND
Tel: +66 44 279112 Fax: +66 44 314889

PERISHABLE FRAGILE KEEP AT 4 °C

Dispatch

All biological materials must be sent by airfreight direct to Suvarnabhumi International Airport. Before dispatching samples, the sender must notify the RL at Pak Chong by facsimile (+66 44 314889). The institution submitting the

samples should provide details of the airway bill number, flight number and time and expected date of arrival of the package in Bangkok, Thailand. Staff of the Department of Livestock Development (DLD) and Regional Reference Laboratory will clear the parcel through customs at the airport. The parcel will be collected and taken to Pak Chong by staff of the Reference Regional Laboratory

Reference Laboratory (Lanzhou, China)

For details on sample collection, packaging and dispatch to RL Lanzhou, information may be found at the following contact details:

Lanzhou Institute of Veterinary Research
Address: No.1, Xujiaping, Lanzhou City, Gansu Province, P.R. China
Contact person: Li Xiaoping
E-mail: lsykyc@caas.cn

FAO World reference laboratory / OIE Reference Laboratory (Pirbright, UK)

Full details on packaging and dispatch of materials to the World reference laboratory in Pirbright can be found at the following link (http://www.pirbright.ac.uk/ref_Labs/Default.aspx). This page also provides a video demonstrating how to package biological material for shipment and copies of submission forms which can be downloaded. Suitable packaging materials for transport to the WRL should be held in stock so that they are ready to be used when needed.

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