

CHAPTER 18

EPIDEMIOLOGY

INTRODUCTION

The FMD contingency plan requires the involvement of expert epidemiology groups at both the National Disease Control Centre and the Local Disease Control Centre. This chapter describes the functions of these groups, the reports to be completed by them and the protocols to be followed by personnel involved in tracing and surveillance.

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1. NATIONAL EXPERT EPIDEMIOLOGY GROUP

- 1.1** The **National Expert Epidemiology Group** exists to assist and advise the CVO on contingency matters during ‘peacetime’. In the event of an outbreak this group provides its expertise directly to the NDCC. **NB. This group is separate to the Expert Advisory Group set up to advise the Minister on general preventive measures.**
- 1.2** During an FMD outbreak, the **role** of the group will be to:
- Evaluate the epidemiological situation nationally
 - Advise on screening and sampling procedures to be adopted
 - Liaise with National Reference Laboratory (IAH, Pirbright)
 - Assist the epidemiological investigation at the LDCC by providing meteorological and geographical information, as well as expert advice
 - Advise on national strategy to be adopted
 - Perform risk assessments and conduct modelling.
- 1.3** The National Expert Epidemiology Group comprises:
- A virologist
 - An epidemiologist
 - A meteorologist
 - A mapping expert
 - An expert on carcase disposal.
- 1.4** The group will have access to an individual or individuals with the requisite skills and equipment (hardware and software) to undertake modelling projects.

2. EPIDEMIOLOGICAL INVESTIGATION BY THE LOCAL EPIDEMIOLOGY TEAM

2.1 The epidemiological investigation into an outbreak of FMD will be carried out by a specialised **Local Epidemiology Team** attached to the LDCC. The team will be designated by the NDCC and will report to both the officer-in-charge of the LDCC and to the NDCC.

2.2 Staff

a) The Local Epidemiology Team will comprise:

- 1 SVI and 2 VIs (at least one of whom is from the local DVO)
- 1 DS and TAO staff from the local DVO
- Other staff as required e.g. virologist, Research Officer, Special Investigation Unit (SIU), Gardai, Teagasc.

2.3 Meteorological and virological information will be supplied through the National Expert Epidemiology Group at the NDCC.

2.4 On establishment of the LDCC, the Local Epidemiology Team will proceed there immediately and report to the officer-in-charge.

2.5 The role of the Local Epidemiology Team is to:

- investigate the origin and possible spread of the disease
- examine and risk assess the surveillance reports
- advise on operational strategy.

2.6 Investigate the outbreak

a) Determine the extent of infection on the holding.

b) Determine how long disease has existed on the holding, i.e. when the disease was introduced. Interpret laboratory results and the ageing of lesions will assist in this. If necessary a virologist or RO may need to be consulted.

c) Determine the likely source of the disease.

d) Assess the risk of spread of disease from the holding by analysing the movement of animals, people, vehicles and machinery on and off the farm in the relevant period.

e) Assess the risk of wind-borne spread of disease from the holding, taking account of the species of animal infected and the local meteorological and topographical conditions. This will be done in liaison with the National Epidemiology Expert Group.

f) Liaise with laboratory personnel on the need for further testing, including serology.

2.7 Examine and risk assess surveillance reports

Assess surveillance reports from VIs engaged in field visits. Following this assessment, make recommendations regarding further action.

2.8 Advise on operational strategy

Based on information gathered in the course of the investigation, make recommendations to the officer-in-charge of the LDCC on:

- a) the extent of the various control zones
- b) sampling strategies in the control zones
- c) frequency and distribution of surveillance visits
- d) risk analysis and recommendations regarding preventive slaughter.



3. PROTOCOL FOR INVESTIGATION OF CONFIRMED INFECTED PREMISES

3.1 Following analysis of the field VI's Suspect Premises Report, a team member, accompanied if necessary by an RO and a member of the Special Investigation Unit, will visit the farm to:

- assess the age and extent of FMD lesions in all species, thus establishing the extent of disease and estimating the likely date of introduction of disease to the holding
- conduct in-depth interviews with the herd/flock owner, family members and farm workers to establish the sequence of events and all possible contacts
- walk the boundaries of the farm to assess the security of fencing and the general bio-security measures in place on the farm and to identify the directly contiguous herds/flocks
- produce a list of high-risk contacts following this visit and to give priority ratings (in addition to any such list already reported by the field VI). The list will be passed to the Tracing Group for follow up action
- assess the need for further testing, including serology, on the farm and on contact premises.

4. REPORTING

4.1 The SVI in charge of the team will inform the officers-in-charge of the LDCC and the NDCC of the preliminary findings as soon as possible **by telephone**.

4.2 Preliminary Epidemiological Report

- a) A Preliminary Epidemiological Report should be produced and transmitted to the NDCC as soon as possible (certainly within 24 hours). This report should be based on the initial report from the field VI and the visit by the team member, plus any other material information that has come to light. A copy of the report should be made available to the SIU if necessary. This report should include the following;
- the name and address of the herd/flock owner, the herd/flock number, the address and map co-ordinates of the infected premises and other out-farms, enterprise type and farm census
 - the disease situation at the time of slaughter, i.e. the number and species affected and age of lesions
 - a map of the infected premises (giving details of the location of susceptible species and the distribution of infected stock) and contiguous holdings
 - an estimate of the most likely time of introduction of the disease
 - an indication as to the likely source of the disease
 - a list of the contacts established and the recommended action to trace these.

4.3 Final Epidemiological Report

- a) A final epidemiological report should be produced, based on the preliminary report, together with additional information from the detailed follow-up investigation. It should include laboratory results and an examination of the wider picture of disease in the locality.
- b) This report should be submitted to the NDCC and the National Expert Epidemiology Group.
- c) A copy should also be transmitted to the FMD Payments Section.

5. RISK ASSESSMENT OF CONTACT HOLDINGS

While completing the field VI's **Telephone Report Form** and the **Suspect Premises Report Form** (see Chapter 27, **Forms**), a list of contacts should be drawn up.

This should be added to, as appropriate, after contiguous herd lists (from the CONTIGUOUS HERD and HERDFINDER facilities) and virus plume data supplied by the CVERA (see Chapter 6, **Mapping**) have been generated.

Each type of contact with each flock/herd should be assessed and put into one of the following categories, by a member of the Local Epidemiology Team and the action appropriate to that category initiated.

5.1 High risk

- a) Examples:
 - Susceptible animals moved on/off the infected farm in the period prior to diagnosis. The length of this period will be determined by the Local Epidemiology Team, based on the earliest possible date of introduction of disease.
 - Personnel that have had close contact with susceptible animals, and have moved on to other farms, i.e. veterinary surgeons, AI operatives, farm relief workers, sheep shearers, neighbouring farmers/farm workers
 - Milk tanker collections (before and after collection on suspect farm)
 - Contiguous herds/flocks
 - Farms located within the virus plume.

b) Action to be taken:

- Identify any herds and/or flocks which may have supplied potentially infected animals or to which potentially infected animals may have been supplied or which were visited by personnel before or after visiting the infected farm
- Restrict immediately using **Form D**. This may be upgraded to **Form B +/- Form A** depending on the outcome of the clinical inspection and following consultation with the NDCC (See Chapter 1, **Procedures when FMD is suspected**).
- At a minimum these holdings require clinical inspections at:
 - 48 hour intervals for the first week after exposure
 - 72 hours for the second week
 - final visit 21 days after exposure
- arrange clinical inspections and sampling (see protocol in **Annex** below)
- If authorisation for preventive slaughter has been given by the NDCC, instruct Slaughter/Disposal Section at the LDCC to arrange slaughter and brief the team on any examinations or sampling to be carried out.

c) Under Article 8 of Council Directive 85/511/EEC, the following minimum periods of restriction apply:

- Tracing **on** – 15 days
- Tracing **off** – 21 days

A derogation may be allowed for animals to go for emergency slaughter under official supervision following clinical examination of the herd.

The measures may be applied to part of a holding in the case of movements **on** – providing animals are housed, kept and fed separately.

5.2 Medium risk

a) Examples:

- Farms visited by vehicles, e.g. feed truck or agricultural contractors, after the vehicle has been on the infected holding.

b) Action to be taken:

Pass the contact on to the Surveillance Section of the LDCC for follow-up action, i.e. **Form D** restriction and clinical examination and participation in surveillance programme. This requires clinical inspections at:

- 48 hour intervals for the first week after exposure
- 72 hours for the second week
- final visit 21 days after exposure.

5.3 Low risk

a) Examples:

- Visitors to the infected holding with minimal animal contact, e.g. utility employees.

b) Action to be taken:

- Obtain a list of these visitors and pass to Tracing Section
- Tracing Section will investigate their subsequent movements and establish if they have access to susceptible animals
- Any holdings felt to be at risk should be placed on a surveillance programme at the LDCC or a request forwarded to the NDCC for action by another DVO (depending on the location).

6. NUMBER OF IN-CONTACT HOLDINGS TO BE TRACED

- 6.1** In the period before the disease is diagnosed, people, vehicles and equipment will have moved onto a number of other holdings from the infected holding.
- 6.2** The number of in-contact holdings that should be traced will depend on the size of the outbreak and the availability of resources.
- 6.3** Ideally, all movements by a person, vehicle or equipment in the **three working days** following the contact with an infected holding should be traced.
- 6.4** At the very least, all holdings visited by a person, vehicle or equipment on the **same day** as the visit to the infected holding should be traced and inspected.
- 6.5** Artificial Insemination technicians (or other personnel which may have had close contact with susceptible species on several farms each day) may have made many visits in the three working days following contact with the infected premises. Depending on the extent of the hygiene precautions taken by individuals, priority should be given to tracing the first 3 visits made after the contact with the infected premises.
- 6.6** The frequency of surveillance visits in the 3 km Protection zone should be similar to that for high-risk traces, i.e. at 48 hour intervals for the first week after confirmation of disease, followed by 72 hours for the second week, with a final visit at twenty-one days.

7. TRACING OF MEAT, MILK AND SEMEN/OVA/EMBRYOS

- 7.1 Article 5 of Council Directive 85/511/EEC requires the tracing and destruction of meat originating from all susceptible species on the infected holding between the probable date of introduction of disease and the date of restriction of the holding.
- 7.2 Article 10 of the current draft Commission proposal to amend the Directive (Document COM (2002) 736 final) also requires the tracing and destruction of milk and milk products, and semen, ova and embryos produced during the same time period.
- 7.3 As soon as these details have been determined by the Local Epidemiology Team they should be faxed or phoned to the NDCC so that the relevant products can be traced and destroyed under official supervision.

8. TRACING PROCEDURES FOR FMD

The Local Epidemiology Team will record traces both manually and using computer systems. This data will then be supplied to the Tracing Section for follow-up action.

8.1 Manual system

- a) Obtain list of contacts that require tracing from the **Suspect Premises Report**.
- b) If necessary, obtain further information from owner of the herd on the IP. There may have been additional contacts to those listed in the Suspect Premises Report.
- c) If necessary, get more information from the owners of the premises listed in the report.
- d) Complete the **FMD-T Request Forms** (T stands for trace).
- e) Fax request forms to NDCC and follow up by telephone for allocation of an FMD-T reference number for each trace premises.
- f) If the contact requiring tracing is **outside the area of the LDCC**, the NDCC will ensure that the appropriate follow-up action is undertaken by the relevant DVO.
- g) For traces involving herd owners **in the area of responsibility of the LDCC**:
 - Give a copy of the FMD-T Request Forms to the person in charge of the Surveillance Section and request that the visits are carried out in accordance with the instructions on the form (e.g. clinical, sampling)
 - Ensure after clinical inspection that a copy of the **Tracing Report Form** is put on the file of the contact holding
 - Manually check that the visit has been carried out and relevant action taken as requested, e.g. sampling

- Ensure that the relevant restriction notice has been served on the herd owners
- Ensure that a copy of the relevant restriction notice is placed on the file of the contact holding
- When suspicion of FMD has been ruled out on the holding or the relevant time period has elapsed, ensure that restrictions on the holding are lifted and a copy of the notice placed on the file.

8.2 Computerised system

Interim systems have been developed for the LDCCs and the NDCC. In March 2002 an initial trial run of the LDCC system was carried out in Raphoe. Feedback from the trial run was incorporated into the system.

LDCC

Task Allocation

This interim system is used for administering a Control Area, including:

- setting up the 'zone events' and 'zone types' in that Control Area
- loading location fragments into zones
- allocating, recording and monitoring tasks such as census, agreement, slaughter and payment data for locations in that Control Area .

This system is designed for use in multiple locations and the data captured can be accessed centrally.

NDCC

Trace and Suspect Cases

This interim system involves tracing all contacts with suspected or confirmed outbreaks.

Future Developments and outstanding issues:

The Report from FMD Workshop on Data Management and Information Technology (Athlone - 14 November 2001) recommended that a comprehensive Class A disease system should be developed within the AHCS as soon as feasible.

ANNEX 1

PROTOCOL FOR SAMPLING OF HERDS/FLOCKS FOR FMD

1. Suspected clinical cases

- Tissue samples from lesions in affected animals (by RO).
- **1 heparinised** blood + **1 plain** blood from **up to 10** clinically affected (febrile) animals (by VI or RO).

2. Imported animals from FMD affected countries

- If the imported animals are still within a single epidemiological unit, take **15-20** blood samples using plain blood tubes from these animals.
- If the imported animals are now mixed with other animals from the holding of destination, take **60** random blood samples using plain blood tubes from the in-contact group, including samples from the imported animals themselves where these can be identified.

3. Tracings from infected premises

- If the contact animals are still in a single epidemiological unit, and there are no clinical signs in the unit, take **15-20** blood samples using plain blood tubes from these animals.

If the contact animals are now mixed with other animals from the holding of destination, take **60** random blood samples using plain blood tubes, including samples from the animals that have come from the infected holding, where these can be identified.