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# Development of a Risk Management Approach to the Containment of a Foot and Mouth Disease Outbreak

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## Introduction

During the foot-and-mouth disease (FMD) outbreak at Proleek, Co. Louth, in March 2001, a methodology was developed to identify all at-risk herds within the control area surrounding the FMD confirmed premises, so as to ensure that the necessary surveillance work was undertaken.

## Methodology

A database named the Epi-local system was designed to run within Microsoft Access™ over the local area network at the Local Disease Control Centre (LDCC). The purpose of the system was to facilitate the efficient management and reporting of surveillance visits including census details and blood sampling as well as to maintain information about herds within protection and surveillance zones. A number of forms and report options were designed to facilitate the day to day running of the system, in conjunction with management reports to summarise the number of active herds within various zones and to monitor progress at the LDCC.

An initial list of farmer addresses and herd numbers was obtained from the Client Registration database. This was uploaded to the system for all herds within Co. Louth. Herd census details for tuberculin testing in cattle were obtained from the national bovine tuberculosis database held at the Veterinary Epidemiology and Tuberculosis Investigation Unit (VETIU). Sheep census figures for breeding ewes and hoggets were uploaded from a list of ewe-premium applicants for Co. Louth.

Herds within each of the 1 km, 2-3 km, the extended 3 km, and the extended 10 km zones surrounding the FMD affected fragments were identified using the Land Parcel Information System (LPIS) based on digitised area-aid maps. This process was complicated by the fact that an area of commonage lay within a 3 km radius of the outbreak, which was grazed by a number of sheep flocks. A text file containing a list of herds/flocks was separately uploaded to the Epi-local system for each zone.

While the LPIS system provided a rapid means of identifying herds within the control area, an additional facility was available to manually add or amend details of herds within zones to take account of a small percentage of land fragments not claimed for area aid, as well as land parcels that had been taken over by another herd owner since the last area-aid claim was submitted.

After the initial uploading process, the zone lists were then compared to identify any herds that had fragments in more than one zone, and the herd file updated to reflect the zone with the highest priority (i.e. the closest to the outbreak). The list of herds obtained from LPIS was then verified for possible omissions. A reference list was compiled of District Electoral Divisions (DED's) and townland addresses located within the control area. A list of herds located in DED's in or near the control area with no claim to parcels within the control area were then selected from the client registration database and compared geographically with the reference list of DED's and townlands for the control

area. Using this method, some additional herds which were deemed to be in the control area by field officers with local knowledge were manually inserted into the zones. Local knowledge was also useful in the validation of pig units, and goat herds, within the area, which were less likely to be registered under the area-aid scheme.

## Experimental

To facilitate the various stages in the processing of work by the LDCC, each task was divided into the following stages, each with separate input screens: Create Task, Task Allocate, Task Back and Task Interpretation/Follow-up. Each herd within a zone was scheduled for an initial surveillance visit, and each visit was assigned a unique task ID to facilitate tracking of the task within the Epi-local system. The system was designed to create tasks both individually and in batch mode, e.g. where a list of herds within a zone were all scheduled for the same task. Figure 1 shows the input screen for creation of a single task.

**Figure 1.** The Create New Task Screen.

Herd / Flock Details:	
Herd Number:	01234567
Name:	Mr Murphy
Address1:	Hill Farm
Address2:	Any Town
Address3:	Co. Louth
Phone:	
Zone:	Ext. 3 Km

  

Details of task to create:	
Task Type:	Surveillance
Priority:	1
Special Instructions:	Census and clinical examination required
Dept. Officer:	
Task Status:	Await. Listings
File Ref.No.:	FMD2001/01
Comments:	
Visit Required:	<input checked="" type="checkbox"/>
Scheduled Date:	22/03/2001
Status Date:	21/03/2001
FMDT Ref. No.:	

A flexible report selection screen was designed to provide a task allocation list using a range of reporting criteria (Figure 2). A hard copy of the task allocation list was produced in Priority and Herd Number order to facilitate prioritisation of work and the allocation of adjacent herds to the same field officer insofar as possible.

**Figure 2.** The Report Selection screen for the Task Allocation List.

The screenshot shows a software window titled "Task Allocation List - Report Selection". Inside the window, there is a section labeled "Selection Criteria:". This section contains several input fields and dropdown menus arranged in two columns. The left column includes: "Task Status:" with a dropdown menu showing "Await. Listings"; "Task Type:" with a dropdown menu showing "Surveillance"; "Priority:" with a dropdown menu showing "<ALL>"; "Zone Type" with a dropdown menu showing "Ext. 3 Km"; "Officer:" with a dropdown menu showing "<All Staff>"; and "Order By:" with a dropdown menu showing "Priority/Herd No.". The right column includes: "From Scheduled Date:" with a text box containing "(Blank for all)"; "To Scheduled Date:" with a text box containing "22/03/2001"; "From Allocated Date:" with an empty text box; "To Allocated Date:" with an empty text box; and "District Electoral Division:" with an empty text box. Below the "Selection Criteria:" section, there are two buttons: "Print" and "Cancel".

Each field officer was assigned a block of herds for the next working day and given a field pack containing the necessary forms for clinical inspections and blood sampling, as required. The system produced a set of field visit cover sheets, one for each task, displaying any prior census information, and highlighting special instructions. A task allocation list was also included along with contact details for the herd owners. An area-aid map for each farm was provided by the LPIS system. An ordinance survey map of the area was also provided by the VETIU with the location of the 1 km, extended 3km and extended 10 km zones clearly indicated, for field use.

As each field officer returned to the LDCC (Task Back stage), the Task ID from the field visit cover sheet was input into the computer and the status of the task status updated accordingly. The results of census information for susceptible species within the various zones, along with details of blood sampling, and any significant clinical findings were also recorded on the system.

After inputting results, the file was sent for veterinary decision (Task Interpretation stage) regarding follow up work. A herd enquiry facility was provided to review the status of all tasks to date, zone information and general herd information. Options were also provided to review all census figures and a summary of all blood sampling to date. Since many of the herds required repeated visits, a facility was provided to auto-schedule for a follow-up task as a previous task was signed off. On rare occasions when new herds came to light (e.g. from local knowledge), these were manually added to the herd list, inserted into the appropriate zone and scheduled for an immediate surveillance visit on veterinary advice.

A number of suspected no-stock herds were eliminated from the surveillance programme after a field officer had called to identify any other herds that may have been grazing the land and the original herd owner had signed a no-stock declaration. Other active herds having land within the control area were dropped from the surveillance programme either because all susceptible stock had been grazed outside the control area, or because all susceptible stock had already been removed.

At the time of zone clearance, i.e. 21 days after the initial outbreak, there remained 409 holdings with susceptible stock within the control area; these had received 1,160 surveillance visits (Table 1).

<b>Zone Type</b>	<b>No. Holdings</b>	<b>No. Clinical Visits</b>
Protection	111	444
Surveillance	298	716
<b>Total</b>	<b>409</b>	<b>1160</b>

### **Conclusions**

The required number of clinical visits was achieved within the control area over the three-week surveillance period. The Epi-local information system processed a total of 1,800 surveillance tasks counting visits to the no-stock and depopulated herds, operating over a local area network. Due to the highly infectious nature of the FMD agent, any future system may be required to service multiple disease outbreaks simultaneously under the management of multiple LDCC's. A centralised database operating over a wide-area network would be an imperative if this scenario were to arise.

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