# DEER Tb: MAF DISEASE CONTROL DATABASE

TJ Ryan, National Advisor (Epidemiology), Ruakura.

## Introduction

This paper outlines the computerised information system that has been developed to assist the control of tuberculosis in deer herds. The design and management of district databases and the accumulation of national statistics are described. Current problems and future developments are also briefly discussed.

I believe all would accept that an efficient management information system is a key part of the national tuberculosis eradication scheme. In both the administration and technical evaluation of the scheme accurate data are required. For example general policies must be translated into an efficient field testing programme. In herds where infection has been identified the statutory requirements of movement control must be met. Progress must be measured at herd, district and national levels and, if necessary, appropriate changes made to the scheme rules.

## Database Design

As would be expected the database is based on 'herds' as specified in the rules of the scheme. However, to improve efficiency there are secondary integrated systems that handle the administration of movement control herds, veterinary practitioner lists and possum control operations.

Each herd is registered on the system by way of a unique code. The farm name, owner or manager and their postal address are also recorded, along with information on the herd type, geographic location, Tb testing instructions and whether or not the herd lies in a Tb special control area.

Events that might affect the disease status of a herd are recorded chronologically in the so-called 'Tb episode' file. As a herd moves towards accreditation details of the whole herd tests are recorded. If all eligible stock are tested on the same day, the whole herd test code 'W' is entered; if the test is completed in parts, sequences of part herd tests coded 'P' with a final part coded 'F' are entered. In additional miscellaneous or sale tests, clinical cases, non-reactors that are found to be infected at slaughter (i.e. Tb culls), and introductions of feral deer and deer from an infected herd can be recorded. Two other important events can also be included. The first is a decision by a MAF veterinarian to change the disease status of a herd independently of a testing episode. The second is any possum control operation that has taken place on or adjacent to the property where the

deer herd was located.

The age and sex, both of animals that have been tested, and of all reactors can be entered into a special file. Likewise the results of any post mortem examinations can be recorded. These data are linked to the Tb episode file, thereby allowing the generation of comprehensive testing summaries.

Control of retest dates is an important part of administration. The date by when the next herd test should be completed, the type of test and who will do the test is recorded for all deer herds.

Additional information that might assist practitioners or livestock officers can also be entered and printed on test allocations. Examples are the circumstance that deer are tested in another farmer's yards, or some animal numbers that are needed for the next test.

The statutory requirements of movement control present some special problems, and for this reason an additional module to assist with administration has been developed. This provides for a check not only on the renewal of movement control notices, but also on which herds should be on movement control.

Much of the field testing programme is under the direct control of veterinary practitioners, and it is therefore important that there is an efficient way of linking practitioners to specific herds. This is achieved by way of a special file of practitioner or practice names.

In Tb endemic areas the objective of the cattle Tb control scheme is the 'cost-effective reduction of Tb reactors'. Where there is a moderate to high prevalence of Tb in possums, quite considerable savings can often be made by reducing possum numbers. To assist with the evaluation of local disease situations a special possum operation module was introduced. This is also included in the deer database, but is probably of little used at this time. In the future similar options may have to be considered.

## District database operation

District databases have been established on MS DOS '286' or '386' personal computers using SIR (Scientific Information Retrieval) relational software in each of the 23 veterinary districts in New Zealand. Each site is independent. Local MAF staff administer the database, with specialist advice being provided by personnel from MAF Quality Management and MAF Technology, Ruakura, Hamilton. Routine administration consists of 4 broad activities; data entry, quality control, maintenance and report generation. In

addition routine and special statistical analyses are conducted.

Information is usually entered by way of special screens that mirror the way that it is collected in the field. For example, a sequence of screens that automatically cross reference data are used to enter herd test results, details of animals that reacted and post-mortem findings. However, if large quantities of data have to be entered, a system called 'batch data entry' is used. The information is first prepared on sheets, then keyed at a specialist 'punch pool' into the Ruakura minicomputer and then transferred to the district computer either directly or by floppy disk. Once on the district system, blocks of data are run into the database. All the district databases were established using batch data entry.

The axiom 'garbage in, garbage out' is as relevant as ever. Indeed, many of the former highly centralised systems used by MAF foundered because of accumulated errors. It was for this reason that a decentralised system has been adopted and to assist staff, a variety of quality management procedures have been introduced.

First where possible, either valid values or ranges have been established and all data are automatically tested during input. Second, all test results are entered twice. The values that are keyed in are compared and if there is a difference a warning is given to the operator. Third, various consistency checks are done. This may occur either automatically at the time that data are being entered, or later as a special operation. In this way the quality of information can be assessed at each site.

Although computers are often regarded as infallible, realistically it is a matter of when, rather than if, a major technical fault will occur. The result can be loss of all data. Adopting a decentralised system increases the risk of failure and for this reason much thought was given to how the databases should be maintained. Every week the integrity of the files is checked and copies are taken and stored at another site. To date although there have been a number of either hardware or software problems, no data have been lost.

As noted in the introduction, information generated by the computer system is used in either field operations or analysis of progress. The most important function is the preparation and printing of herd testing schedules and allocations. As herd testing progresses through the year, various checks are made for such things as overdue herd and supplementary tests, and slaughter and post-mortem of reactors. In this way the Tb disease history of a herd is built up and MAF veterinary officers can assign herd status in a consistent manner.

A variety of standard statistics about a herd, district or Tb endemic area can be produced by calling up programs from a set of menus. The programs prompt the operator for his/her requirements. As the same quality systems are used in each veterinary district, the reports generated at each site are comparable. Sometimes different or more sophisticated analyses are required. The database can be interrogated directly using either an *ad hoc* query system, SQL, or a special SIR programming language. It is also possible to generate special datasets that can be read and analysed using spreadsheet or statistical software.

## The National Tb Database

Progress towards the eradication of Tb in deer herds at the district and national level is monitored by combining standard monthly reports from each database. Currently a variety of statistical reports are printed at each site and dispatched to Wanganui where the data are entered into a spreadsheet. Much of the data that Chris Carter has presented is from this source. There are plans to improve this system by transferring the summary data electronically on the MAF network.

## Conclusions

Since its inception about 5 years ago, the cattle and now the deer SIR disease control system has gone from strength to strength. For the first time we can now be confident about the consistent application of the rules of the scheme and about the accuracy of the bank of data that has been accumulated. The success is primarily due to the efforts of district MAF staff who have enthusiastically supported the system. It must be stated, however, that the this decentralised approach can lead to problems. Often a database is managed by one or two key staff members, and if they are transferred or leave MAF, for a time there can be many difficulties.

Anybody, either from MAF or a veterinary practice, who is new to the disease control system will at first find it complex and confusing. The test allocation will probably appear a jumble of abbreviations and apparently unrelated data. This is of concern as success is dependent on a mutual understanding by MAF staff, practitioners, deer farmers and others in the industry. For example a simple coding error of the episode type could lead to many misinterpretations. There is a trade-off between simplicity and having sufficient detail to make informed decisions, and it has been the goal of the managers of the system to achieve the right compromise. We can only appeal to all those involved in Tb control to spend some time learning how it works.

One problem is commonly reported in all districts. It appears that practitioners often do not return test allocations promptly and sometimes essential information is missing. In some cases this has led to much confusion, especially when deer were being sold. A busy practitioner might be tempted to put the paper work aside. However, until it is finished and the form returned to the MAF district office the job is not complete.

As new requirements are identified by either practitioners, MAF staff or farmers, the disease control database will be updated. A new version will shortly be released containing modules to better record the results of supplementary testing, testing of special management groups of deer and possibly introduced animals. As communication and computer technology develops the operation of the databases will be reviewed. It is very likely that a national network will be established; the benefits of the decentralisation will be maintained whilst being able to interrogate all databases as if they were one. It may be possible for a practitioner's computer system to be linked to such a network. The benefits of amalgamating various currently separate databases should also be looked into. In any district, Tb control covers both cattle and deer and from an epidemiological point-of-view it would preferable if both species were covered by the same database.

There is little doubt that Tb will be a problem in New Zealand for the foreseeable future. Tb control will be an important part of the work of both practitioners and MAF. As information accumulates this database will become a very important resource for all.

Acknowledgements

The following were also involved in the development of the Deer Tb Database

Don Wilson, Statistics & Computing, Ruakura.
Catherine Cameron, Statistics & Computing, Ruakura.
Chris Carter, MAF, Wanganui.
Kevin Rooney, MAF, Hawera.