

Structure and functions of MAF's National Centre for Disease Investigation

D Hugh Davies



Abstract

On 1 November 1998, the Ministry of Agriculture and Forestry's *NATIONAL CENTRE FOR DISEASE INVESTIGATION* (NCDI) began operation on the Wallaceville Campus in Upper Hutt.

The NCDI incorporates the functions of the New Zealand Animal Health Reference Laboratory and the Exotic Disease Response Centre. It is a new facility dedicated to the diagnosis of exotic, new and emerging disease of livestock, fish and bees.

The staff of the NCDI will manage the investigation, diagnosis, containment, control and, where required, the eradication of an exotic animal disease from the Exotic Disease Response Centre at Wallaceville. Local, on farm disease control activities will be provided by field staff contracted from other agencies.

The primary function of the reference laboratory is to meet the requirements of the Chief Veterinary Officer for the diagnosis of exotic disease of animals and the design and implementation of surveys to confirm New Zealand's freedom from exotic unwanted organisms.

The NCDI is also the clearing house and coordinating centre for the collation, analysis and reporting of all information provided by private animal health laboratories and industry laboratories that forms the basis of the reports verifying New Zealand's freedom from exotic, unwanted organisms.

The introduction of increased contestability in the delivery of surveillance and exotic pest and disease services provides opportunities for veterinarians in the future.

Introduction

In 1996 Government undertook an independent review of the functions of MAF Quality Management, the delivery arm of the then Ministry of Agriculture. This review concluded that the central reference laboratory for exotic animal disease and the critical resources to plan and manage a response to an incursion of exotic disease should remain in Crown ownership. Other laboratory services and the specific expertise and resources required during an exotic disease response could be delivered through contractual relationships with third party suppliers.

This led to the establishment, on 1 November 1998, of the National Centre for Disease Investigation (NCDI). The NCDI was set up to investigate exotic, new and emerging disease of animals including the isolation and characterisation of aetiological agents from unusual disease events. The National Plant Pest Reference Laboratory (NPPRL) based at Auckland and Lincoln provides similar functions for the horticultural industries.

The National Centre for Disease Investigation, the subject of this presentation, has been set up on the AgResearch Wallaceville campus, the site where New Zealand's first laboratory for the investigation of animal disease was established in 1905.

The Mission of the NCDI is to enhance New Zealand's animal industries by delivering accurate, timely information on the health status of our animal populations and by being prepared to diagnose, control and/or eradicate any incursion of exotic or emerging animal disease.

The NCDI has two interdependent parts; the Exotic Disease Response Centre (EDRC) and the New Zealand Animal Health Reference Laboratory (NZAHRL). The total staff complement is 38 of whom 10 are registered veterinarians. Another four specialist microbiologists have veterinary training but are not registered in New Zealand.

Exotic Disease Response Centre

The EDRC is responsible for the investigation, to the point of definitive diagnosis, of all reports of suspect exotic, new or emerging disease of animals. To do this we are reliant on veterinarians, farmers and members of the public reporting suspect cases to MAF through our freephone number 0800 809 966. We currently receive about 5,000 calls a year on this number, of which one or two per day relate to suspect exotic disease. These calls lead to further investigation by NCDI staff about once per week.

The requirements for our response capability are specified in standards developed by the Chief Veterinary Officer's group in MAF Regulatory Authority. The standard specifies that we have the capability to investigate, diagnose and contain any suspected exotic disease of animals, including fish and bees, anywhere in New Zealand, 24 hours per day, 7 days per week, every day of the year.

We must be able to eradicate specified diseases on up to 25 restricted places (infected properties) in the first 7 days with the ability to respond to a further 10 restricted places per week thereafter. We must also be able to undertake post-eradication surveillance for up to five years after the event.

The EDRC is clearly not big enough to staff all of these functions on its own. What we do provide is the expert investigational capability with our team of epidemiologists, exotic disease investigators and microbiologists plus the operational and technical management of an eradication response if required. The field-based activities will be provided by contracted suppliers. At the moment, this service is provided by AgriQuality New Zealand, the SoE that took over MAF's commercial functions on 1 November. However, it is intended that these activities will become fully contestable in July 2000.

New Zealand Animal Health Reference Laboratory

The key functions of the NZAHRL are to provide reference diagnostic capability in virology, bacteriology, immunology, serology, molecular biology, diseases of fish, diseases of bees, and the identification and control of vectors (provided in collaboration with NPPRL entomologists).

The primary function of the reference laboratory is to meet the requirements of the Chief Veterinary Officer for the diagnosis of exotic disease of animals and the design and implementation of surveys to confirm New Zealand's freedom from exotic unwanted

organisms. Nevertheless, we will continue to test animals in post-entry quarantine; provide testing for export certification; provide a diagnostic virology testing service for samples referred by private laboratories where the service is not provided commercially and act as a reference laboratory for the definitive identification of micro organisms submitted by private diagnostic laboratories and industry laboratories.

Speedy accurate diagnosis is the key to effective disease control. This includes early reporting of suspicious disease events even when the probability of it being exotic is low, rapid clinical, pathological and epidemiological assessment in the field, followed by rapid laboratory confirmation.

Early detection minimises the outbreak through reduced disease spread, reduced quarantine zones, increased opportunity for regionalisation, faster eradication, early declaration of country freedom and thus reduced economic consequences.

We can shorten the time for laboratory by introducing safe, reliable, accurate screening tests to provide early exclusion of exotic disease. However, if we are to do this we must work in a biosecure facility to ensure that our laboratory testing does not result in a new focus of infection away from the infected area.

To achieve this we have begun construction of a biosecure, physical containment, level 3 (PC3) laboratory. This will enable us to carry out screening tests for exotic diseases in New Zealand.

This will reduce our reliance on overseas laboratories where there can be major delays getting clearance to transport potentially infected samples through the air space of countries en-route. For example, samples from horses affected with Balclutha Horse Syndrome were delayed in Hong Kong and took more than a week to get to Pirbright despite pre-arranged transport procedures.

The PC3 laboratory has two levels of containment. The primary barriers are biohazard cabinets as in any microbiology laboratory dealing with potential pathogens. These are surrounded by secondary, facility design barriers. Access to the laboratory will be restricted and entry and exit will be through air locks. The airlocks, corridors and laboratories operate at negative pressure with the dirtiest areas at lowest pressure. All exhaust air is filtered through Hepa filters (99.97% particulate matter $>0.3\mu$). Apart from the staff, who shower out at the end of the day, all materials leaving the lab will be heat or chemically sterilised. These physical barriers and detailed operating procedures will ensure biosafety and microbiological security to protect the operator and the environment.

The new laboratory relies on careful monitoring of test performance, comprehensive quality standards (ISO 17025) and participation in international interlaboratory comparison programmes to ensure test accuracy and international acceptance of our test results.

We also provide technical audit and ILCP programmes for the accreditation of private laboratories that wish to supply passive surveillance information to the Crown.

To do our job properly we need to draw on all of the scientific expertise within New Zealand. To this end we maintain links with all our New Zealand science providers either on a formal contractual basis where we want to ensure availability or by way of informal networks. We have a network of contracted specialists in the fields of anatomical pathology, haematology, parasitology, apiculture, geographical information systems and meteorology. We also have links to research providers, the CRIs: (AgResearch, NIWA, ESR, etc), and the Universities (Massey University, EpiCentre. These are supplemented by international networks to back-up the expertise available in New Zealand.

The NCDI is the clearinghouse and coordinating centre for the collation, analysis and reporting of all passive surveillance information provided by private animal health laboratories and industry laboratories. These data, along with data from active surveillance programmes designed and implemented by NCDI staff, will form the basis of the reports verifying New Zealand's freedom from exotic, unwanted organisms that the Chief Veterinary Officer provides to trading partners and international organisations.

The design and management of active surveillance projects will enable us to shift the emphasis of New Zealand's statements of disease freedom from the empirical, "we have never seen the disease in one of our laboratories", (ie passive absence of evidence) to active surveillance that provides statistically based proof of absence using structured surveys.

Opportunities for veterinarians

All of these activities provide opportunities for the veterinary profession into the future including involvement in exotic disease responses by acting as patrol veterinarians during an outbreak or as part of an organisation providing initial investigating veterinarians or field outbreak response teams.

In the surveillance area veterinarians will always have a critical but indirect role in the supply of passive surveillance information as the key decision maker as to whether a case is submitted to a laboratory. However, in the new environment, there will be increased opportunities to participate in enhanced passive surveillance programmes like the current TSE surveillance scheme and to contract for sample collection for active surveillance projects. Further down the track there may be opportunities for sentinel practices to provide passive surveillance information from their catchment areas to give us better national coverage than the current laboratory based passive surveillance system.