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The Development of an Access® Database Application for the Recording of Animals subjected to Interferon-\(\gamma\) assay

P. W. White

Introduction
The use of the single intradermal comparative tuberculin test (SICTT) has been highly successful as a means of identifying herds infected with \textit{Mycobacterium bovis} in the course of national bovine tuberculosis eradication programmes in many countries. However, the SICTT does not detect all animals infected with \textit{Mycobacterium bovis}. This is a constraint to the bovine tuberculosis eradication programmes since recurring disclosure of tuberculin reactor cattle in some “problem herds” prolongs the period of restriction and affects the tuberculosis status of contiguous herds and the national herd as a whole.

The interferon-\(\gamma\) (IFN-\(\gamma\)) assay is a complementary test to the tuberculin test. It provides a means of identifying those cattle that are most likely to be infected with \textit{M. bovis} in problem herds at an early stage by assessing their current cytokine status as regards \textit{M. bovis} infection (Wood, Corner and Plackett 1990). The reliability of the IFN-\(\gamma\) assay when used in the Irish cattle herd was reviewed by Monaghan \textit{et al.} (1997) and Collins \textit{et al.} (2000). The assay has been used in the investigation of “problem herds” and has identified tuberculous animals which were not responsive to the SICTT in such herds and has provided a basis for their removal. However, not all IFN-\(\gamma\) positive animals have been removed from such herds. A database was developed to facilitate the tracking of such animals.

Methodology
An Access™ database (Figure 1), was developed as a tool to correlate the IFN-\(\gamma\) results with the results of the subsequent SICTT and lesion status of the animals. As test summary information and individual results for animals subjected to the IFN-\(\gamma\) assay were recorded, the system validated each tag number and herd number to ensure data integrity. For completed tests, a range of reports was provided including a statement of results for faxing back to the relevant District Veterinary Office (DVO). As tuberculin testing and post-mortem results became available at the DVO for the herds/animals subjected to IFN-\(\gamma\) assay, these were entered electronically on the national bovine tuberculosis database held in the Veterinary Epidemiology and Tuberculosis Investigation Unit, thereby eliminating the need for manual data entry from paper-based reports.

An initial group of herds with one or more animal(s) testing positive to IFN-\(\gamma\) and negative on the corresponding SICTT were identified as a target population. Within these herds, the tuberculin test status for animals testing both positive and negative to the IFN-\(\gamma\) assay was determined for the tuberculin test corresponding to assay, and for tuberculin tests conducted on these animals during the following 12 months. The assay results were analysed against the SICTT readings and the lesion status of reactors at post-mortem examination. These data provided a means of assessing the degree to which animals testing positive on IFN-\(\gamma\) assay subsequently showed evidence of \textit{M. bovis} infection by means of the SICTT or other surveillance methods.
Conclusion
The ability to correlate tables containing data from various sources by means of a primary key is a fundamental element of relational database design, and is a feature that facilitates the exploration of large datasets derived from disparate sources. Such techniques provide a powerful tool for the optimisation of the field use of complementary tests such as the IFN-γ assay. The system described here, when used in conjunction with an analysis of the SICTT data and the post-mortem examination results, will provide a basis for determining the true predictive value of this assay as a means of identifying additional M. bovis infected animals in “problem herds” and assessing the extent of its contribution to the acceleration of the bovine tuberculosis eradication programme.

References
