

A computerised database system for bovine traceability

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Summary

A computerised database system to record the details of all individual cattle, cattle holdings, cattle movements and cattle tests has been in use in Northern Ireland since 1988. This system was originally used purely to administer official tuberculosis and brucellosis eradication schemes, but subsequent developments have employed the traceability function to extend the use of the system to quality assurance, public health and marketing of beef and beef products. The database has evolved into the current, second generation system and this case study details that evolution from a manual system and describes potential future developments of the system.

Keywords

Animal health – Animal movement – Cattle – Computer systems – Databases – Identification – Information systems – Northern Ireland – Public health – Traceability.

Introduction

Northern Ireland has approximately 36,000 farms, of which 32,000 contain cattle at any given time. The average size of farms in Northern Ireland is 34.5 hectares. Approximately 5,000 farms are dairy enterprises, with an average herd size of 51 cows. The cattle population comprises approximately 1.7 million animals, generating a total of 1.5 million movements annually.

The traditional method of beef production in Northern Ireland sees calves born on one holding, move to at least one other holding for rearing and make a final move to yet another holding for finishing prior to slaughter. Almost two thirds of all moves occur through livestock markets. Although the system is being changed to reduce the number of movements, in response to market requirements, the number of movements per head of cattle population remains high. Each animal will be moved on average five times during a lifetime.

Since the early 1950s, Northern Ireland has implemented schemes for the eradication of tuberculosis and brucellosis from the national herd. Currently, the Veterinary Service of the Department of Agriculture and Rural Development (DARD) takes 700,000 samples for brucellosis each year and performs 2.3 million intradermal tests for tuberculosis each year.

Thus, a large amount of data is added to the system each year and considerable processing of that data is performed.

Legislative requirements

A number of legislative requirements have been in place for many years which have formed the basis for identification, registration and movement control of bovines in Northern Ireland. Initially, such systems were manual, but since 1988 they have been computerised, and the current system is the second generation system, called the Animal and Public Health Information System (APHIS).

Herd registration

The first requirement was the compulsory registration of all holdings that keep cattle. Thus, all holdings that keep cattle in Northern Ireland are registered with the DARD. On registration, each holding is assigned a unique herd number which is used to identify all cattle kept as a single epidemiological unit on that holding. In the majority of holdings, only one such unit exists per holding, but in some circumstances, a holding may comprise more than one such unit. If this is the case, then information on the linkages with other herd numbers is held. Information is also held on other links between herds as the result of factors such as familial relationships, trading links, etc. Initially, the herd number was

a minimum of three digits up to a maximum of six. The first two digits denoted the electoral division in which the herd was situated. This was useful prior to computerisation as the geographical location of the herd of origin was evident from the herd number. This is less important in a computerised system, but can be useful when a computer check is not available.

Example: herd number 371

Herd number 371 is the first herd registered in area 37, which is near Belfast. The number has now been altered, to comply with the European Union (EU) legislation, by addition of the prefix 'UK9' which denotes that the herd is in a region of the United Kingdom (UK), namely Northern Ireland, i.e. UK 9 371.

Animal identification

Identification of all cattle within twenty days of birth with a unique individual identifier comprising the registration number of the herd of birth and a sequential number for that herd is a legal requirement. This has been compulsory since the start of the tuberculosis and brucellosis schemes, but following computerisation, an additional verifier (check letter, or latterly, digit) has been added to the identification to permit the computer verification that a valid identification number has been entered (Fig. 1).

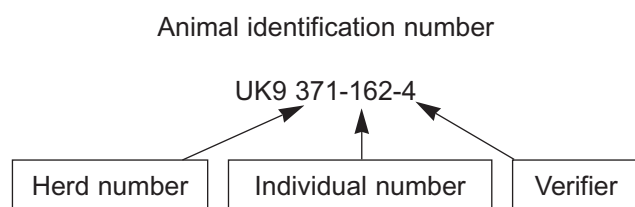


Fig. 1
An example of the animal identification number used in Northern Ireland

Until January 1998, national legislation required a single metal 'tamper-proof' tag to be inserted in the right ear of every animal; after this date, in accordance with the EU legislation, the requirement was altered to two large plastic 'tamper-proof' tags, one in each ear.

At all times from the inception of the earliest identification programmes in Northern Ireland, the issue of ear tags to herd keepers has been subject to approval from DARD, thus establishing another important control point.

Movement control

The legislation which enacted the brucellosis eradication scheme also established the principle that animals could only move when accompanied by a movement document issued by the central authority. Initially, this applied only to breeding

animals, but was extended to include all animals, prior to computerisation.

System audit

All of the above controls ensured that comprehensive information was available to the Government on the birth, death and movement of animals in Northern Ireland. Not only was this information available, but as it formed part of the disease eradication schemes, it was collected and used in the administration of these schemes. The information was used to create lists of animals on holdings which were due to be tested in the schemes. The presentation of an animal on the list was an audit point for the system, whether computerised or manual. As all herds were tested at least once per year, in effect an audit was performed of both the herd and the information generated by the system.

The manual system

At the commencement of the schemes for the eradication of tuberculosis and brucellosis, a manual system was implemented to record all herd registrations, individual animal registrations and identification, and also all movements of cattle. This was accomplished via a network of ten Divisional Veterinary Offices (DVOs), each of which held the manual herd file for each herd registered in that division. Prior to an animal movement, the herd owner was required to apply for a movement permit, giving the identification and description of the animal to be moved, the herd number and address of the herd from which the animal was moving, and the herd number and address of the herd of destination. If the animal had passed the requisite tests and was verified on the manual herd file, a triplicate movement permit was issued containing the information provided on the application form. This triplicate form enabled the information to be stored in the herd file at the DVO of origin and in the receiving herd file at the DVO of destination, whilst the third copy accompanied the animal. In this way, each herd file was effectively a running total of all animals that had left the herd, entered the herd and of those currently in the herd. This enabled a list of all animals in the herd to be produced for testing purposes.

Animals born into the herd were captured either at a disease-screening test when the details of the animal were added to the test forms, or when an application was made for movement of the animal from the farm of birth. Similarly, deaths were recorded at herd tests when animals on the herd list were found to be missing, or following the entry of an animal to the lairage of a slaughterhouse. Animals that were exported were similarly recorded as removed from the system.

Although the exercise was fairly laborious and lengthy, both forward and backward tracing from diseased herds was possible using this system.

Despite having some flaws, the system was quite sophisticated and worked very well, although it was extremely labour-

intensive. The desire to capture all animals, and not only breeding animals, on the system added considerably to the complexity and workload in maintaining a manual system. This problem, allied to a desire to capitalise on advances in computer technology, led to a decision to computerise the manual system. The first computerised system was the Animal Health Computer System (AHS).

The Animal Health Computer System

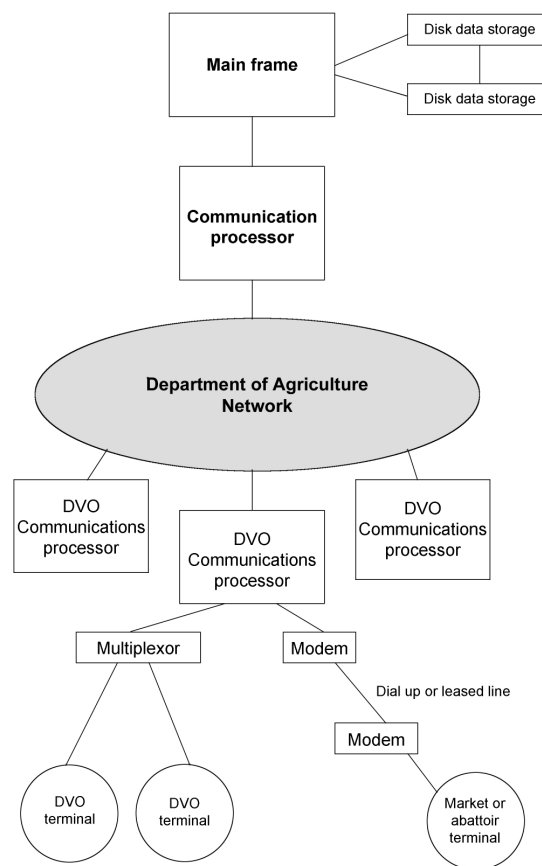
The AHS went live in September 1988. The concept was simple, namely: to replicate the functions performed by the previous manual system, register herds and animals, approve the issue of ear tags, and produce all movement documentation, herd test sheets and disease restriction notices automatically. The system was designed to computerise the administration of the tuberculosis and brucellosis eradication schemes and produce disease statistics to assist in monitoring the progress of those schemes. The project was highly successful in achieving these aims.

This system was based on a Unisys 2200 mainframe computer located at Veterinary Headquarters in Belfast and maintained by Government officials. The AHS was connected to over 300 'dumb' terminals (allowing input and display, but not processing of data), in the following locations:

- Veterinary Service Headquarters
- ten DVOs
- five sub-offices
- seven cattle slaughterhouses (all the cattle slaughterhouses in Northern Ireland)
- thirty-seven livestock markets
- two border inspection points
- the Veterinary Science Division Laboratory.

The connection to these locations from the host was via communication processors to the DARD network and hence to communication processors in the local DVOs. Terminals in the DVOs were connected via multiplexors, or for remote locations such as abattoirs and markets, via modems and usually high speed dedicated leased lines as illustrated in Figure 2. A complete mainframe and communication backup system was located at a separate site for contingency.

The information added to the AHS from the manual system was limited to the identification, description and location of the animal, the dates of the next tuberculosis and brucellosis tests and whether those tests were routine or risk type tests. This information was termed the 'base capture' of the animals. The data were added to the system in a series of tranches to allow



DVO: Divisional Veterinary Office

Fig. 2
Schematic diagram of Animal Health System in Northern Ireland

the system to be fully updated before going live. Thus, when first put into practice, the system held the descriptive details of all animals in their current herds (without previous movement history) and details of the date and type of the next tests for tuberculosis and brucellosis.

From the implementation date in 1988, all movements of animals held on the system were recorded. As in the manual system, this was based on the prior application for a movement permit and confirmation of that movement by virtue of another transaction such as a test result or subsequent application for movement from the herd of destination. However, computerisation offered additional possibilities, such as confirmation of movements, which could occur wherever an AHS data terminal existed. Thus, movement to markets and abattoirs could be confirmed on entry to those locations. This allowed the possibility of a self-written declaration of movement to such locations, thus facilitating the operation of the system by farmers. This was permitted for all animals moving to slaughter and for some categories of stock to markets. The use of self-written declarations to markets was limited to stock that were ineligible for the brucellosis

eradication scheme. This ability to access animal information at markets and abattoirs was critical in the development of the AHS and subsequently of the APHIS.

The AHS transformed the management of the eradication schemes for both tuberculosis and brucellosis. Herd lists detailing all animals expected to be presented for test could be printed at any time. The test results could be entered into the system, and on interpretation of the test by the veterinary officer, would automatically issue any restrictions required. A similar system was available for brucellosis, with test results being entered at the Veterinary Science Division Laboratory. The system also allowed the recording of post-mortem findings of tuberculosis lesions and of bacteriology results for both tuberculosis and brucellosis.

Forward and backward tracing was possible overnight, and based on this tracing, the system would identify those herds at greatest risk, and for each DVO, automatically create a list of those herds to be tested, set up the tests, allocate the tests to a testing officer and print a notification to the testing officer. The testing officer can then allocate a test date, and print test sheets which detail all animals requiring testing in each herd. This comprehensive traceability system was highly cost-effective in rapidly identifying possible disease spread and in implementing the necessary follow-up testing regime.

Development of the Animal Health Computer System

The next stage in the development of the AHS was the realisation that a range of indicators could be attached to individual animals that met certain movement conditions. This was first used to indicate positive findings of residues in a herd, and then more widely to administer a Farm Quality Assurance Scheme (FQAS). The identification of a farm as meeting the requirements of the FQAS could result in a status indicator being applied to the herd file in the database, and thus all animals born into this herd could be assigned a similar status. Similarly, FQAS animals from other herds, which moved on to, or through such a farm would retain this status, while movement onto or through a farm which was not FQAS would result in the animal losing such a status.

The ability of the system to attach or remove statuses to animals and herds became vitally important in 1990 when the first case of bovine spongiform encephalopathy (BSE) was confirmed in Northern Ireland. Using the system already developed to administer the FQAS, a status could be assigned to a herd file on the database to denote whether a case of BSE had ever been detected in the herd, or moved through the herd. This permitted administration of the subsequent EU legislation, which required proof of BSE status, before an animal, or beef and beef products from that animal, could be exported. Thus, every herd in which BSE was detected was identified as such by the database, and any animal that was born into the herd or

moved through the herd was given a BSE status for the required period of time. Prior to the imposition of a total ban on the export of cattle and beef from the UK, this was a vital tool to ensure compliance with the EU regulations on the export of animals and animal products.

Thus, the system which had initially been a computerised system for disease management, had developed a second, and equally important focus, as an animal identification and traceability system. Despite these later developments, the AHS was still largely viewed both by government and industry as primarily a tool for the administration of disease eradication. However, the later developments were of increasing use to industry, and this, together with the increasing availability and interest in information technology, was to have a major influence on the development of the second generation system.

At the time of implementation, the AHS was a unique and revolutionary concept. However, the constraints of hardware and software available at that time limited the potential of the system for greater use. The mainframe architecture and flatfile database structure was inflexible, preventing the use of personal computer (PC) technologies or Windows™ environments. Expansion of the system to incorporate other species such as sheep and pigs was not easily possible, and the programs were not compatible with more modern software. The disease management facility of the system had restrictions, while access to geographical information system (GIS) or decision-support tools was also limited. Finally, and most significantly, the system was not Y2K compliant. For these reasons, AHS was replaced on 13 November 1998 by the APHIS.

The Animal and Public Health Information System

The APHIS was designed from the outset not only to replace the AHS, but also to extend the functionality of the system for cattle to encompass ante-mortem and post-mortem findings beyond tuberculosis, and to extend some elements of the disease eradication, movement control and meat hygiene functionality to other species.

In accordance with EU legislation, all holdings of pigs and sheep are registered and allotted a unique registration number. The registered holding number identifies all pigs and sheep born onto the holding. All movements onto or off holdings or premises must be recorded in herd or flock registers.

System architecture

Unlike the AHS, which was a mainframe system supporting a flatfile database, the APHIS is a client-server, PC-based system. A central server serves client PCs in each of the ten DVOs and outlying locations in the Division. The system has a graphical

user interface, which is similar to that used in many common applications, and thus is user-friendly.

Similarly to the AHS, the system serves the following:

- Veterinary Service Headquarters
- ten DVOs
- five sub-offices
- nine cattle slaughterhouses (all the cattle slaughterhouses in Northern Ireland)
- thirty-seven livestock markets
- two border inspection points
- the Veterinary Science Division Laboratory
- the Livestock and Meat Marketing Commission.

Over 300 PCs are connected to the system and it is used by almost every member of staff of the Veterinary Service.

Data held on the Animal and Public Health Information System

Herd data

In common with the AHS, the APHIS system holds the name, address, postcode, map reference and telephone numbers of all bovine holdings registered in Northern Ireland (approximately 36,000). This is the basic information held on all herds.

Additional information can be added to this data set, such as FQAS, 'bad herd record' status, etc. This additional information is required to allow other functionalities to operate, such as FQAS and aspects of the movement control scheme.

Basic information, such as a map reference, can also be used by the system to identify all herds adjacent to a herd location or alternatively to create a list of herds within a 3- or 10-km radius. This is particularly useful in the event of an outbreak of epizootic disease.

The system also holds similar details on other associated enterprises, such as meat plants, markets, etc., which again can be used to identify all enterprises adjacent to any location or within a set radius of any location.

Detailed test history is held for all herds, including dates and types of tests, details and test results of each animal tested, and the date of the next test. (The test history data held on the AHS were migrated onto the APHIS.) Thus, the database contains a full history of all tuberculosis and brucellosis tests performed in the herd, with details of each test.

Any movement restriction imposed on the herd is recorded, whether for disease control reasons or as a result of other testing regimes such as residue testing.

Animal details

The system holds the identification number of the animal, a description (e.g. colour, breed, gender) and the official identification number of the dam. Details of all movements of the animal are also held. This includes the date of the movement and the details of the herds to and from which the animal moved. All movement data held on the AHS were migrated onto the APHIS.

Details of animal tests held include the dates of all tuberculosis and brucellosis tests, the readings and results. Ante-mortem findings on welfare, cleanliness and clinical disease as well as post-mortem findings on pathological conditions are available. In the case of tuberculosis and brucellosis reactors, any histological or microbiological results are also recorded.

Additional information held on animals can include FQAS status, residue status, movement control statuses (see later), BSE status (suspect, confirmed, progeny), restrictions placed on an animal and the reason for those restrictions.

Major improvements in functionality

Many of the details held on the APHIS system were present on the AHS. However, two principal differences exist between the AHS and APHIS. These have not only extended the functionality of APHIS, but will also influence the future development of the system, as discussed below.

Meat hygiene functionality

The first difference is the meat hygiene functionality. In addition to the locations that were covered by the AHS, the APHIS extends to the meat plant. System PCs are located in the meat inspection office and ruggedised data entry terminals located on the slaughter line of a number of meat plants, to facilitate the input of post-mortem data.

Previously, the AHS recorded the entry of an animal into the lairage of an abattoir as the end of data recording on that animal. The new system extends the recording of data into the meat plant and onto the slaughter line. This new functionality allows for the recording of welfare information to be entered in the lairage, which is then made available at the local DVO. Similarly, ante-mortem data, such as the cleanliness of the animal, any clinical signs, or visible suspicions of residues recorded in the lairage, are immediately available to meat inspectors on the slaughter line, so that any necessary investigations can be made or samples taken.

The facility on the slaughter line also enables the meat inspector to record any pathological conditions found at meat inspection. This information will in future be made available to producer and processor to target areas of possible intervention on the farm to improve animal health, e.g. fascioliasis found routinely at a meat plant could indicate the need for a new anthelmintic strategy or other control measures on the affected farm.

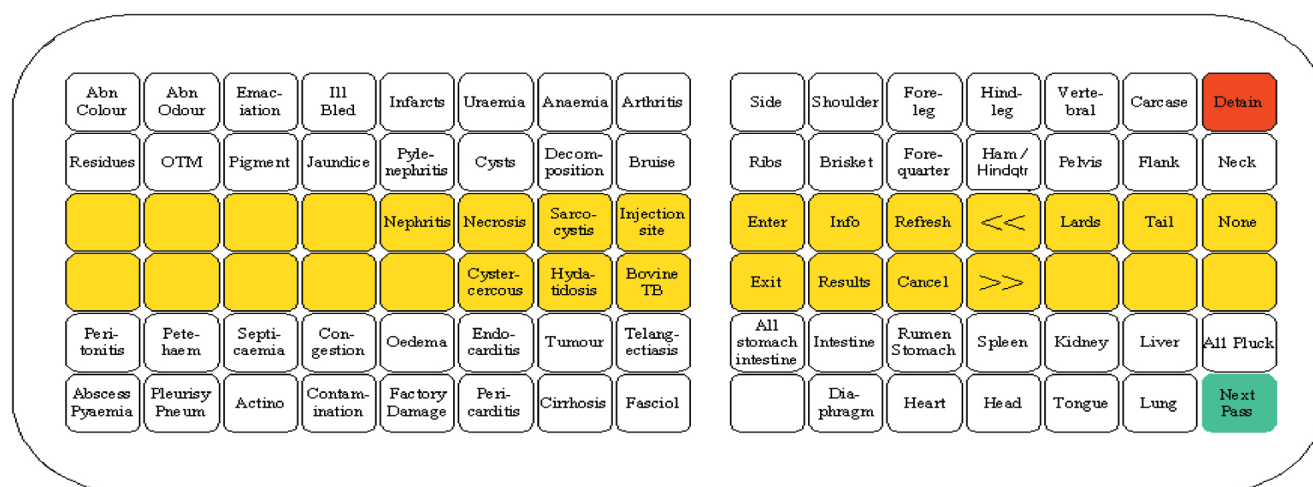


Fig. 3
Keyboard of the data entry terminal used on slaughter lines

Figure 3 is an example of the keyboard on the ruggedised data entry terminal used on the slaughter line.

The residue functionality of the system allocates the required sampling regime and this is displayed on the PC in the office of the meat inspector in each meat plant. In this way, the meat hygiene team in each plant is aware of the samples to be collected in the plant each day.

This meat hygiene functionality will eventually be extended to all cattle, pig and poultry slaughter plants (projected date: early 2002). Thus, for the first time, information can be potentially provided on an individual animal or herd to both producer and processor.

Movement control functionality

The new system affords all the disease control functionality afforded by the previous AHS, but incorporates considerable improvements to the movement control system, rendering the new system more robust and very comprehensive. In combination with the meat hygiene functionality, this provides a tremendous potential for traceability and labelling of beef and animal products.

To comply with the EU regulations on cattle identification, registration and movement control (1, 2), the new system has movement control functionality which requires all births to be notified within twenty-seven days, and each movement, receipt or death of an animal to be notified within seven days.

Each herd keeper is issued with a book of numbered movement documents and confirmation stickers, which provide for the subsequent recording of movement on the APHIS. To record the movement of animals from the herd, the keeper completes the movement document, recording the official identification numbers and descriptions of the animals

to be moved, the date of movement and the details of both the issuing and receiving herds. The original form is then sent to the DARD, the issuing herd keeper retains a copy and two further copies accompany the animal. To record the movement of animals into the herd, the keeper checks the animals against the accompanying movement documents. If the description of any of the animals received differs from that on the document, a cross is marked against the description. The receiving keeper then applies a confirmation sticker issued to the herd to the form and sends the form to the DARD, retaining the other copy for the farm records. This system allows the DARD to confirm the departure and arrival of animals within seven days of the movement in a fully auditable way. This constitutes a strengthening of the movement controls that operated under the AHS.

The system has been developed to cope with the situation in which notification of animal arrivals is received before notification of the initial departures. Similarly, notification of receipt of the animal can be received after notification of subsequent moves has been recorded. The system must be able to store this information and ultimately reconstruct the correct sequence of events in the movement of an animal.

If notification of births, deaths or movements is received outside the allotted time period, the system allocates a status to the animal which indicates non-compliance with the movement regulations, as follows:

- LNO (late notification status), which indicates that notification of the birth of the animal was outside the required twenty-seven days
- NNO (not notified status), which indicates that, although recorded on the system, the animal was not formally notified to the DARD. This situation can arise following the inspection of a herd by a DARD official

– BMT (bad movement trace), which is applied if the notification of the movement or receipt of the animal was outwith the required seven days.

As part of the audit of the system and in compliance with EU regulations, DARD Veterinary Service personnel perform from 1,500 to 1,800 annual herd audits on farms. These audits correlate the information held on APHIS, the herd list, with the actual animals in the herd and with the animals recorded in the herd register. The discrepancies found at such audits may also result in a status being assigned to the herd or to individual animals. These statuses are as follows:

– BHR (bad herd record); this status may be assigned to either a herd or an individual animal. If the herd register has not been kept in compliance with national and EU standards, then the herd and all the animals in the herd at the time of the inspection are assigned this status. If the records are acceptable overall, but an individual animal is not correctly recorded in the register, then the animal alone may be assigned this status

– IDQ (identification query); this status is assigned where a discrepancy is noted between the description of the animal and the details registered on APHIS, or where the animal has not been identified in accordance with requirements. The status may be applied following an official inspection or notification by the keeper of the animal

– UNCOR (uncorrelated retag); some animals may have been retagged with a number other than that originally allocated at birth. If an official of DARD has not inspected the animal and confirmed that evidence corroborates the linkage, then the animal is deemed to be uncorrelated.

Information on the dam of an animal is also recorded for the purposes of the Date Based Export Scheme which requires that to be eligible for export, an animal must have a dam which has lived for at least six months after the birth of the animal in question. Thus, two statuses indicate that the dam information has been received, as follows:

– VDM (valid dam confirmed), a dam number has been received and another computer transaction has taken place, which confirms that the dam was alive six months after the birth of the animal

– VDP (valid dam provisional), a dam number has been received, but as yet no computer transaction has taken place which confirms that the dam has lived for at least six months after the birth of the animal.

This comprehensive movement control system will shortly be linked to new functionality designed to allow the input of results from audits of cattle movement control. Between 1,500 and 1,800 of such audits are performed by the DARD Veterinary Service each year. The new functionality will allow the input of the results of these audits and in addition, will automatically allocate the correct animal or herd status as a

result of any discrepancy identified, in accordance with EU regulations. Additionally, any restrictions required on either the herd or an individual animal will be automatically imposed by this new functionality.

In addition to such audits, a series of verifier programmes is used to check the data held and a movement exception programme highlights any anomalous use of the system to system managers.

These checks result in a robust and extremely comprehensive movement control and recording system.

Future development of the Animal and Public Health Information System

At present, the APHIS system is still primarily used for the administration of the tuberculosis and brucellosis schemes. The movement control system is extremely comprehensive and the disease tracing and testing functionality is both robust and rapid. However, the principal development since inception of the system has been the movement control functionality, and future developments will be driven by the other uses of this functionality.

Given the increasing interest and skills in information technology within the farming industry, and a greater government focus on transacting business electronically through the use of Internet technology, information should, logically, be entered onto APHIS at the locations where those data are created and by those who create the data. Thus, information on births, deaths and animal movements should be entered directly onto the system by the herd owners themselves from a PC at home or a similar facility offered by a service provider. Similarly, the arrival of animals at market or abattoirs should be entered at those locations by the operators of those premises. At present, these data inputs are performed by DARD staff at local DVOs, or at markets and abattoirs. Further, the development of direct links to databases in Great Britain and other Member States of the EU will allow the prompt registration of imported cattle on the APHIS and notification of exports.

An early example of this type of data capture is already under development. This new functionality would allow the results of tuberculosis tests performed by private veterinary practitioners to be input directly onto the APHIS. These veterinarians could also directly access the system to obtain lists of tests due and up-to-date lists of animals which need to be tested.

These developments would require a number of different types of access to the APHIS. This is possible, but needs to take

account of the overriding government priority to maintain the security of a government system.

Automation provided by electronic identification would greatly facilitate the above developments. The ability to directly capture electronic identification data into the APHIS could enable the movement of an animal through a gate on farm, at markets or in abattoirs to constitute the official notification of movement or receipt of an animal. This development is currently being considered with a view to introduction when a common standard for electronic identification has been established within the EU.

The traceability system was previously used to certify the eligibility of animals and animal products for export. Since the ban on exports of beef in 1996, the traceability system has been used by meat plants to ensure that trade specifications, such as the total number of movements of an animal, are met. Similarly, the FQAS can ensure that only animals which have been born and reared to set welfare and production standards are traded under the FQAS. Thus, the APHIS system is now an integral part of beef production in Northern Ireland. Information from APHIS is downloaded to the commercial computer systems in almost every plant, to assist in marketing and business administration. This facility needs to be further developed to increase the speed and ease of such downloads and to widen the information available. Such functionality could be integrated with the meat plant labelling system, opening possibilities for greater and improved information to be provided on labels.

As previously mentioned, the APHIS system captures data on pathological conditions recorded during meat inspection. This information can be of great benefit both to the individual and the industry. Future developments could include a system whereby the information is automatically sent both to the herd owner and the veterinary practitioner. This would assist in early intervention in production diseases.

The robust movement control system is already used to assist in the verification of applications for grants and subsidies and information is freely exchanged between APHIS and the grants and subsidies computer system. At present, EU legislation requires that herd owners apply for agricultural support schemes, providing information to support eligibility. In many cases, this information relates to the number and class of animals on the holdings at certain times or over certain periods. These data sets are already held on the APHIS computer and

software could be created which would both identify herd owners eligible for such support and calculate the amount of that support. This information could then automatically be provided to the eligible herd owners, and to receive payment the herd owners would only have to confirm from their herd records that the information on which the calculations were based is correct.

The system above could also be greatly enhanced by linkage of the APHIS to a GIS on which agricultural holdings are identified. This would extend the capability to include calculations of agricultural support, based on a headage per hectare basis. In addition, the linkage with such a GIS would provide a very powerful tool for the management of disease and spatial analysis of disease dynamics.

Critical to using computer information in the automatic administration of agricultural support arrangements is confidence in the information held. At present, physical examination of animal identity on holdings either at inspections specifically for that purpose or at disease screening tests is the method of choice. However, this could be extended by the use of deoxyribonucleic acid (DNA) technology. At registration of an animal, a sample of hair, blood or other tissue could be provided to a central archive. A percentage audit could then compare the DNA analysis of such a sample with a similar analysis of tissue from the animal, either at slaughter or at any stage during the lifetime of the animal, to confirm the integrity of the identification system. This would be an extremely powerful tool, not only to confirm the integrity of the information held in the database, but also to further support beef labelling systems.

While all of the developments described above are possible, implementation would require considerable changes in legislation and approach by the Commission of the EU.

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Un système de base de données informatisé pour les besoins de la traçabilité bovine

R. Houston

Résumé

Depuis 1988, l'Irlande du Nord applique un système de base de données informatisé qui enregistre les renseignements relatifs à tous les bovins ainsi qu'aux exploitations dans lesquelles ils sont entretenus, à leurs déplacements et aux tests dont ils sont l'objet. Ce système, conçu au départ pour la gestion des programmes officiels d'éradication de la tuberculose et de la brucellose, a été développé afin d'étendre la fonction de traçabilité à l'assurance qualité, la santé publique et la commercialisation de la viande bovine et des produits carnés. Le système actuel de seconde génération est issu de la base de données originelle. L'auteur retrace l'évolution du système depuis le stade manuel et en décrit les développements ultérieurs potentiels.

Mots-clés

Bases de données – Bovins – Déplacements d'animaux – Identification – Irlande du Nord – Santé animale – Santé publique – Systèmes d'information – Systèmes informatiques – Traçabilité.



Sistema de base de datos para la rastreabilidad de bovinos

R. Houston

Resumen

En Irlanda del Norte se viene usando desde 1988 un sistema informático de bases de datos para registrar información sobre todos los ejemplares bovinos y sobre las explotaciones ganaderas, los desplazamientos de animales y las pruebas que se les practican. Aunque en un principio este sistema servía sólo para aplicar los planes oficiales de erradicación de la tuberculosis y la brucelosis, posteriormente se ha ido utilizando para fines de rastreabilidad, haciendo extensiva su aplicación a la garantía de calidad, la salud pública y la comercialización de carne vacuna y productos cárnicos. La base de datos original dio paso al actual sistema de segunda generación. El autor repasa su desarrollo desde el sistema manual de los primeros tiempos, y describe las posibilidades de evolución que presenta el sistema.

Palabras clave

Bases de datos – Bovinos – Identificación – Irlanda del Norte – Movimiento de animales – Rastreabilidad – Salud pública – Sanidad animal – Sistemas de información – Sistemas informáticos.



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