Brucellosis in cattle in Ireland 1998-2005: Progress towards eradication continues

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Brucellosis in cattle, caused by *Brucella abortus*, is now at an historically low level in Ireland. The country is free of porcine brucellosis and ovine brucellosis. The incidence of brucellosis in cattle has shown a significant reduction each year since 1998. Data from that period are presented here. The reasons for the improvement are discussed, along with a look ahead to the crucial final phase of the eradication programme.

A brief history of the eradication scheme in Ireland

A milk ring test survey of 105,000 dairy herds in 1965 indicated that at least 12% of herds were infected with *Brucella abortus*, with higher levels in the intensive dairying areas in the south (Hynes, 1973).

A national eradication scheme commenced in 1966. A programme using a combination of vaccination, serological testing, anamnestic testing using 45/20 vaccine (Cunningham and O’Connor, 1971), and slaughter of reactors made considerable progress towards eradication. By the mid-1980s the number of herds being restricted for brucellosis had been reduced to between 300 and 500 annually. However, prior to final eradication being achieved, the programme was relaxed. In 1984, the decision was taken to cease vaccination. In 1986, the requirement for an annual herd blood test was removed, and in 1988 the requirement for a pre-movement test was withdrawn. During this period we continued to have between 300 and 400 new brucellosis restrictions each year. In 1991, the testing programme was curtailed due to a dispute with veterinary practitioners. In 1992, the introduction of the suckler cow quota scheme led to unusually high volumes of movement of older dairy cows throughout the country, as farmers sought to establish suckler quotas. It is likely that this led to an increased dissemination of brucellosis infection throughout Ireland.

From 1993 onwards the levels of new restrictions for brucellosis began to increase, with 434 new restrictions in 1994, 441 in 1995, 630 in 1996, 823 in 1997 and a peak of 1,081 in 1998. A full round of serological testing was re-introduced in 1998, and this, along with the range of measures outlined below, has led to significant reductions in disease levels each year between 1998 and 2005.

Brucellosis data 1998-2005

A number of different parameters can be used to measure progress in relation to brucellosis eradication. Whichever measurement is used, it is clear that significant improvements have been seen since 1998. Data in relation to four key measurements are presented here:

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Figure 1: Number of brucellosis blood positives, 1998 - 2005. The 2005 figure represents a 96.4% decrease on the 1998 figure.

Figure 2: Number of new herd restrictions due to brucellosis, 1998 - 2005. The 2005 figure represents an 86.7% decrease on the 1998 figure.

Figure 3: Herd incidence of brucellosis, 1998 - 2005. There were 142,302 cattle herds in Ireland on December 31, 1998 with a total bovine population of 7.79 million. There were 123,318 cattle herds in Ireland on December 31, 2005, with a total bovine population of just under 7 million.

Figure 4: Number of new herd depopulations due to brucellosis, 1998 - 2005. The 2005 figure represents a 91.8% decrease on the 1998 figure.
Reasons for improvement
A series of enhanced programme measures have been introduced since 1998 and these collectively have produced a marked reduction in the incidence of brucellosis.

Pre-movement test
The 30 day compulsory pre-movement test was re-introduced in February 1998 and has significantly reduced the levels of 'bought-in' infection. In 1997, as a result of epidemiological investigations by veterinary inspectors, bought-in animals were considered to be the source of infection in 29% of brucellosis cases where a likely source was attributed. By comparison, in 2001, bought-in animals were considered to be the source of infection in only 12.5% of cases.

Intensified testing programme
A full round of annual serological testing of all eligible animals was re-introduced in 1998. In addition, computerisation of the contiguous testing programme and greater use of computerised mapping technology have improved the efficiency of the surveillance programme.

Rapid depopulation policy
Experience in Ireland has clearly shown that the more quickly an infected herd is removed the less contiguous spread occurs. Contiguous spread has been considered to be the major source of new infections in Ireland in recent years. It is current policy to remove infected herds within as short a time frame as possible following initial diagnosis.

Slurry treatment
B. abortus can survive for up to 12 months in slurry. Work done in Ireland (Hahesy, 1995) has shown that marker bacteria in slurry can be dispersed up to half a mile in certain conditions (Hahesy, 1995). A number of samples taken by the Department of Agriculture and Food in 1999/2000 showed that Brucella could be isolated quite easily from slurry on many infected farms. Arising from this, a unique system has been developed in Ireland to allow for the simple treatment of slurry on infected farms. The system is based on the addition of hydrated lime in liquid form ('thick lime milk') in sufficient quantities to raise the pH of the slurry to 12. Following treatment, slurry can be safely spread within 24 hours. This treatment has been compulsory in all brucellosis depopulated herds since January 2001.

Diagnostic improvements
No test for brucellosis is 100% sensitive or 100% specific. The microtitre serum agglutination test (MSAT) has been the standard screening test in use in Ireland, with the complement fixation test (CFT) used as a confirmatory test. A number of newer blood tests for brucellosis are now available, and greater use is being made of these as part of the eradication programme. These tests include the indirect ELISA (EIA), the competitive ELISA (cEIA) and the fluorescence polarisation assay (FPA). Strategic use has also been made of the brucellin skin test in designated areas and herds.

Improved milk testing
The milk ring test (MRT), applied to bulk milk samples, had been in use since 1965. It suffers from poor specificity, however, with up to 80% false-positive results and a more specific and sensitive test, the milk (or whey) ELISA test, has become available. The changeover to the whey ELISA test commenced in 2000, and since March 1, 2002, it has replaced the MRT as the milk screening test in Ireland.

Extended rest periods
District Veterinary Offices now have the option of extending the rest period following depopulation beyond the previously used four-month period. This measure is used in situations where active infection is still present in contiguous herds and where a re-stocked herd could be at high risk of becoming re-infected.

Compliance with programme requirements
Given the highly infectious nature of brucellosis, there has been considerable focus on ensuring that all testing, movement, and tracing...
requirements are fully complied with. Successful prosecutions have been brought in cases of serious irregularities. DAF staff now have access to a highly effective and user-friendly computerised system for tracking cattle movements. In a disease outbreak situation this has made the job of tracing movements and contacts much quicker and more efficient.

Cull cow monitoring
Since 1999, blood samples for brucellosis testing have been taken from cows in all slaughter plants. This scheme has yielded significant benefits in terms of identifying disease that may otherwise have gone undetected for some period of time. More than 80% of all cows slaughtered are now sampled in this way.

Role of veterinary practitioners

Reporting abortions
The reporting of abortions, the testing of foetal material and post-abortion blood testing of cows for brucellosis remain critical means of detecting infection.

Raising awareness
Practitioners have a key role to play in raising awareness of the highly contagious nature of this disease. Epidemiological investigations indicate that in many instances the most likely source of spread from one farm to another is via people or equipment. If brucellosis occurs in a herd, it is a relatively common occurrence for mechanical spread to occur to the home herds of milkers and other farm workers. Obviously it is particularly important for veterinary surgeons to lead by example in terms of cleaning and disinfection of their clothing, footwear, calving jacks and ropes when attending any calving cases, afterbirth retentions, etc. Likewise, practitioners should advise their clients about cleaning and disinfection, buying-in policies, pre-movement and post-movement testing requirements.

Public health
Practitioners also need to be aware of the human health risks associated with brucellosis, and to remind farmers and farming families about reducing these risks. Taking suitable precautions at calving time and never drinking unpasteurised milk are the key points to emphasise. While there are no official figures available, it is clear that many veterinary surgeons in Ireland have themselves contracted brucellosis at some stage during their careers. We are aware of at least one example where the first indication of a brucellosis problem in an area was when a practitioner himself developed brucellosis. The source of the problem was traced to a herd he had been attending.

Challenges in the final phase of eradication
A previous article on brucellosis in cattle (Sheahan et al., 2002) stated that: “The current programme, with some ongoing refinements and improvements, should continue to deliver significant reductions in disease levels over the next few years.” This prediction has been borne out. Now, we can be reasonably confident that total eradication of brucellosis in Ireland is achievable in the short to medium term, if the current programme is maintained.

There are some challenges that we need to overcome. The trend towards an increasing use of ‘bed-and-breakfast’ seasonal housing arrangements in some parts of the country is a concern. This practice increases the risk of spreading the disease, particularly where pregnant female animals are involved.

The presence of relatively higher levels of brucellosis in Northern Ireland is a particular concern, given the close trading and other cross-border links that exist.

The ongoing co-operation between the veterinary authorities in the North and South on this issue is extremely useful.

Complacency and decreased awareness are potential dangers in the final stages of any eradication programme. All veterinarians have a role to play by maintaining vigilance, setting high standards of personal on-farm cleaning and disinfection, and keeping brucellosis on the differential diagnosis list when abortions or weak calves are seen.

There is general agreement by all stakeholders that for final eradication to be achieved in Ireland, North and South, it is essential that the control measures now in place are maintained until the finishing line has been crossed and indeed for a further ‘buffer period’ beyond that point. We have seen previously, in the mid-1980s, the consequences of relaxing controls too quickly when the end is in sight.

References

