TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHIES (TSE) SURVEILLANCE PROGRAMME

New Zealand is free from bovine spongiform encephalopathy (BSE), classical scrapie of sheep and goats, and chronic wasting disease (CWD) of deer. The TSE risk management measures implemented in New Zealand have been described in previous annual reports (e.g. Vink & Kittelberger, 2013). Passive and active surveillance activities are performed. New Zealand performs type B surveillance for BSE as specified by chapter 11.5 of the World Organisation for Animal Health (OIE) Terrestrial Animal Health Code (OIE, 2013). BSE points have been accumulated since 2005 and New Zealand has consistently maintained well in excess of the required 150 000 points. BSE testing in 2013 generated 40 285 BSE points (Table 1) and all tests were negative. Surveillance for CWD is not mandated by the OIE, and is partly funded by industry; it is carried out to assure New Zealand’s trade partners of freedom from this disease. The TSE surveillance programme will continue to be refined in accordance with new knowledge, tests, standards and market access needs.

The passive surveillance programme consists of a targeted, incentivised scheme under which veterinary practitioners submit brain material from animals showing clinical signs of neurological disease. In addition, samples from all imported cattle, sheep, goats and deer are tested for TSE on brain tissue after they die or are culled. Testing by both histopathology and a rapid TSE test was performed up to 2011; subsequently, rapid TSE tests are only performed when histopathology either cannot rule out a TSE diagnosis or has not been done. The numbers of samples submitted have declined since the early 2000s, but have remained more or less stable since 2009 (Figure 1). Although samples are submitted year round, there is a clear seasonal trend, with a peak from July to September (Figure 2).

A number of innovations have been carried out in recent years, specifically regarding diagnostic testing for scrapie and CWD.

Table 1: Numbers of samples tested for transmissible spongiform encephalopathies (TSEs) in 2013, by passive and active surveillance

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>TISSUE</th>
<th>TEST TYPE</th>
<th>ROUTINE SURVEILLANCE</th>
<th>IMPORTED ANIMAL</th>
<th>SURVEILLANCE STREAM</th>
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</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>Brain</td>
<td>Histopathology</td>
<td>134*</td>
<td>–</td>
<td>Passive</td>
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<td></td>
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<td>IDEXX TSE ELISA</td>
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<td>3</td>
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<td>Deer</td>
<td>Brain</td>
<td>Histopathology</td>
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<td>–</td>
<td>Passive</td>
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<td>0</td>
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<tr>
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<td>MRLN† IDEXX TSE ELISA</td>
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<td>–</td>
<td>Active</td>
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<td></td>
<td>MRLN IDEXX TSE ELISA</td>
<td>324</td>
<td>–</td>
<td>Active</td>
</tr>
</tbody>
</table>

*This level of testing earned 40 285 surveillance points for BSE in accordance with Chapter 11.5 of the 2013 OIE Terrestrial Animal Health Code. Only cases where the veterinary practitioner submits a TSE submission form are reported here and counted for BSE points.

Figure 1: Numbers of brain samples tested for BSE, scrapie and CWD under the incentivised passive surveillance scheme from 2007 to 2013

Figure 2: Numbers of brain samples tested for BSE, scrapie and CWD under the incentivised passive surveillance scheme during 2013 (left axis), and trend by calendar month of samples submitted from 2005 to 2013 (right axis)
In October 2009, MPI announced the finding of the first confirmed case of atypical scrapie/Nor98 in a New Zealand-born sheep (Kittelberger & McIntyre, 2009; Kittelberger et al., 2010). MPI strongly supports the view of the World Organisation for Animal Health (OIE) that atypical scrapie is “clinically, pathologically, biochemically and epidemiologically unrelated to ‘classical’ scrapie, may not be contagious and may, in fact, be a spontaneous degenerative condition of older sheep” (OIE, 2013). It is therefore considered to be a negligible biosecurity risk (Vink & McIntyre, in press). The sensitivity of detection of the prion causing classical scrapie is higher in lymphoid tissue than in brain tissue, whereas the atypical scrapie/Nor98 prion is not detected in lymphoid tissue (Meloni et al., 2012). In combination with the labour-intensive and costly nature of testing brains, this led to research being initiated in 2010 at the Investigation and Diagnostic Centre (IDC), Wallaceville, to evaluate the validity of testing medial retropharyngeal lymph nodes (MRLNs) from sheep and goats (McIntyre, 2011) with rapid TSE tests as an alternative diagnostic procedure for the detection of classical scrapie. This work showed that the IDEXX BSE–scrapie test (IDEXX Laboratories Inc., Westbrook, Maine, USA) had high diagnostic sensitivity and specificity (Kittelberger et al., 2014).

Passive surveillance for CWD has been carried out since the early 2000s. However, the number of submissions of deer brains by veterinarians declined sharply in 2008 following the imposition of a maximum of two submissions per farm per year. To inform the feasibility of supplementary active surveillance, a research project was initiated in 2009 to evaluate whether lymphoid tissue could be used with confidence. No difficulties were encountered that would preclude the testing of MRLNs.

These developments led to the implementation since 2010 of an active surveillance programme for classical scrapie and CWD to complement the passive surveillance activities. Samples from normal adult animals sent to slaughter were routinely collected from meat processing plants across the country. In 2013, 324 sheep and 328 deer were tested; these numbers were based on a sample size calculation designed to detect disease at a low prevalence in the population. Although the farms of origin of the sampled deer demonstrated reasonable geographic spread, sheep from the northern part of the North Island were under-represented (Figure 3). MRLN samples of sheep and deer were tested at the IDC; in addition, brain samples were taken of the sheep for confirmatory testing. In 2013, the IDEXX BSE–scrapie test was used, rather than the previous rapid TSE test (Bio-Rad TeSeE ELISA ruminants). All samples tested negative.

REFERENCES


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