Transmissible spongiform encephalopathies (TSE) surveillance programme

New Zealand is free from the main TSEs, namely bovine spongiform encephalopathy (BSE) of cattle, classical scrapie of sheep and goats, and chronic wasting disease (CWD) of deer. The TSE surveillance and risk management measures implemented in New Zealand have been described in previous annual reports (e.g. Vink & Kittelberger, 2014). Surveillance for CWD is not mandated by the World Organisation for Animal Health (OIE), and is partly funded by industry; it is carried out to assure our trade partners of NZ's freedom from this disease.

Both passive and active surveillance activities are performed for the three abovementioned TSEs. 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, brain tissue samples from all imported cattle, sheep, goats and deer are tested for TSE after they die or are culled. Testing is performed by histopathology at accredited veterinary diagnostic laboratories; a rapid TSE test is done at MPI's Investigation and Diagnostic Centres (IDCs) when histopathology cannot rule out a TSE diagnosis. The IDEXX TSE enzyme immunoassay (EIA) (IDEXX Laboratories Inc., Westbrook, Maine, USA) has replaced the previous Bio-Rad TSE ELISA for all rapid testing.

Table 1 shows the numbers of samples tested in 2014.

New Zealand performs type B surveillance for BSE as specified by chapter 11.4 of the OIE Terrestrial Animal Health Code (OIE, 2015a). 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 2014 generated 37 178 BSE points and all tests were negative.

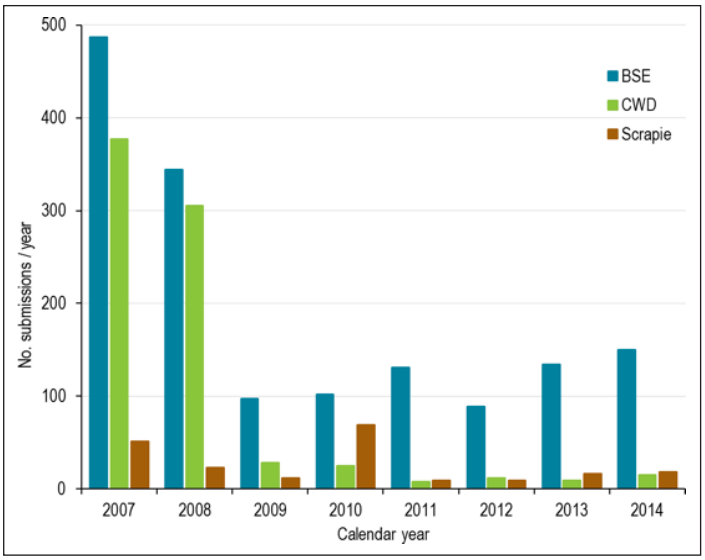

Figure 1: Numbers of brain samples tested for BSE, scrapie and CWD under the incentivised passive surveillance scheme from 2007 to 2014

The numbers of samples submitted under the incentivised passive surveillance programme have declined since 2005. Specifically, the number of deer submissions for CWD declined sharply in 2009 following the imposition of a maximum of two submissions per farm per year in 2008. The annual sample numbers 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**).

To complement the low submission numbers for classical scrapie and CWD, active surveillance has been performed since 2010. Samples from normal adult animals sent to slaughter were routinely collected from meat processing plants across the country. In 2014, 336 sheep and 332 deer were tested; these numbers were based on a sample size calculation designed to detect disease at a low prevalence in the population. All samples tested negative. The farms of origin of the sampled sheep and deer demonstrated reasonable geographic spread across the North Island as well as the South Island, which appeared to be representative of the underlying farm density (**Figure 3**).

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, 2015b). MPI therefore considers it to be a negligible biosecurity risk (Vink & McIntyre, 2014). The sensitivity of detection of the prion causing classical

Table 1: Numbers of samples tested for TSEs in 2014, by passive and active surveillance

Species	Tissue	Test type	Source of test issue		Surveillance stream
			Routine Surveillance	Imported animal	
Cattle	Brain	Histopathology	150*	-	Passive
		IDEXX TSE ELISA	6	3	Passive (rule-out)
Deer	Brain	Histopathology	18	-	Passive
		IDEXX TSE ELISA	0	0	Passive (rule-out)
	MRLN†	IDEXX TSE ELISA	332	-	Active
Sheep	Brain	Histopathology	15	-	Passive
		IDEXX TSE ELISA	0	10	Passive (rule-out)
	MRLN	IDEXX TSE ELISA	336	-	Active

* This level of testing earned 37 178 surveillance points for BSE in accordance with Chapter 11.4 of the 2013 OIE Terrestrial Animal Health Code. These points are calculated from clinical suspect and fallen stock cases submitted by veterinary practitioners under the surveillance programme.
†Medial retropharyngeal lymph node

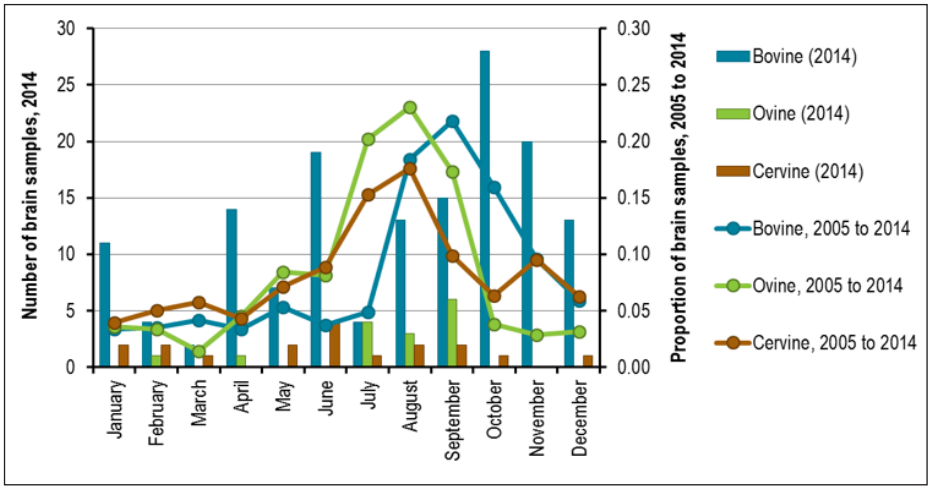

Figure 2: Numbers of brain samples tested for BSE, scrapie and CWD under the incentivised passive surveillance scheme during 2014 (left axis, bars), and trend by calendar month of samples submitted from 2005 to 2014 (right axis, lines)

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); therefore, testing of lymphoid tissue using an ELISA test is an attractive proposition. Research was initiated in 2010 at the IDC to evaluate whether lymphoid tissue testing could be used with confidence. This showed that testing medial retropharyngeal lymph nodes (MRLNs) from sheep and goats with the IDEXX TSE test had high diagnostic sensitivity and specificity (Kittelberger et al., 2014). Consequently, MRLN samples of sheep and deer taken under the active surveillance programme were analysed using this test. The TSE surveillance programme will continue to be refined in accordance with new knowledge, tests, standards and market access needs.

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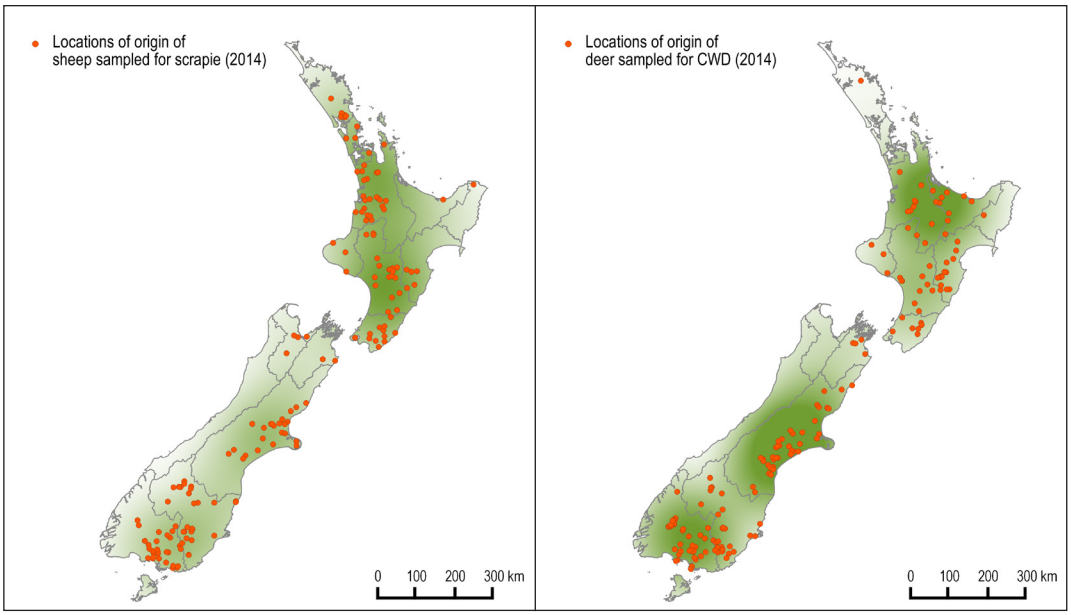

Figure 3: Locations of farms submitting sheep samples for classical scrapie (left; n=162) and deer samples for CWD (right; n=164) during 2014. Two animals were sampled per location. The underlying heatmap represents the density of farms with sheep and deer respectively (source: FarmsOnLine)