Unfortunately, said Johnson, vaccination was the clue for the gelding described in the opening of this statement, provides the best diagnostic answers.

The rub with CSF is that false positives are common because of blood contamination and because neuromyelitis optica (NMO) have a leaky blood brain barrier, so it's expected that there will be more antibodies in the CSF in normal horses. With imperfect tests on both sides and no gold standard, what's a veterinarian to do? “I always encourage people, when it is possible, to test both blood and CSF,” Johnson said.

Rule outs of other likely causes include: severe head trauma, subdural hematoma, meningitis, and, of course, myelopathy. If you know the best sample to collect, as well as the best test to request, it should improve your ability to diagnose neurologic diseases in horses,” said Johnson, who focused primarily on equine reproductive medicine.

For Lyme, equine diagnostic testing potential criteria include:

1. Antemortem tests available for Lyme include:
   - Western Blot (Standard, sWB, and Modified mWB) — useful when testing acute serum samples to discriminate early infection from chronic infection.
   - ELISA; IgG and IgM antibodies (nonspecific and not specific for Lyme disease)
   - LLA (linked immunoassays, SAG 2, 4/3; and SAG 1, 5, 6)
   - S. neurona and Borrelia burgdorferi antibody production. However, she cautions that this approach—doing both the serum and the CSF—can result in ambiguous results.

2. Postmortem testing available for Lyme includes:
   - Pathogen DNA
   - Evidence of nervous system infection by polymerase chain reaction testing (PCR, a type of test for pathogen DNA) or intrathecal (within the spinal cord) antibody production; and
   - Abnormal CSF; however, it is not always diagnostic.

She bases EPM diagnosis in the antemortem (live) horse on three principles:

1. Presence of neurologic disease:
   - As with EPM, neurologic signs;
   - Possible exposure;
   - Recent onset of neurologic signs;

2. Rule outs of other likely causes:
   - Any history of neck trauma;
   - Rule outs that are appropriate for the case.

3. Confirmation of EPM:
   - Presence of proteins: OspA, OspC (thought to indicate early infection), and OspF (thought to indicate chronic infection). The Multiplex assay, which 79% of the poll respondents in the audience said they were using.

Johnson also points out there are times when the ambiguous results you can get and how you should interpret the information in light of the patient’s clinical status. “Only then do you figure out which ancillary lab tests are appropriate to submit,” she said. “And when you get back the results, you figure out what they mean.”

“Some people think if you have a positive Lyme test, you have Lyme,” she said, noting that while she began studying Lyme nine years ago, she’s not much further in her understanding it than she was when she started. “We all know that EPM diagnosis is challenging, because there is extensive equine exposure to the pathogen. If you know the best sample to collect, as well as the best test to request, it should improve your ability to diagnose neurologic diseases in horses,” said Johnson, who focused primarily on equine reproductive medicine.