

Disadvantages of Pooling Samples – False Negatives

The prevalence rate of BVD-PI calves in the industry is very low. Our data for the last 12 years shows that in 500 lb. animals the prevalence rate is 0.38-0.42%. This is the same as 4 BVD-PI animals for every 1,000 tested. This prevalence rate is higher in lighter weight animals. Because of this low prevalence rate it makes sense that pooling animals together in a single test would save producer money on testing costs as most pools will test negative.

CST has extensively evaluated pooling with Elisa technology in an attempt to lower testing costs. In 2006 we identified conditions where negative animals could mask the signal of positive animals resulting in false negative test results. We then conducted several research studies in an attempt to identify what was causing these false negative results when samples were pooled. Although we could not identify what was causing this effect we suspect it could be antibody interference or factors involved in cell mediated immunity. In a research study CST participated in with the National Animal Disease Center of the USDA, factors other than antibodies caused false negative results in detecting calves PI with Hobi-like pestivirus.

In a large study conducted by CST we evaluated the accuracy of a commercial Erns Elisa test where samples were pooled into a single test. One hundred ninety confirmed positive samples were pooled with 1140 negative samples in groups of 7 and resulted in the Elisa only identifying 85.3% of the groups correctly. Pooling samples in this study resulted in false negative results in 14.7%.

Recently we evaluated pooling of samples using the IDEXX SNAP test. In the first study where two negative animals were pooled with a single positive animal, it resulted in missing 37% of the positive animals. A second study was conducted pooling just one negative sample with one positive sample. In this study 67% of the positive animals were missed. Examples of the negative results can be seen in the following pictures.





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All positive animals used in this study were confirmed positive with two or more testing methods. In the above photos, animal 101c is a confirmed positive but a weak positive on both the CST and IDEXX Elisa tests. In the SNAP test this animal tests negative even as a single sample.

CST has tried multiple techniques to overcome this testing interference and has been unable to develop methods to prevent the effect of negative animals causing false negative results in pooled samples. Therefore while pooling samples will reduce testing costs it will result in lowered accuracy and likely remove the benefit of PI testing altogether.