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Emerging Acute/Peracute Clinical Disease Outbreaks Associated with BVD Virus

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Recent reports suggest cattle herds are being affected by atypical Bovine Viral Diarrheal (BVD) virus with disease in cows as well as calves and heifers, and higher than expected morbidity and mortality. An investigation in Pennsylvania has revealed dairy herds with high mortality and clinical signs including the following: high fever (107 degrees F or higher), anorexia, decreased milk production, occasional diarrhea, respiratory signs, and death within 48 hours of onset. Diagnostic evaluations are being performed to determine the etiology of these disease outbreaks. To date, BVD has been isolated in two of the herds (1).

Evidence exists that a similar BVD outbreak situation started in Canada early in 1993. Ontario reports of multiple herds with peracute disease and high death loss in both young and adult cattle, as well as other acute forms of BVD have been verified by a survey of veterinarians, BVD laboratory submissions, and rendering data. While overall laboratory submissions at Ontario Veterinary Laboratory Services have remained relatively constant, submissions with evidence of BVD disease increased almost three-fold in 1993 compared to 1991-92. In addition, Ontario rendering data show a 60% increase in numbers of dead calves picked up in 1993 compared to 1992 (2).

Two distinct biotypes of BVD virus have previously been identified: cytopathic and noncytopathic. Persistent infection with noncytopathic BVD has been recognized and both biotypes are isolated from classical mucosal disease.

Acute and peracute nonmucosal clinical presentations appear to be associated with a BVD virus that has major genomic differences from the virus that causes classic BVD. Researchers at USDA-ARS-NADC have tentatively labelled the classic BVD type 1 and the other genomic form type 2. Canadian peracute outbreaks have been associated with a noncytopathic BVD classified as type 2. Both biotypes (i.e., cytopathic and noncytopathic) occur in each of the genomic types (type 1 and type 2). Work is currently underway to characterize the BVD genome from the affected herds in PA.

The clinical picture of BVD is varied and diverse and includes the following diseases/signs of disease (3). Prenatal BVD infections can lead to abortions, mummifications, stillbirths, birth of weak calves or, in other cases, lead to persistent infection in surviving calves. These persistently infected calves, if later infected with a cytopathic BVD virus, may develop mucosal disease (with oral and gastrointestinal ulcers and diarrhea) or chronic debilitating disease. Acute BVD, alternatively, results from postnatal BVD infection. Often the result is subclinical or mild clinical disease. Other acute BVD presentations include hemorrhagic syndrome (with thrombocytopenia, fever, and diarrhea, particularly in calves) or peracute disease (with high fever [107-110 degrees F], anorexia, occasional diarrhea, and respiratory disease, in all ages of cattle often resulting in death within 48 hours of onset).

USDA-APHIS-VS is working with ARS, universities, and diagnostic laboratories to gain further information related to the outbreak in Pennsylvania and further clarify the situation in North America. This collaborative effort has gathered information to address the following questions:

1) WHAT IS THE DISTRIBUTION OF THE ACUTE AND PERACUTE DISEASES ASSOCIATED WITH TYPE 2 BVD?

On request, 29 veterinary diagnostic laboratories in 28 states contributed input on observed BVD manifestations in the last 12 months. The laboratories reported observations of BVD cases which were confirmed, suspected but not confirmed, and
not seen (for several manifestations). For each, they were asked to indicate if the numbers seen had increased, decreased, or showed no change from previous years. Highlights of the results are shown below:

- Laboratories in seven states (CA, KY, MI, NY, OH, PA, WI) reported confirmed cases of peracute disease with PA and NY indicating an increase in numbers, three states indicating no change, and 2 unable to determine. Two (2) laboratories (CO and WA) reported suspected, but not confirmed, cases.

- Eight (8) of the responding laboratories had confirmed cases of hemorrhagic syndrome in the last 12 months, with NY indicating increased numbers. Two (2) laboratories had suspected, but not confirmed, cases.

- Twenty-three (23) laboratories had confirmed cases of mucosal disease, with PA and OK seeing an increase and KY and OH seeing a decrease. Two (2) laboratories reported suspected, but not confirmed, cases.

- Seventeen (17) laboratories had confirmed cases of BVD associated abortions, with PA and CA seeing an increase and OH seeing a decrease. Six (6) states reported suspected, but not confirmed, cases.

2) DO ACUTE AND PERACUTE CLINICAL PRESENTATIONS OF BVD REPRESENT AN EMERGING DISEASE CONCERN FOR U.S. CATTLE?

Yes, this form of BVD does represent an emerging disease concern to U.S. cattle, because:

1) there are documented clinical cases in certain regions of the U.S.,

2) there are large numbers of unprotected cattle at risk of disease (unvaccinated or inadequately vaccinated),

3) introduction of infected cattle into susceptible herds appears to be a risk factor, and few U.S. producers maintain closed herds, and

4) implications for individual producers with peracute BVD outbreaks are severe. 42% of dairy producers in the U.S. do not vaccinate dairy heifers against BVD.

The distribution of inadequately vaccinated dairy heifers are unknown (4). 87% of cow-calf operations fail to vaccinate cows for BVD, and only 33% of beef calves up to weaning are vaccinated for BVD (5). Again, the distribution of inadequate vaccination is unknown. On the other hand, management practices to control this disease (BVD vaccination) are widely available.

3) HOW CAN PRODUCERS MINIMIZE RISK OF BVD OUTBREAKS AND DEATH LOSSES?

Recommended management practices to control BVD (2,6,7,8) include:

a. Vaccination has often been recommended in breeding females prior to breeding to protect against fetal infection. However, incomplete or partial protection of the fetus has been reported. Canadian reports show that effectively vaccinated cattle may develop clinical signs, but herds do not experience high mortality.

b. Management practices with epidemiologic basis for prevention of BVD disease outbreaks include:
- Limit movement of cattle on and off the farm to essential traffic (maintain closed herd to the extent possible). If not possible, test cattle prior to entry to the herd for persistent infection with BVD.
- Isolate newly purchased and sick cattle.
- Avoid overcrowding, stressing, and mixing of cattle.
- Identify and remove persistently infected cattle in the herd. Persistently infected cattle are a source of infection to other cattle with transmission through inhalation or ingestion of infected saliva, oculonasal discharge, urine, and feces. Effectiveness of these techniques relative to peracute BVD disease are unclear.

4) HOW DO CURRENT VACCINATION PROTOCOLS RELATE TO DISEASE RISK?

To date, reports from Ontario animal health officials, certain U.S. veterinary diagnostic laboratories, and university personnel indicate that outbreaks of BVD have typically occurred in herds with a history of no or inadequate BVD vaccination. Single initial doses of a killed vaccine are inadequate, even if vaccination is boosted annually. While adequate vaccination appears to protect the cow from severe disease and death, it may not always protect the fetus. Most current vaccines contain type 1 BVD virus, but there does appear to be some cross-protection against type 2 BVD virus, at least for a limited period.

Killed virus vaccines require a two-dose priming vaccination series, followed by frequent revaccination and are safe for
use in pregnant cattle.

Modified-live vaccines have the advantage of needing only a single initial dose, but should not be used in pregnant cattle or cattle in contact with pregnant cattle. Periodic revaccination may be necessary. All vaccines should be used according to the label. Consideration should be given to vaccination of new arrivals upon entry into the herd (7).

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