

## Environmental testing for PRRSV and PEDV around dead-boxes

Igor A.D. Paploski<sup>1</sup>, Dennis N. Makau<sup>1</sup>, Mariana Kikuti<sup>1</sup>, Cesar A. Corzo<sup>1</sup>, Kimberly VanderWaal<sup>1</sup>

<sup>1</sup>Department of Veterinary Population Medicine, University of Minnesota

### Background:

Pigs on sow farms die of various causes including highly contagious diseases. Studies have shown that the odds of a PRRS outbreak in farms that perform rendering as a disposal method for dead animals are higher than in farms that perform composting. However, the mechanisms behind such association are unclear. This study aimed to assess if the environment surrounding dead animal boxes can test positive for PRRS and PED.

### Materials and Methods:

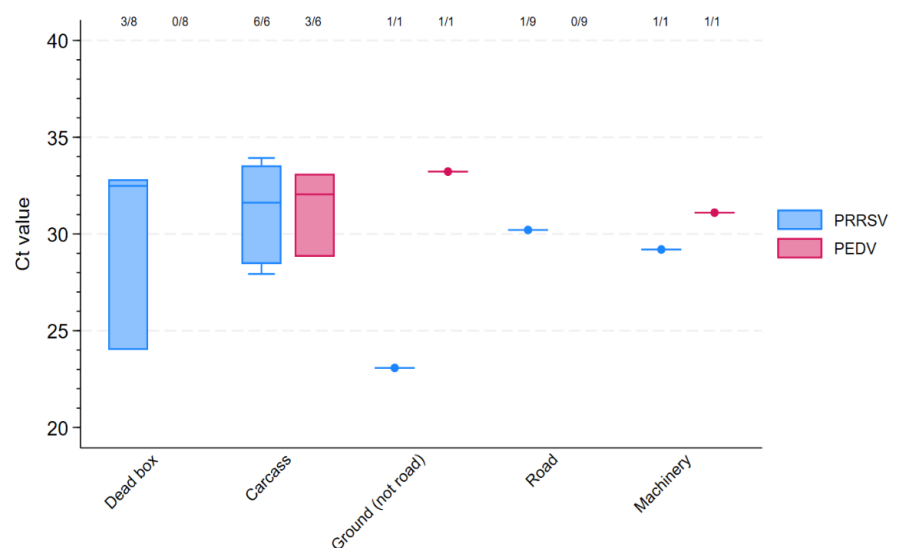
Farms were visited and environmental samples of the roads, machines and structures involved in moving dead animals from the barns to the rendering box were collected. Three PRRSV positive finishing farms, one of which was also PEDV positive, were visited. Two of the farms had animals during the visit, while the third farm had depopulated one week prior to the visit and had whitewashed the dead box immediately after depopulation. A total of 25 (10 samples each for farms one and two and 5 from farm three) environmental samples were sent for PRRSV-1 and PRRSV-2, PEDV, PDCoV and TGEV detection by RT-PCR. Three samples with the three lowest Ct values from each positive farm were sent for viral isolation on both MARC-145 and PAM cells, to ascertain the viability of the detected viruses.

### Results:

All samples from farm three were Rt-PCR negative for all tested viruses. Of the 20 environmental samples from farms one and two, 12 and 5 yielded RT-PCR positive results for PRRSV-2 and PEDV, respectively. PRRSV positive samples were obtained from the surfaces of dead animals (fresh and desiccated), in and around the rendering box, the wall of metal boxes placed inside rendering boxes and the skid loader bucket used to carry dead animals. Two positive samples were also obtained from the ground, one in front of a barn and another on the road approximately 5 meters from the rendering box. The Ct values of PRRSV positive samples ranged from 23.1 to 33.9 (Figure 1). Of the 6 PRRSV positive samples (3 from each farm) submitted for viral isolation, one yielded a PRRSV isolate (collected from the ground in front of the barn of one of the farms). The five PEDV positive samples were obtained from the only PEDV positive farm, which also had six PRRSV positive samples (5 of which were positive for both PRRSV and PEDV). No PEDV isolate was obtained from environmental samples, despite it being attempted on 6 samples.

### Conclusions and implications:

This study shows that samples collected from or near rendering boxes can test positive for viruses present on the farm, and may also contain viable viruses. All farms yielding positive samples for PRRSV or PEDV were already known to be positive to these viruses. The presence of positive samples on roads suggests a potential pathway for PRRSV transmission between farms, as these roads are used not only by rendering trucks but also by farm personnel, veterinarians, maintenance crews, and feed trucks that may visit subsequent farms. One virus isolate was obtained, even though isolating viable PRRSV is challenging, particularly from environmental samples. Our environmental sampling focused on farms utilizing rendering for dead animal disposal, but other methods for disposing of dead animals, such as composting or incineration, are also available. Further studies investigating the potential for environmental contamination by PRRSV and PEDV on farms using processes other than rendering are warranted. These results illustrate the challenges of ensuring biocontainment of viruses on farms.



**Figure 1.** PRRSV (blue) and PEDV (red) RT-PCR Ct values in environmental samples collected in and around dead animal removal facilities on three farms, stratified according to where sample was collected. Numbers on top of box plots show the number of positive samples out of total samples tested in each category.

This study was funded by the University of Minnesota Swine Disease Eradication Center.