Environmental monitoring as an educational tool in a PEDV outbreak

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Keypoints:

- Environmental monitoring can highlight biosecurity gaps and be an educational tool
- Biosecurity involves exclusion and containment
- Staff involvement in monitoring results and solutions can be critical to staff behavior and motivation

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In March 2019 the Kansas State Swine Teaching and Research Center (KSTRC) was unfortunately confirmed infected with PEDV. After diagnosis, 2 other sites within the university failed to exhibit clinical signs with no evidence of infection. This indicated the infection was contained to the KSTRC. Also, extensive monitoring of the feed mill failed to find PEDV contamination evidence. The KSTRC is a farrow to finish farm all on one site, utilizing batch farrowing every 5 weeks. Thus, there are 4 groups of sows and 5 groups of nursery and finisher pigs. At initial evaluation about 2 weeks after confirmed infection we began an extensive environmental monitoring program. Environmental monitoring was subsequently performed until 16 weeks post infection. Initial results indicated 44% of samples obtained from outside the perimeter buffer zone which included worker cars, an on-site student apartment, and the area near the entrance bench were PCR positive. Additionally, 81% of the transition zone (shower/changing area and office) and 66% of samples from non-pig contact areas outside of barns had evidence of PEDV. As expected, pig contact areas were heavily contaminated throughout the monitoring period.

After the initial testing we revised the entrance and transition area protocols. These changes were effective at containing the PEDV within the farm. We reduced the contamination in the transition zone by cleaning and disinfecting the area twice per day. However, higher viral contamination than expected remained in the transition area. We attributed this to dirty farm coveralls being laundered in the transition zone. After moving the coverall laundry, we were able to maintain the transition area free of viral contamination. This illustrates the importance of keeping the transition zone free from contamination. In many farms we have observed dirty coveralls left on the floor of the shower area. We believe this leads to contamination of the transition zone and potential for transmitting viral contamination outside the farm.

The environmental monitoring was critical for changing farm staff behavior. Upon seeing improvements in contamination rates, the staff was motivated to comply with protocol changes. Also, farm staff contributed the idea to move the laundry from the transition zone as well as other changes to make protocols more effective and practical.

The infection and subsequent monitoring highlighted several important lessons. Foremost among these were that biosecurity has a containment as well as an exclusion component, transition zones need redundant procedures to reduce contamination, and environmental monitoring can be a useful educational tool.

	Weeks after initial infection					
Location	**2**	**4**	**6**	**8**	**12**	**16**
Exterior to perimeter	44% (4/9)	13% (1/8)	0% (0/1)	25% (1/4)	0% (0/2)	0% (0/3)
Transition	81% (13/16)	21% (3/14)	29% (4/14)	44% (4/9)	0% (0/6)	0% (0/7)
Non-pig contact outside buildings	66% (4/6)	50% (2/4)	25% (1/4)	NS	0% (0/4)	0% (0/5)
Non-pig contact Inside buildings	100% (12/12)	80% (4/5)	88% (8/9)	75% (3/4)	100% (4/4)	80% (4/5)
Pig contact areas	NS	100% (2/2)	100% (2/2)	100% (4/4)	100%* (4/4)	75% (3/4)

*Closure gilts challenged at 6 weeks and gilts in gestation barn.
NS=Not sampled.