

## Evaluation of biosecurity measures to prevent indirect transmission of porcine epidemic diarrhea virus

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### Keypoints

- PEDV transmission is likely to occur with contaminated fomites in low biosecurity scenarios.
- Indirect contact transmission of PEDV can happen very rapidly. Transmission was detected 24 h after personnel moved from infected to low biosecurity rooms (no change in clothes, boots or washing hands)
- Changing PPE (personal protective equipment) and washing skin exposed areas is beneficial to decrease the risk of PEDV transmission

### Background

The effectiveness of biosecurity methods to mitigate the transmission of porcine epidemic diarrhea virus (PEDV) via farm personnel or contaminated fomites is poorly understood. This study was undertaken to evaluate the effectiveness of biosecurity procedures directed at minimizing transmission via personnel following different biosecurity protocols using a controlled experimental setting.

### Materials and Methods

In order to evaluate the risk of indirect transmission of PEDV by personnel following different biosecurity protocols, study personnel moved from an infected group of pigs to groups of naïve pigs housed in separate rooms. Personnel in the low biosecurity (LB) group moved directly from the infected room without changing clothes or footwear or washing hands. Personnel in the medium biosecurity (MB) group changed clothes, footwear and washed hands and face, and personnel in the high biosecurity (HB) group showered and changed clothes and footwear. Movements started approximately 44 h following the experimental inoculation of pigs in the INF group at a time when direct contact transmission was known to have occurred. The contact time with piglets in each room was 45 minutes. Transmission was measured by virus shedding (RT-PCR) in the sentinel pigs.

### Results

Virus shedding in INF pigs peaked at 1 day post infection (dpi) and viral RNA levels remained elevated through 19 dpi despite the fact that diarrhea was very mild. Sentinel pigs in the LB group became PEDV positive after the first movement of study personnel from the INF group. However, rectal swabs from pigs in the MB and HB groups were negative during the 10 consecutive days of movements and remained negative through 24 days post movement when the trial was terminated (Figure 2).

Viral RNA was detected at 1 through 3 days post movement from the personal protective equipment of LB personnel. In addition, at 1 dpm, 2 hair/face swabs from MB personnel were positive; however, transmission of virus was not detected. All swabs of fomite from the HB study personnel were negative.

### Conclusions:

Indirect PEDV transmission through contaminated PPE occurs rapidly (within 24 h) under modeled conditions even when clinical signs of diarrhea are limited. Biosecurity procedures such as changing PPE, washing exposed skin areas, or taking a shower are recommended for pig production systems and appear to be an effective option for lowering the risk of PEDV transmission between groups of pigs.

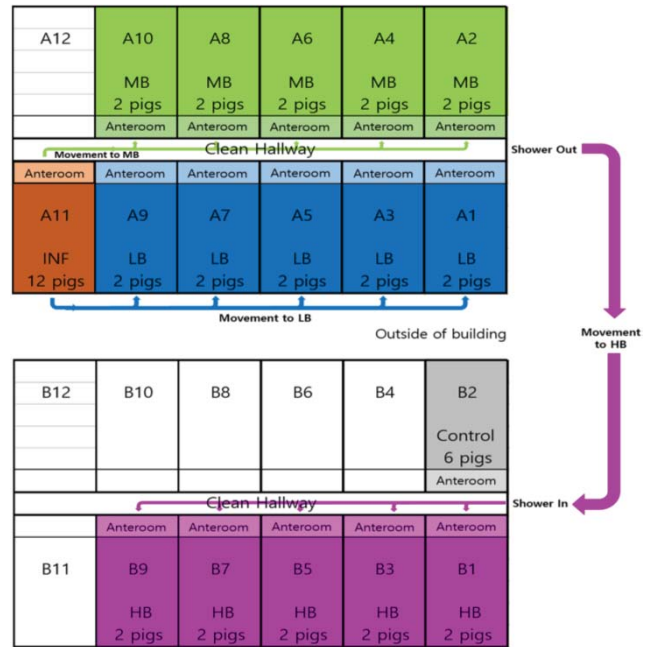


Figure 1. Movement from infected source group (INF) to low biosecurity group (LB) and INF to medium biosecurity group (MB)

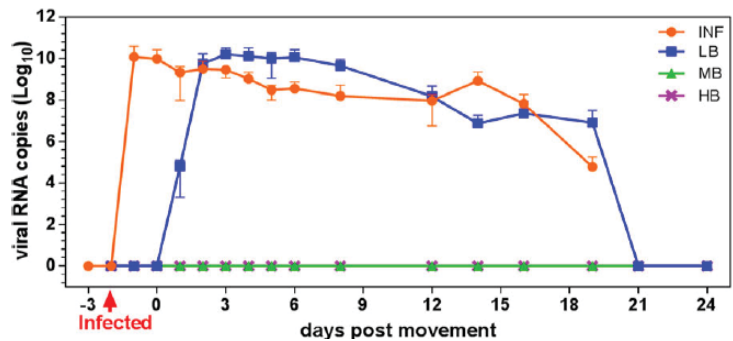


Figure 2. Viral shedding of pigs. Movements were terminated at 10 day post infection (dpi). Data presented are average values of viral RNA copies ( $\pm$  SD) of infected source group (INF) (n = 12), low biosecurity group (LB) (n = 10), medium biosecurity group (MB) (n = 10), and high biosecurity group (HB) (n = 10) groups.

Based upon the paper cited here: Kim et al. BMC Veterinary Research (2017) 13:89 DOI 10.1186/s12917-017-1017-4