

Control and Prevention of Foal Diarrhea Outbreaks

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Isolation of sick and in-contact foals, disinfection, and effective farm management are essential steps in controlling a potentially expensive foal diarrhea outbreak. Prevention also includes vaccination and measures to prevent infectious diseases from entering the farm. Author's address: Maxwell H. Gluck Equine Research Center, University of Kentucky, Lexington, KY 40546-0099. © 2001 AAEP.

1. Etiology

When dealing with any infectious disease, knowing the etiology and epidemiology of the disease is paramount to developing a control plan. This is especially true in cases of foal diarrhea. The most commonly diagnosed cause of foal diarrhea in intensive breeding areas worldwide is rotavirus Group A.^{1,2} In a three-year study of foal diarrhea outbreaks in central Kentucky, rotavirus was the cause of 90% of farm outbreaks.¹ The epidemiology of this disease has been extensively studied. Other common causes of infectious foal diarrhea include *Salmonella*, *Rhodococcus equi*, *Clostridium difficile* and *perfringens*,³ and multiple Gram-negative bacteria causing concurrent septicemia. The epidemiology for these diseases is not as well understood. For example, how long does a *R. equi* foal shed bacteria in its feces during and after convalescence? Coronavirus,^{4,5} adenovirus, and cryptosporidia have been reported from both diarrheic foals and normal foals, with uncertain significance.

2. Outbreak Control

To the best of our knowledge, contagious causes of foal diarrhea are spread by environmental-oral or

fecal-oral transmission. Minimizing the exposure to the pathogen will be of great aid in slowing and stopping a foal diarrhea outbreak. Drawing from reports in the literature of infectious disease control, as well as personal experience, general principles of isolation, disinfection, and traffic control are required to curtail outbreaks of diarrhea.^{6,7,8,9} Foal diarrhea, with the exception of the typical foal heat diarrhea, should be the first indication for animal isolation. A diarrheic foal should be considered infectious and contagious until proven otherwise. This is especially true with foals less than 60 days of age, when the majority of serious rotaviral diarrhea cases occur. While this may seem extreme to the farm manager or horse owner, the expense of an all-out diarrhea outbreak due to rotavirus or *Salmonella* more than outweighs the inconvenience from separating sick foals.

Isolation should be intensive, with protective clothing (gloves, gowns, and shoe coverings) worn prior to entering the stall and either disposed of afterwards or attached to the stall for the next person to use. A separate thermometer should be used for sick foals. Different mucking tools should be used in sick animals' stalls; alternatively, stalls of

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healthy horses should be cleaned first, with the sick animals' stalls cleaned last. Then, all equipment should be disinfected. The same rules apply for grooming tools and any other equipment used on sick animals.

The muck from sick foals' stalls should not be spread on fields, but disposed of in a manner consistent with the regulations of the locale. Options may be disposal via dumpster or composting the manure in a pile that will not contaminate ground water and is fenced off from other horses. Under no circumstance should the manure be spread onto fields occupied by horses (or on any fields if the etiology is *Salmonella*).

Stalls, equipment, clothing, and any towels used in a barn with sick horses should be disinfected with a chemical which is effective 1) against the pathogen, 2) in the presence of organic matter, and 3) on all surfaces involved. Phenolic compounds have been shown to be effective against rotavirus in the presence of organic matter,¹⁰ and two products are approved for use in Kentucky international equine quarantine facilities.^{a,b} Practical experience has shown that the most important part of the disinfection process is the hard work involved in cleaning the surfaces so that they can be adequately disinfected by chemicals. Surfaces need to be washed with a detergent and rinsed prior to disinfection. Guidelines for disinfection of stalls and horse facilities have been published in the lay press for your clients¹¹ and for the practitioner¹² (see Appendix). Traffic control is paramount. Once a sick foal has been detected, no in-contact foals should be moved to other locations. In-contact foals, whether sharing the same barn or paddock, could be incubating the disease and represent a potential source of infection for other parts of the farm should they be moved. Isolation and disinfection methods discussed above should shield these foals from significant further exposure, with the hope that they have not ingested enough pathogen to cause disease. In a three-year study of rotavirus, the only clinically normal foals which were rotavirus positive were on a farm where a rotavirus diarrhea outbreak was in progress.¹

Traffic of people should also be curtailed so that only specified individuals deal with sick animals and do not handle others. An alternative is to work with healthy animals first, then don protective clothing prior to working with sick animals. Veterinarians, farriers, and other personnel who have to travel between barns should visit the barn with sick animals last (unless there is an emergency). Use of protective clothing should be enforced. Vehicles going between and through barns to deliver bedding and feed should also have the same traffic pattern of going to non-affected barns first, leaving the sick animals' barn last. If driving the tractor with the muck wagon through the barn is necessary, always attempt to drive in a direction from healthy to sick animals' stalls whenever possible.

3. Contagious Disease Prevention

While it may not be practical to implement all of the following measures on every farm, the more closely they are adhered to, the lesser the risk of disease outbreaks, whether from foal diarrhea or other infectious diseases. Common sense and scientific studies have shown a clean environment at foaling decreases the incidence of foal diarrhea.⁵

1. Implementing an infectious disease prevention program revolves around vaccination, disinfection, and management. Among the causes of foal diarrhea, equine rotavirus is the only pathogen for which a vaccine^c is commercially available.¹³ This has proven to be quite effective in preventing and minimizing the effects of rotavirus diarrhea on central Kentucky horse farms.¹⁴ Some breeding farms insist that incoming pregnant mares have been vaccinated in order to protect the resident population. The vaccine is labeled for use at 8, 9, and 10 months of gestation in pregnant mares to enhance protective colostrum immunity to foals.
2. Horses should be segregated on the farm according to use, with a minimum of animal movement on the farm. That is, resident pregnant mares, barren and maiden mares, weanlings, yearlings, horses in training, and so on, are grouped in separate paddocks and barns. Each horse should be kept in the same stall as much as possible, thus minimizing movement of horses around the barn. If more than one horse needs to use a stall, the same group of animals should share the same stall. This step can take significant organizational effort and should be accomplished in the fall after weaning and prior to mares being heavy in foal.
3. Resident mares and foals should be kept separated from visiting horses as much as possible. Many contagious diseases have been spread by turning out a new mare with the resident population, only to have rotavirus diarrhea, equine herpesvirus abortion, strangles, influenza, salmonellosis, and other diseases start shortly after the co-mingling. A quarantine period for new mares to be added to a resident herd should be at least 14 days, which should account for the incubation times of most infectious diseases (for strangles, a 21-day isolation is preferred). Establish a schedule for disinfecting stalls and barn aisles throughout the year to reduce pathogen buildup. The practicality of this depends upon the types of flooring and stall construction present. All stalls which will have mares foaling in them should be thoroughly cleaned and disinfected prior to each foaling. Whenever possible, mares should foal in their own stalls, avoiding the use of central foaling

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stalls. If central foaling stalls must be used, disinfection must be thoroughly done between foalings.

Mares coming onto a farm for foaling purposes should arrive at least 30 days prior to the anticipated foaling date. This allows the mare's immune system to become exposed to the "local" pathogens, develop antibodies, and pass those onto their foals.

4. Conclusions

Fortunately, the steps involved in control and prevention of foal diarrhea outbreaks also are applicable for most other equine infectious diseases. Major practices are discussed in this article, however other measures are often overlooked, such as controlling rodents throughout the year, providing adequate hand-washing facilities with liquid soap and disposable paper towels, washing contaminated personal clothing with disinfectant, and other "details" which are just as important. Practitioners should encourage their clients to work with them to develop an infectious disease plan for their facility. The cost and work of isolation, disinfection, and effective farm management can more than pay for themselves in the long run of not having to deal with salmonellosis, rotavirus, and other diseases.

References and Footnotes

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^aTek-Trol® Bio-Tek Industries, Atlanta, GA.

^b1-Stroke Environ® Stearis Corp., Mentor, OH.

^cEquine Rotavirus Vaccine, Fort Dodge Animal Health, Fort Dodge, IA.

Appendix

Sample Disinfection Procedure

The following are steps to cleaning and disinfecting non-porous surfaced stalls. These same procedures can be used for non-porous aiseways and horse trailers.

- Remove all buckets, feed tubs, and bedding from the stall.
- Sweep the walls and floor of the stall to remove as much organic matter as possible.
- Using a hose and a garden spray nozzle, wash down all stall surfaces using a detergent, such as Tide® (Proctor and Gamble, Cincinnati, OH) or with a phenolic disinfectant solution which contains a detergent. For stubborn stains, keep the surface wet for 10-20 minutes, then scrub by hand. Rinse by starting at the top of the stall, then working from the edges of the stall to wherever the draining area is. If dirty areas remain (pay attention to corners and drains), these may need a second cleaning.
- After all surfaces are cleaned and rinsed, remove as much excess water as possible, especially from floors, by using a broom. Since the disinfectant will be diluted according to label instructions, you don't want the disinfectant further diluted by spraying it on standing water.
- Put on protective clothing, gloves, and goggles before working with the disinfectant. Follow label instructions and dilute the disinfectant into an applicator such as a garden sprayer. Spray the disinfectant to the walls (begin at the top) and floors and allow to dry. *Do not* rinse.
- If an outbreak of infectious disease is ongoing, repeat the spraying and drying of the disinfectant.
- Scrub all buckets, feed tubs, and other feeding equipment with a detergent, then rinse. Spray on the diluted disinfectant, allow to stand for 10 minutes, then thoroughly rinse with potable (drinkable) water. *Anything that the horse will eat out of needs to be completely rinsed of disinfectant.* Dry these containers and return them to the disinfected stall.
- All equipment such as pitchforks, shovels, and grooming tools should also be cleaned, rinsed,

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then soaked in disinfectant solution for 10 minutes. Natural bristle brushes should be rinsed and other equipment can be allowed to dry. Any disinfectant will be tough on leather brush handles, so these should be protected.

9. Towels, contaminated clothing, and other machine washable materials should be rinsed of

gross filth, soaked for 10 minutes in disinfectant solution, then washed with laundry detergent.

The Appendix on Sample Disinfection Procedure has been reprinted with permission from Dwyer RM. Disinfection Protocol. *The Horse* Nov 1999: 76.