**ROTAVIRUS**

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<th>Animal Group(s) Affected</th>
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<td>Mammals, including humans; and poultry</td>
<td>Fecal-oral</td>
<td>Diarrhea and other signs of enteritis, including lethargy, and inappetance</td>
<td>Self-limiting to severe</td>
<td>Supportive, correcting dehydration, acid-base imbalance; antibiotics to prevent secondary infection</td>
<td>Separate vaccines available for humans, cattle, horses, and pigs</td>
<td>Yes, potentially</td>
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**Fact Sheet compiled by:** Meredith M. Clancy  
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**Fact Sheet Reviewed by:** Yunjeong Kim; Bonnie Raphael

**Susceptible animal groups:** Ruminants, including non-domestic ruminants such as antelope, pronghorns (*Antilocapra americana*), cervids, and giraffids. Rotaviral enteritis also documented in poultry and wild birds, ferrets, felids, canids, equids, guinea pigs, domestic pigs and poultry, in addition to other zoo and wildlife species: pygmy marmoset (*Callithrix pygmaea*), grizzly bear (*Ursus arctos horribilis*), and red kangaroo (*Megaleia rufa*).

Rotaviruses, especially of Group A, are the most common cause of severe diarrhea in children under 5 years of age. Rotavirus infections are considered species-specific, but re-assortment of the virus between species may occur.

**Causative organism:** Rotaviruses (family Reoviridae) are generally named after the species where it was first found: Bovine Rotavirus, Porcine Rotavirus, Feline Rotavirus, Canine Rotavirus, etc. Much diversity exists in these viruses due to their genomes’ ability to mutate, re-assort and rearrange. In human medicine and virology, rotaviral isolates are grouped according to antigens present using A – E, with Group A being the most prevalent cause of illness in humans but Group C can also cause outbreaks.

**Zoonotic potential:** Animal rotaviruses are both reservoirs for genetic exchange with human rotaviruses, and animal rotaviruses can infect humans, both naturally and experimentally.

**Distribution:** Worldwide  
**Incubation period:** Variable – from 15h to 5d  
**Clinical signs:** Despite the difference in species that can present, rotavirus nearly always presents as diarrhea. Animals may be infected subclinically. Clinical infections generally present with inappetance and dullness with or without mild fever and development of pale yellow diarrhea that can at times be mucoid. In severely affected individuals, dehydration and metabolic acidosis develop, which can lead to death.

**Post mortem, gross, or histologic findings:** Gross lesions include thinning of the intestinal walls with sequestration of fluid into the small intestine leading to marked distention of the intestines and even abdomen. In young animals, non-digested milk may be present in the intestine. Depending on the strain’s virulence, lesions may present in only localized areas of the jejunum, or may be throughout the small intestine and into the large intestine. Rotaviruses infect mature enterocytes on the villi surface in the small intestine, leading to villous atrophy and blunting with club-shaped, stumpy villi that are often fused. Crypt epithelium is often hyperplastic while trying to recover the lost villous enterocytes. Columnar epithelium is lost and replaced with cuboidal or squamous epithelium.

**Diagnosis:** Electron microscopy (EM) can be used as a screening tool to identify virus in the feces. EM alone is not sufficient to diagnose rotavirus as the cause of diarrhea; comparative levels with nonclinical animals are used in cattle to support diagnosis. Antigen detection can be performed via enzyme-linked immunosorbent
assays (ELISAs), which are commonly used to diagnose rotavirus. Enzyme immunoassays (EIA) point-of-care rapid-response tests exist for human medicine that have been validated in detecting bovine rotavirus. Latex agglutination testing can also be used to detect Group A rotavirus antigen. Polymerase chain reactions, including reverse-transcriptase qPCR can both detect rotavirus and differentiate between species. Indirect fluorescent assay (IFA) can detect antigen in tissue, generally using post-mortem samples. Serology is generally noncontributory, as rotavirus exposure is often widespread and results are nonspecific.

**Material required for laboratory analysis:**
- Feces for ELISA, EIA, latex agglutination, PCR
- Fresh tissue (small intestine) for IFA
- Blood/serum for serology

**Relevant diagnostic laboratories:**
- Michigan State University Diagnostic Center for Population and Animal Health
  - ELISA and PCR for bovine, equine, and porcine rotavirus and ferret rotavirus PCR
- Clinical Pathology Laboratory
- A215 Veterinary Medical Center
- Michigan State University
- East Lansing, MI 48824-1314
- (517) 353-1683
- http://www.dcpah.msu.edu/

- Texas A&M Veterinary Diagnostic Laboratory
  - Electron microscopy
  - College Station Laboratory
  - PO Box Drawer 3040
  - College Station, TX 77841-3040
  - Phone: (979) 845-3414
  - Fax: (979) 845-1794
  - http://tvmdl.tamu.edu/


**Treatment:** Treatment relies on correction of dehydration and metabolic acidosis, using IV fluid resuscitation or oral rehydration solutions and bicarbonate given orally or IV to address acidosis. Antibiotics are often used to prevent secondary bacterial infections via the compromised gastrointestinal tract.

**Prevention and control:** In ruminants, colostrum often contains antibodies (IgA) to rotavirus in herds where rotavirus is naturally circulating, but the calf’s antibody concentrations decline sharply after one week. Vaccination of the dam 1-3m prior to calving increases circulating antibodies in the milk and helps reduce rotavirus in calves. Most commercially available bovine vaccines include coronavirus. In exotic hoofstock, protection is variable and vaccine reactions have been seen after two or more administrations. In species without viable vaccine, prevention and control are best achieved by reducing fecal contamination of the environment through routine cleaning and removal of feces, disinfection of enclosures and all material the animal contacts. Isolation of sick individuals and quarantine of new animals is important to reduce exposure of naïve animals to shed virus. In production animals, the all-in/all-out technique is used to reduce exposure and contamination.
## ROTAVIRUS

**Suggested disinfectant for housing facilities:** Rotaviruses are harder than coronaviruses and other diarrheal viruses. Disinfectants that are reported to be effective include formaldehyde (0.25%), phenol (2%), sodium hypochlorite (1%), quaternary ammonium compounds, and iodophores. Cleaning, steaming, and disinfecting of housing facilities is recommended.

**Notification:** Not reportable to USDA or OIE

**Measures required under the Animal Disease Surveillance Plan:** N/A

**Measures required for introducing animals to infected animal:** Not recommended. Animals that have been naturally infected may have short-lived immunity via mucosal and cell-mediated immunity, however, so can be reintroduced once convalesced.

**Conditions for restoring disease-free status after an outbreak:** N/A

**Experts who may be consulted:**

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**References**

