

RECOMMENDED ROUTINE HEALTH PROTOCOL FOR RHINOCEROS

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Routine health monitoring should be performed on all rhinoceros on an ongoing basis. Animals should be trained to permit sampling and examination. The following protocol advises that specific baseline laboratory tests be performed for the purpose of evaluating current health status. Additional tests are recommended to increase baseline information on other diseases to determine their significance to rhinoceros health. The final decision for specific procedures should be made by the animal care and veterinary staff based on individual circumstances. For additional information, refer to the AZA Rhinoceros Husbandry Manual and contact the TAG/SSP Rhinoceros Veterinary Advisors.

Minimum Database:

1. Anamnesis - review information regarding previous health screens, medical problems, diagnostic test results, and treatments.
2. Physical exam by a veterinarian familiar with rhinoceros health problems. This should include a review of all systems (if performed in a restraint device, exam may be limited by training and temperament of individual, and design of facility). Special attention for certain species include¹:
 - a. Black rhinos – oral exam due to prevalence of dental problems/gingivitis
 - b. Indian rhinos – foot exam due to prevalence of pododermatitis; ophthalmic exam (keratitis)
3. Body weight – actual weight should be recorded when possible; body score and/or digital photos can be used when scales are not available.
4. Blood collection
 - a. Complete blood count (CBC), serum chemistry panel, fibrinogen, serum protein electrophoresis
 - b. Bank a minimum of 10-20 ml serum (duplicate sample for SSP serum bank) – all banked samples should be labeled with species, studbook #, age, sex, and date collected.
5. Fecal analyses
 - a. Parasite screen - Fecal samples should be collected semiannually; direct, flotation, and sedimentation should be performed on every sample to detect intestinal parasitism.
 - b. Enteric pathogen screen - Aerobic culture of feces for enteric pathogens should include special media for the detection of *Salmonella spp.* Because *Salmonella* organisms may be shed intermittently, at least 3-5 fecal cultures should be performed (may be done on consecutive days) on an annual basis. PCR is also highly recommended in addition to culture on the same sample.
6. Vaccinations
 - a. Annual vaccination for leptospirosis in black rhinoceroses, and possibly for greater Asian one-horned rhinoceroses.
 - b. Vaccination for rabies, tetanus, arboviruses (EEE/WEE/WNV) may be considered if part of an institutional protocol.
 - c. Check with SSP veterinary advisor for current recommendations on specific vaccination protocols.

Additional Preventive Health Recommendations:

1. Serological screening for leptospirosis (multiple serovars), and WNV (West Nile Virus). Although these tests are not species-specific and have not been validated for rhinoceros, they may detect cross-reactive antibodies in exposed animals. The presence of antibodies does not necessarily denote infection/disease. Antibodies to leptospirosis have been detected in vaccinated rhinoceros and may be used to monitor response and possibly determine frequency of vaccination, although data is insufficient to determine protective titers (M. Miller, pers. comm.). Insufficient data is available at this time to determine the significance of WNV antibodies in rhinoceros; although it is important to note that an Indian rhinoceros with clinical signs developed a WNV titer during a period of known exposure (P. Calle, pers. comm.).
2. Serum vitamin E levels – submit heparinized plasma to Michigan State University, Animal Health Diagnostic Lab.
3. Reproductive tract examination – whenever feasible, a complete reproductive examination should be conducted which includes transrectal ultrasound, semen collection and analysis, and serum or fecal collection for hormone analysis. Uterine leiomyomas have been observed in captive Indian rhinoceros and may be detected via transrectal ultrasound.¹ Since this condition can have potentially significant effects on reproduction, a careful evaluation is warranted if the animal is being considered for breeding.
4. Urinalysis – fluid and sediment evaluation of clean voided sample; +/- microbial culture.
5. Foot radiographs – radiographs of feet are strongly recommended if any signs of pododermatitis or nail cracks are observed, especially in Indian rhinoceros.¹ Regular foot trimming and care may require immobilization in certain individuals (i.e., those that have a history of chronic foot problems).
6. Diagnostic tests for tuberculosis – periodic testing for tuberculosis in rhinoceros should be considered especially if there has been a history in the institution or herd. Intradermal testing can be performed using PPD bovis (0.1 ml ID) in the eyelid, behind the ear, caudal tailfold, or axillary region.¹ Both false positive and false negative results have been found in testing rhinos. Ancillary tests such as nasal swabs, tracheal washes, and gastric lavages for mycobacterial culture have been used. Serologic tests (ElephantTB STAT-PAK/“Rapid Test”, MAPIA; Chembio Diagnostic Systems Inc.) are being investigated for possible use in rhinos. Contact Dr. Michele Miller for additional information.
7. Other vaccination regimens will depend on regional requirements and exposure risks (consider vaccination for Clostridial diseases). Contact the SSP veterinary advisor for current information.

References Cited

1. Miller, R.E. 2003. Rhinocerotidae (Rhinoceroses). *In: Zoo and Wild Animal Medicine*, 5th ed. M.E. Fowler and R.E. Miller (eds). W.B. Saunders, St. Louis, MO. Pp. 558-569.

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