# Approaches to Management and Care of the Neonatal Nondomestic Ruminant

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**KEYWORDS**
• Neonate • Pediatric • Antelope • Deer • Ungulate

Veterinary care of the newborn nondomestic ruminant can be both rewarding and very challenging, with some practitioners reporting high mortality rates before 6 months of age.[1] Case management during the critical neonatal period is typically modeled after management of domestic ruminants; however, some unique differences exist between nondomestic ungulates and their domestic counterparts that affect neonatal management and medical care. These differences become apparent quickly when the nondomestic neonate requires treatment, and an understanding of the special needs and risks involved can prevent unnecessary problems and losses. The aim of this article is to discuss the unique challenges presented by nondomestic ruminants and approaches to management of neonatal and pediatric cases.

## MANAGING THE DAM

Preparation for neonatal and pediatric care should begin when the dam is known to be pregnant. In nondomestic ruminants, early diagnosis of pregnancy is uncommon due to the increased manipulation and stress associated with handling for rectal palpation or ultrasound. For many species, fecal progestin assays have been developed, providing a means of noninvasive pregnancy diagnosis.[2–5] However, this procedure often requires time-intensive repeated fecal collection from the dam (generally 2–5 samples per week) for the duration of 1 estrous cycle plus 2 or more weeks to verify maintenance of elevated progesterone. Several zoological institutions have endocrinology laboratories that may provide endocrine assessments as a service. Rectal palpation and ultrasound examination should be conducted opportunistically, such as for annual examination, hoof

The authors have nothing to disclose.
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Vet Clin Exot Anim 15 (2012) 265–277
doi:10.1016/j.cvex.2012.02.004 **vetexotic.theclinics.com**
1094-9194/12/$ – see front matter 

work, or other medical care, for females suspected to be pregnant. However, the risk of anesthesia may outweigh the benefit of early pregnancy diagnosis in many fractious species. Stillbirths are not uncommon in nondomestic ruminants anesthetized repeatedly during pregnancy.

Preparation for successful birth and mother-rearing should emphasize health and reduced disturbance to the dam. If possible, fractious nondomestic ruminants should give birth in an environment to which they are accustomed. Inexperienced dams, particularly those that have not observed maternal behavior in a herd setting, should be monitored closely near parturition. Species with strong herd instincts may be most successful when housed with conspecifics during calving season, and many will demonstrate birth synchrony.[6,7] However, wild ruminant species vary widely in social grouping and behavior, and captive grouping can affect reproductive success.[8] Research into the best captive social environment for the species in question before birth can maximize the chance of successful birth and maternal care. Timing exposure of females to males in nonseasonal or seasonally polyestrous species to maximize the chance of late spring or early summer births in temperate zones can also improve neonatal survival in pasture-managed animals. Housing should provide the opportunity for seclusion, adequate ventilation and drainage, and exposure to sunlight to reduce pathogen levels.

Vaccination of dams for diseases of regional risk approximately 2 months before expected parturition can optimize levels of specific immunoglobulins (Igs) in colostrum and improve neonatal health. Vaccination at this time for diseases of particular concern to neonates such as *Clostridium* sp, *Escherichia coli*, rotavirus, coronavirus, and bovine viral diarrhea is common practice in domestic ruminants.[9–11] However, live vaccines should be used with caution in nondomestic ruminants. One month before expected birth, the energy ration should be increased and special attention paid to the provision of adequate calcium and minerals, particularly if the regional soil is deficient in specific minerals, such as selenium.

General signs of impending parturition include teat and udder enlargement, which can occur days to weeks before birth depending on the species, and vulvar swelling/relaxation. Vulvar changes generally occur closer to parturition than udder enlargement. Dams will often seek isolation just before birth and will often give birth to live offspring at night, while stillbirths and abortions can occur at any time.

## PREPARATION FOR BIRTH

While most ruminants are capable of successfully delivering and raising offspring, nondomestic ungulates in zoos and related institutions are often housed in unnatural social or environmental situations, increasing the chances of dystocia, conspecific trauma, and maternal neglect. If a neonate requires medical care, it may be impractical to house the animal with its dam due to the need for frequent separation, stress on the dam, and the likelihood of maternal rejection. Therefore, preparations for neonatal care should include a hand-rearing protocol, which should detail record keeping, equipment/supplies, formula and supplements needed, housing, and socialization. The Association of Zoos and Aquariums' Nutrition Advisory Group (http://www.nagonline.net/) and the book, *Hand-Rearing Wild and Domestic Animals,*[12] are practical hand-rearing resources. Veterinary preparations include plans for treatment of failure of passive transfer (FPT, discussed later). Plans to acquire plasma, colostrum, and milk replacer formulas should be in place before birth.