

Group Treatment Strategies for Animals in a Zoologic Setting



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KEYWORDS

- Group treatment • Zoo • Multispecies • Amphibian • Avian • Hoofstock
- Herd health • Aviary health

KEY POINTS

- Group treatments vary between taxa, but all have benefits and risks that should be considered before therapy administration.
- Treatments administered topically on or milled into food, solubilized in drinking water, and mixed into a bath are common routes of administration for groups of animals.
- Sick animals should be treated individually to ensure compliance, because group treatments are often only effective against highly susceptible pathogens.

INTRODUCTION

Providing care for groups of animals is a major part of practicing zoologic medicine. Herd health is key to the mindset of a zoo clinician no matter the species encountered, be it avian or artiodactylid. In addition to the classic examples of group treatment involving chemotherapeutics (discussed in detail later), zoo clinicians also practice herd health by preventing disease from entering the collection. Before traveling to a new institution, most animals undergo a preshipment examination, which serves as a screening tool for common infectious diseases specific to that taxa, and provides a snapshot of that individual's health. Diagnostics commonly included in a preshipment examination are a complete blood count, serum or plasma biochemistry, imaging, and fecal examination. On arrival to a new institution, most animals undergo a quarantine period, often 30 to 90 days, in addition to another thorough examination. All of these precautionary measures are vital to ensure that infectious disease does not enter an institution, and also provide the opportunity for targeted therapy if

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needed, before the animal is placed within its new social group. It is highly recommended that all animals that die within a zoologic setting receive a thorough gross necropsy with histopathology to try and determine the cause of death. Then, if an infectious cause is diagnosed, therapy for the remaining group of animals is based on the pathology findings.

Another way that zoo clinicians can try to limit the need for group treatment is to have a working knowledge of which taxa can be safely housed together. In addition to such factors as size and potential for trauma, knowledge of how certain infectious diseases interact with various species can prevent future outbreaks. For example, *Entamoeba invadens* is transmitted from clinically healthy herbivorous tortoises to snakes when they are housed together, causing the snakes to develop severe ulcerative colitis and hepatitis.¹ If a disease outbreak does occur, practicing vigilant biosecurity to try and limit transmission is key to decreasing the number of animals affected and needing treatment. Depending on the etiologic agent footbaths, isolation, and appropriate personal protective equipment may be used.²

When treatment is needed in a zoologic setting it presents unique challenges. One obstacle commonly encountered is that few pharmacokinetic studies have been performed in the species commonly found in zoos, so doses are often extrapolated from their closest domestic relative. Although extrapolation from domestics is done easily for some taxa, such as exotic canids, felids, or equids, there are species with no domestic counterpart, such as marsupials or invertebrates. Several different types of interspecies scaling have been described in the literature, with allometric scaling considered the most accurate.³ However, there are limiting factors to consider when using allometric scaling, such as the route of elimination and the extent of metabolism of the selected therapeutic agent.³ An additional challenge is that often accurate body weights cannot be obtained, so estimated weights are used, which can increase the risk of underdosing or overdosing an animal.⁴ Group treatment is not common for some taxa, such as large carnivores, and individual treatment is advised when possible. Once a dosage has been selected and a weight obtained or estimated, the next question is how to administer the drug to the animal. Treatment options are heavily dependent on the species, and are covered in detail in the following sections. Group treatment is not standard for all taxa, so only the most common species are discussed.

AMPHIBIANS

Terrestrial and aquatic amphibians may be housed in single-species or mixed species exhibits, and individually. Regardless of species, morbidity and mortality is best prevented with appropriate environments, husbandry, nutrition, and biosecurity.⁵⁻⁸ Separating ill or injured individuals from a group for individualized treatment is advised. Aquatic amphibians including premetamorphic larvae, neotenic salamanders, and aquatic newts and frogs inherently have a greater potential need for group treatments because of their aquatic existence; however, the potential exists for the need to treat a variety of amphibians as a group.

Terrestrial and aquatic amphibians living in a group may be separated for individualized treatments and this is generally well-tolerated. Individual animals may be temporarily moved out from the group enclosure to a separate enclosure for treatments and may remain separated for the duration of the treatment or be moved for short periods of time on a routine basis (Fig. 1). Individualized housing for medical care may be simplistic, but is acceptable as long as husbandry needs are adequately met.⁵ Benefits of individualized treatments are assurance of medication compliance, ability to closely monitor clinical condition, reduced risk of infectious disease spread,

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