

Arranging a Necropsy for a Wild Animal: Reasons and Procedures

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Abstract: Some wild animals admitted to rehabilitation die on arrival, or during care. While cause of death may be attributed to circumstances and/or obvious physical signs, there are situations more information about the cause of death is required (e.g., potential human exposure to disease) or could be extremely helpful for decisions by the rehabilitator, veterinarian, biologist or government agency. This paper offers an overview of reasons for necropsies, types, steps, costs, resources, guidelines, and possible requirements to facilitate the rehabilitator arranging for a necropsy in a timely, effective and cost-efficient manner.

Wildlife rehabilitators and their veterinarians work to help wild animals admitted to rehabilitation achieve and maintain good health. Unfortunately, some of them are unable to survive. In many cases, the animal's death may be attributed to circumstances (e.g., hit by a vehicle, fall from a tree, fed by rescuer [advanced pneumonia]) and/or obvious physical signs (e.g., chest punctures from cat's teeth, fractured neck). The sheer volume of wildlife cases and workload, and limited resources often can result in reliance on information from the circumstances and physical signs.

However, more information about causes of animal's death may be sought for many reasons, including when case is:

- of special interest, unusual, or an at-risk species;
- expected to provide immediate help with care and treatment decisions for others;
- causes are vague or unknown, with possible broader implications;
- multiple fatalities or trends from common causes are apparent or suspected;
- possible impacts on humans, domestic livestock, or domestic pets;
- may influence wildlife decisions, policies, or laws; or
- there are possible legal, financial or other reasons.

In such cases, more detailed information is wanted or needed as to the reason(s) that a wild animal died, the extent of condition, if and how it may affect other animals or possibly people, and further action that may be needed.

A necropsy is then arranged to be conducted on the animal, similar to an autopsy of a person. A necropsy is a specialized surgical examination of a dead animal, and more extensive than a quick examination or even a dissection. A necropsy can provide valuable information for a wildlife rehabilitator, agencies, and others to ultimately help wildlife. Communications with rehabilitators reveal that few have arrangements in place *before* the need for necropsies arise. This paper describes some tips on accomplishing that.

Why are necropsies conducted?

Necropsies can reveal wildlife injuries, impacts, and consequences - and help identify types of treatments that may be useful with concurrent or future cases. Necropsy results can be used to identify diseases and physical affects, and their geographic locations and movements, such as with rabies, plague, avian botulism and West Nile Virus. Necropsies may identify the vector of transmission and virulence, strain or mutation, extent and complexity of disease and/or condition, and secondary conditions. Necropsies may reveal parasites, such as Baylis ascaris, mites, tapeworms, and consequences of those infestations. They

may show presence of chemicals or toxins, and how they are affecting the species, which can then be used to identify sources and reduce or stop their use, such as lead shot in raptors, rodenticide in small animals, and larger animals that eat poisoned animals (secondary poisoning). As well as providing information on the specific animal's death, necropsies can provide crucial information in identifying trends and broader concerns, such as fragmented habitats and climate change.

Necropsies may reveal how care practices might have resulted in problems, such as aspirated liquids found in lungs, problems with hydration methods, products and amounts, or malnutrition or nutritional disorders due to diets or even feeding methods. Necropsies can reveal if antibiotics addressed particular bacterial infection, or even caused side effects. Such information can aid future rehabilitation decisions and practices, veterinary diagnostics and treatment and, ultimately, survival of wildlife.

Understanding the reasons that individual or larger populations of wild animals die provides information for policies, laws and resource allocation by the public, agencies, and other organizations. For example, the effects and extent of cat and dog bites on wildlife have helped public campaigns to reduce free-ranging pets. Necropsies that showed whales who starved when unable to process food since their stomachs were full of plastic waste prompted action to reduce use of plastics and change trash disposal practices. Wildlife management decisions and corporate policies may be influenced learning how practices affect wildlife and the extent of those populations, including oral rabies vaccine use, trash receptacles for fishing line, and road and bridge locations.

What are the types of necropsies?

A gross necropsy describes the animal's body condition and major findings, particularly of major organs (e.g., lungs, liver, kidneys, spleen, gastrointestinal tract,) and, if possible, an easily observed cause of death. Necropsy plus histology is the microscopic evaluation of tissue samples that may reveal bacteria, viruses, fungal organisms. A necropsy plus histology and toxicology is the evaluation of the tissue samples for toxins. Histologic results and correlation with any other diagnostic findings take longer and cost more. It is less expensive when a veterinarian removes tissue samples, puts them in a specified solution or refrigerates, and sends those to pathology lab than when the whole body is sent and tested. While a simple dissection may provide useful information, conducting necropsy requires more skill, knowledge, and resources – and is far more likely to reveal in-depth information for complex cases.

Who does necropsies and where?

Knowledgeable and skilled veterinarians, biologists, and pathologists with professional laboratories, equipment, and standardized procedures may conduct necropsies. In some cases, veterinarians or pathologists may supervise graduate students conducting necropsies. Written authorizations may be required in advance by a variety of government agencies (e.g., state or federal wildlife agencies, human health departments), such as required by laws and regulations for species protection (e.g., species listed as threatened or endangered, marine mammals), high potential for disease (e.g., rabies) and so forth. Various legal considerations may apply, such as if the animal may have been in illegal possession, victim of cruelty and/or abuse, 'taken' illegally (e.g., poaching), location of the action (e.g., federal land) or other legal action. The person or facility conducting the necropsy should be familiar with such considerations, including chain of custody and documentation requirements.

How can a necropsy be arranged?

In most cases, the first person to consult is the veterinarian with whom the rehabilitator works on wildlife cases for diagnostics, treatment, and euthanasia. Some veterinarians may perform necropsies for some species and possible conditions. In some states, government agencies must be involved. Others may refer to another veterinarian, pathology laboratory (e.g., government, university), wildlife biologist, or a specialty laboratory with expertise and authority for the particular tests (e.g., rabies, Chronic Wasting

Disease). In situations involving at risk species or legal considerations, the first contact is the responsible wildlife or law enforcement agency.

When a rehabilitator establishes a relationship with a veterinarian for services regarding wildlife cases such as diagnostics, treatments, and euthanasia, it is beneficial to discuss circumstances when rehabilitator may request the conduct or arrange necropsies. If the animal is covered by special legal, regulatory or health considerations, the appropriate government agencies must be consulted and, in some cases, grant prior written authorization for the necropsy and specifically who and where it will be conducted. In some cases, advanced testing and pathology may need to be arranged with a pathologist and laboratory with authority for such testing.

What is required to do a necropsy?

1. Qualified professional;
2. Government approval or authorization if needed;
3. Facility where disease containment and sanitation can be managed;
4. Equipment – including safety, protection equipment; appropriate surgical instruments;
5. Methods to document in writing and photos;
6. Materials to safely and securely ship samples and tissues as appropriate;
7. Carcass that is recently deceased and ‘stored’ safely and appropriately (not frozen).

What other information does the veterinarian or pathologist need?

1. Species – and special information, e.g., Rabies Vector Species, Endangered or Threatened Species (state or federal), marine mammal, migratory bird;
2. Date of admission;
3. Source location (city, state – be as specific as possible);
4. Date of animal’s death;
5. Method, if euthanized (e.g., inhalation, chemical);
6. Reason(s) for necropsy – potential disease consideration, exposure to toxins, unusual condition, treatment impacts, etc.;
7. History of case
 - Reason for initial admission/presentation;
 - Case documentation by caregiver/rehabilitator – animal estimated age, diet, behavior, medical care, comparison with others of species and age, trends/changes in health and/or behavior, reason for concern, contagiousness, etc.;
 - Veterinary consultations and records (diagnostics, treatments, dates, etc.);
 - Photos;
 - Other items of special interest – concerns, trends, similar cases, impacts, human and/or animal exposure;
 - Particular questions and needed information.

What is needed to help ensure useful information from a necropsy? *Some of these are general guidelines, while other steps may be specific to the situation.*

1. Have an established, ongoing relationship with a veterinarian and/or veterinary clinic. Consult with the veterinarian or clinic to learn what is required, including authorizations, documentation, arrangements for carcass disposal and possible costs *before* taking or shipping a wild animal for euthanasia and/or necropsy.
2. Understand how the method of euthanasia or the animal’s death will affect the necropsy. Before the wild animal is euthanized, discuss the case and possible information needed with veterinarian or pathologist. For example, discuss the sequence and consideration of type of data needed and particular tests, e.g., blood work *before* chemical euthanasia, impact of inhalation euthanasia on lung tissue, or location of tissue samples needed for testing (e.g., rabies or CWD).

3. Arrange for the necropsy to be conducted as soon as possible after the animal dies, preferably immediately, but at least within a couple days. Some test results are less informative if too much time has elapsed.
4. Small animals, such as nestlings, small adult birds (nuthatches, chickadees, etc.), amphibians are subject to rapid decomposition. Such animals should be submitted whole and kept refrigerated according to specific instructions for best results.
5. The carcass should be securely sealed in a plastic container and then chilled immediately. The container should be refrigerated or placed on ice until the necropsy.
6. Know when the facility is open for delivery and available to conduct necropsies.
7. Know and follow the exact detailed method of delivering or shipping the animal or tissues. For example, samples submitted for rabies testing have very specific requirements.
8. Clearly write and secure labeling of each individual sample on each container according to lab requirements (e.g., name, location [city, state], animal info [species, sex, estimated age], dates, any human exposure to disease, reason for necropsy, animal history, and other relevant information) Also have the appropriate label, identification and name and address on the shipping container. Follow requirements for delivery, shipping, etc.
9. Follow shipping requirements exactly – such as using icepacks, etc. Be sure the samples and containers do not break or leak! Packing any breakable containers (e.g., glass) in absorbent materials and then in sealed Ziplock containers.

What does a necropsy cost?

That varies from free, expensive, and in between. It's a good idea to get an estimate of a range or firm amount before taking or shipping the body/carcass for necropsy. Some veterinarians, universities and agencies will conduct a preliminary general necropsy for free or minimal fees, especially if they have interest in the case. Gross necropsies that involve sending in the full body for extensive tissue testing can be quite expensive – and may or may not identify causes of death or problems. It can be less expensive to have a veterinarian perform a gross necropsy – and send tissue samples to a pathologist for those specific tests (rather than shipping and testing the whole body). Again, costs should be discussed and agreed to prior to the necropsy.

Check with wildlife and health agencies for requirements

Rehabilitators and veterinarians need to maintain awareness of requirements for testing, procedures, who can conduct the necropsy, reporting, and so forth since they vary by state or federal agencies, species involved, potential reasons (e.g., exposure of humans, pets; toxins; trends). It is helpful to be familiar with these requirements before the need for a necropsy arises.

Conclusion

Necropsies can be an extremely helpful tool to help not only identify the cause of death of a wild animal, but also provide essential information for future diagnostics, treatment and care decisions and practices, wildlife policy, and strategies to inform the public about factors affecting wildlife and potential threats to humans and domestic animals.

Authors

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Resources

American Veterinary Medical Association. 2020. Avian Necropsy. Schaumburg, IL.
https://www.avma.org/sites/default/files/2019-12/cpe_moa_3.pdf

Brand, Christopher. 2014. Wildlife Mortality and Disease Research: Contributions of the USGS National Wildlife Health Center to Endangered Species Management and Recovery. *Ecohealth*. 10 (4): 446-54.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3938848/pdf/10393_2013_Article_897.pdf

Cunningham, M. W., M. A. Brown, et al. 2008. Epizootiology and management of feline leukemia virus in the Florida panther. *Journal of Wildlife Diseases* 44(3): 537-552.

Leary, Steven, et al. 2020. AVMA Guidelines for the Euthanasia of Animals: 2020 Edition. AVMA. Schaumburg, IL https://www.avma.org/sites/default/files/2020-01/2020_Euthanasia_Final_1-15-20.pdf

Miller, Michael, et al. 2012. Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories: Recommendations of a CDC-convened, Biosafety Blue Ribbon Panel. *Morbidity and Mortality Weekly Report*. January.
<https://www.cdc.gov/mmwr/preview/mmwrhtml/su6101a1.htm>

Parkinson, Christina, et al. 2011. Diagnostic Necropsy and Selected Tissue and Sample Collection in Rats and Mice. *Journal of Visualized Experiments*.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3211129/>

US Code of Federal Regulations. 2019. Part 58 - Good Laboratory Practice for Nonclinical Laboratory Studies, Subpart E- Testing Facilities. Title 21, Volume 11. 21FR58.81
<https://www.ecfr.gov/cgi-bin/text-idx?SID=ebc7898c679ec43d3e29d82933d4a328&mc=true&node=sp21.1.58.e&rgn=div6>

US Fish and Wildlife Service. Injury and Mortality Reporting System.
<https://www.fws.gov/migratorybirds/pdf/management/injuryandmortalitysysteminfosheet.pdf>

Stroud, Richard and Frank Kuncir. 2005. Investigating Wildlife Poisoning Cases. *International Game Warden*. Winter, p.8-13. <https://www.fws.gov/lab/pdfs/Stroud%20&%20Kuncir.2005.pdf>