



**Missouri
State**[™]
UNIVERSITY

VETERINARY CARE PROGRAM

Missouri State University (MSU) and its Institutional Animal Care & Use Committee (IACUC) is committed to an animal care and use program of the highest quality. Missouri State recognizes its responsibilities involving the care and use of animals including, but not limited to: the humane care and use of animals used in educational and research programs at MSU, the need to educate faculty, staff, and students of the importance of humane care and use of these animals, and compliance with all applicable federal laws and implementing regulations.

MISSION

The mission of the Veterinary Care Program shall be to ensure the health and safety of the animal collection and to preserve the integrity and efficacy of any and all animal research and teaching activities at Missouri State University.

ASSURANCE

The Attending Veterinarian (AV) shall have ultimate authority over the health and safety of any and all animals owned, housed, leased or used in any way by any person or persons associated with Missouri State University or any of its subsidiaries or assignments.

The Attending Veterinarian has the authority to exercise duties required by Missouri State University Animal Care and Use Policies, professional standards and federal agencies to ensure the highest quality veterinary care and ethical treatment of animals. The following duties apply to this position:

- Provide clinical care and administrate the animal disease prevention program, animal husbandry and nutrition, sanitation practices, zoonosis control and hazard containment
- Member of the IACUC
- Assurance of compliance via post approval monitoring of experimental protocols and animal use
- Provide training to staff, faculty and students whenever animal care or use as issues arise
- Oversight of all analgesic, anesthetic, surgical and post-operative care. The AV will give research personnel advice that ensures that humane needs are met and are compatible with scientific requirements.
- Health surveillance of all University laboratory and farm animals and unannounced visits to all animal care facilities
- Provide emergency coverage evenings, weekends, and holidays and be readily available by pager or cell phone
- Compile an annual health report on animal health and use and other reports as needed.

The Laboratory Animal Technicians, farm managers and caretakers have the following job requirements:

- Share the responsibilities of daily animal husbandry and health assessment according to established guidelines of the Missouri State policy and the standard operating procedures of each animal unity
- Are directly responsible for communicating any problems to the Attending Veterinarian and implementing corrective actions as advised
- Are responsible for ensuring 24 hour daily, weekend and holiday care
- Supervise the procurement, receipt and quarantine of all animals

GENERAL HUSBANDRY REQUIREMENTS

- Animals are kept physically separated by species with the exception of farm animals kept for purposes of farm animal management courses and will be identified according to accepted practice. (Addendum 3)
- Newly acquired animals are examined upon acquisition and either quarantined or allowed to acclimate prior to use
- Vaccines and parasite control programs are administered as required by species and as specified
- Euthanasia is in accordance with the AVMA Panel on Euthanasia and is detailed for each species

- Enrichment of animal environments to combat boredom and aggression will be customized to each species and their microenvironment
- Appropriate medical records will be kept for each species and flock. (Addendum 1)

HANDLING OF BIOLOGICS, DRUGS, AND SUPPLIES

- Monitoring will be the responsibility of the AV with the assistance of appropriate lab animal technicians, farm managers, and other staff
- Controlled substances used in research will be kept according to federal and state statutes. The Attending Veterinarian will provide assistance and advice to all holders of DEA/BNDD licenses
- All biologics, pharmaceuticals and supplies will be discarded on their expiration date in an appropriate manner
- All biological waste generated will be handled according to Missouri State Policy (Addendum 2)

PEST CONTROL AND PRODUCT SAFETY

Pest control is provided on an as needed basis. All products used will be approved by the AV before use.

LABORATORY AND DIAGNOSTIC SERVICES

Diagnostic services will be provided by appropriate reference laboratories according to need.

EUTHANASIA

Euthanasia will be accomplished according to guidelines published by the AVMA (January 2020) and will generally follow the below schedule. Modification of euthanasia procedures requires AV approval and will only be approved within the AVMA guidelines.

Aquatic species: Anesthetic overdose (immersion or injectable) followed by pithing, or physical methods allowed by the AVMA Guidelines on Euthanasia (2020)

Bats: CO₂ or barbiturate overdose followed by disarticulation.

Livestock: Barbiturate overdose or other AVMA approved method.

Rabbits: Barbiturate overdose.

Reptiles: Barbiturate or other anesthetic overdose. Physical methods as allowed by AVMA guidelines.

Rodents: CO₂ chambers, Barbiturate overdose, cervical dislocation after inhalant anesthesia, or other allowed AVMA approved method.

Avian: Birds less than 200grams may be euthanized by cervical dislocation

Birds greater than 200g CO2 followed by disarticulation.

Disposal of carcasses will be according to State and Federal laws.

The Veterinary Care Program will be updated as necessary according to the needs of the Research and Teaching community at Missouri State University.

PREVENTIVE MEDICINE, QUARANTINE, AND VACCINATION PROGRAM

VETERINARY CARE FOR RODENTS, RABBITS, GUINEA PIGS, AND OTHER SMALL MAMMALS

1. Disease Detection and Surveillance

- a. Daily observation of all animals is performed on a departmental basis by personnel who are qualified to verify the animals' well-being. Any adverse events (any unexpected event usually not according to protocol i.e. death, sickness, injury or unfavorable response to experimental procedures) must be reported to the AV within 24 hours of occurrence. All unexplained deaths will be necropsied by appropriate veterinary personnel with appropriate pathology submitted.
- b. The AV (or their designee) will evaluate the animal and develop an action plan.
- c. Regularly scheduled veterinary visits are a requirement for adequate veterinary care and a component of the preventative health care program. The frequency of such visits is at the discretion of the AV, but will occur no less frequently than weekly for rodents. Instances which may require more frequent visits include unexplained animal deaths, disease outbreaks, surgical and postoperative care and project consultations.

If an issue(s) requiring correction is found during a scheduled visit, the PI will be notified of such issue(s). The AV will also provide a report of the findings with recommendations for correction, which will be filed with the University Vivarium Manager and/or the IACUC chair, the Director of Research Administration, and the IO.

- d. The Attending Veterinarian is responsible for overseeing the health monitoring program at each vivarium in accordance with the Standard Operating Procedures for each vivarium. Disease surveillance is performed at an appropriate pathology laboratory for rodents.
- e. The AV is available for emergencies, weekend and holiday veterinary care of research animals. Each department is responsible for developing a plan to contact the AV regarding emergency, weekend, or holiday care.

2. Analgesia, Anesthesia and Euthanasia

- a. The Attending Veterinarian is responsible for the appropriate use of analgesics, anesthetics and anesthetic monitoring for research animals pre, post and during protocols.
- b. Acceptable means of euthanasia of research animals are outlined in the *AVMA Guidelines on Euthanasia* (January 2020). These guidelines will be followed in all instances unless prior approval has been attained from the IACUC. The Attending Veterinarian is also available for consultation on the appropriate means of euthanasia.

3. Surgical Support

- a. The Attending Veterinarian is responsible for consultations and collaboration on the preoperative, surgical and postoperative procedures performed on research animals. This

includes provisions for training personnel in surgical techniques and post-operative care of research animals, including pain management. Appropriate anesthetic and post-operative records must be maintained for all animals undergoing surgical procedures. Guidelines for the appropriate methods of anesthetic and post-operative monitoring and survival surgery in small mammals are provided according to approved IACUC protocol and policy.

4. Animal Well-Being

- a.** Promoting an animal's well-being before, during, and after an experimental procedure is the responsibility of every animal user. Supervision of such activities falls under the Principle Investigator(s) however, individual departments and/or the University Vivarium Manager or his/her designee may be assigned to aid in this responsibility. The Attending Veterinarian is responsible for consultation on appropriate husbandry programs for a wide variety of species.
- b.** Recognition of pain and distress in laboratory animals is considered to be of paramount importance. The Animal Care Program will follow guidelines established by two source documents: 1. NIH publication "Pain and Distress in Mice, Rats and Rabbits: Responsibilities, Recognition and Alleviation" <http://oacu.od.nih.gov/ARAC/FinalPainDistress0704.pdf> and 2. ACLAM document "Guidelines for the Assessment and Management of Pain in Rodents and Rabbits" http://www.aclam.org/Content/files/files/Public/Active/position_pain-rodent-rabbit.pdf.

5. Appropriate Use of Animals in Research and Teaching

- a.** The Attending Veterinarian will provide training to investigators in the proper restraint, dosing techniques, sample collection and appropriate animal use.

VETERINARY GUIDELINES FOR LIVESTOCK (CATTLE, GOATS, HORSES, POULTRY, SHEEP, AND SWINE)

Missouri State University maintains livestock for both production and research purposes. In general, whenever livestock are under an approved IACUC research protocol they are under the care and direction the University AV.

The Attending Veterinarian and other non-University associated Veterinarians as well as facility staff provides veterinary care for livestock at Missouri State University, as such it is important for complete medical records to be available to the AV and IACUC.

Guidelines in the Standard Operating Procedures compiled for each facility will be followed by the Facility Manager, who will document in the medical record the observation of any abnormality noted as well as any follow-up observations, treatments and dispositions (such as euthanasia). The Attending Veterinarian must be notified within 24 hours of any adverse events (any unexpected event usually not according to protocol i.e. death, sickness, injury, or unfavorable response to experimental procedures) encountered and/or notified of any non-university associated veterinary use. All unexplained deaths will be necropsied by appropriate veterinary personnel with appropriate pathology submitted.

Consultations with the AV will be recorded in the facility medical records. Medical records will be available to the Attending Veterinarian and the IACUC. The Attending Veterinarian will visit each facility semi-annually, more frequently if circumstances call for it, to make observations and to consult with the Facility Manager on herd health and veterinary care. The Attending Veterinarian will complete a walk-through of the animal facility at least quarterly for discussion of veterinary care issues at the facility.

The attached Herd Health Program include common procedures and maladies encountered in a livestock herd setting that may be performed or treated by the Facility Manager or other properly trained personnel. The problem, procedure and/or treatment must be recorded in the medical record. The Attending Veterinarian will be contacted immediately if an animal shows severe signs of any kind, or appears moribund and cannot be euthanized quickly. Conditions not outlined in the document require consultation with the Attending Veterinarian.

VETERINARY CARE FOR LIVESTOCK

1. Disease Detection and Surveillance

- a. Daily observation of all animals is performed on a departmental basis by personnel who are qualified to verify the animals' well-being. Typically, this is performed by the facility manager or the trained student staff. Any adverse behaviors or signs of distress are reported to the facility manager and the Attending Veterinarian in a timely and accurate fashion. The Attending Veterinarian is responsible for the veterinary care of livestock used by Missouri State personnel.
- b. When an animal exhibits adverse behaviors, signs of distress, injury, illness or morbidity, the facility manager initiates a Medical Record incorporating the required elements outlined in the IACUC Policy on Medical Records.
- c. Facility managers may initiate treatments on common maladies encountered in a production environment. These are outlined for each species in The Herd Health Programs. The Herd Health

Programs are developed in conjunction with the facility managers and the Attending Veterinarian.

- d. Regularly scheduled veterinary visits are a requirement for adequate veterinary care and a component of the preventative health care program. The frequency of such visits is at the discretion of the Attending Veterinarian but will occur no less frequently than quarterly. Instances which may require more frequent visits include unexplained animal deaths, disease outbreaks, surgical and postoperative care and project consultations. At that time, it is the responsibility of the facility manager to notify the Attending Veterinarian the status of animals currently undergoing treatment or having completed treatment since the previous visit.
- e. Each facility will have established provisions to quarantine diseased animals or newly arrived animals to prevent the spread of pathogens to other animals. The Attending Veterinarian is responsible for consultation on these matters.
- f. Each facility must track the disposition of animals. Completed forms are kept on file with the facility manager.
- g. In consultation with the facility managers and investigators, the Attending Veterinarian can prescribe the appropriate treatment or control measures following the diagnosis of an animal injury or disease. When treatment is instituted the facility manager must maintain a Medical Record that documents the diagnosis, treatment, and case resolution.
- h. The facilities must make arrangements to provide emergency, weekend and holiday veterinary care. Each facility is responsible for developing a plan to contact the veterinarian regarding emergency, weekend, or holiday care. The emergency contact information must be made available to all personnel and be approved by the Attending Veterinarian.
- i. Each facility managers is responsible for developing an emergency disaster plan and providing the Attending Veterinarian with a copy.

2. Analgesia, Anesthesia and Euthanasia

- a. Routine husbandry procedures requiring anesthesia or pain relief are detailed in the Herd Health Plan. The AV is responsible for consultation on the provision of pain relief in research situations.
- b. The Attending Veterinarian is responsible for consultation on the appropriate use of anesthetics and anesthetic monitoring for research and teaching animals. Any use of anesthetics requires documentation in the Medical Record and appropriate monitoring.
- c. Acceptable means of euthanasia of research/teaching animals are outlined in the *AVMA Guidelines on Euthanasia (2020)*. The Attending Veterinarian is responsible for consultation on the appropriate means of euthanasia.

3. Surgical Support

- a. The Attending Veterinarian is responsible for consultations or collaboration on the preoperative, surgical and postoperative procedures performed on research and teaching animals. This includes provisions for training personnel in surgical techniques and post-operative care of research/teaching animals, including pain management. Appropriate anesthetic and post-operative records must be maintained for all animals undergoing a surgical procedure.

4. Animal Well-Being

- a. Promoting an animal's well-being before, during, and after an experimental procedure is the responsibility of every animal user and is supervised by each facility manager. Facilities are responsible for developing their own husbandry programs to provide for the animal's well-being in accordance with IACUC policies. The Attending Veterinarian and facility managers are available for consultation on appropriate husbandry programs for a wide variety of species.

5. Appropriate Use of Animals in Research and Teaching

- a. The Attending Veterinarian and facility managers provide training to investigators in the proper restraint, dosing techniques, sample collection and appropriate animal use.

VETERINARY GUIDELINES/CARE FOR OTHER SPECIES

AQUATICS

Fish, amphibians, and turtles will be cared for according to acceptable veterinary methods. Where applicable, care and use will be guided by the following references:

- Guide for the Care and Use of Laboratory Animals (2011)
- Guidelines for the Use of Fishes in Research (2014)
- http://fisheries.org/docs/policy_useoffishes.pdf
- USDA NA:L <https://pubs.nal.usda.gov/sites/pubs.nal.usda.gov/files/reptiles.htm>

In all instances the Attending Veterinarian has ultimate authority in the care and use of these species and all animals will be treated in the same spirit and manner as previously outlined in this document.

SNAKES

Snakes will be cared for according to accepted veterinary standards. Appropriate training in the handling of venomous species will be given according to need.

- Guide for the Care and Use of Laboratory Animals (2011)
- The Care and Use of Amphibians, Reptiles and Fish in Research (1992)
- Guidelines for the Use of Live Amphibians and Reptiles in Field and Laboratory Research (2004)
- USDA NAL: <https://pubs.nal.usda.gov/sites/pubs.nal.usda.gov/files/reptiles.htm>

BATS

Bats will be housed and cared for according to acceptable veterinary standards and according to the following references:

- Animal Welfare Act
- Bat Care Guidelines published by the Bat Conservation Trust. www.bats.org
- Fish and Wildlife Services White-nose Syndrome protocols
- All caretakers will have appropriate rabies prophylaxis before handling bats.

OTHER SPECIES

Species not specifically mentioned within this document are still subject to appropriate veterinary care and will receive such. All vertebrate animals owned, used, housed, managed, leased, or otherwise associated with Missouri State University or its designees are considered to be under the care of the Missouri State University Attending Veterinarian and as such are subject to any and all rules and regulations promulgated by the AV and IACUC.

ADDENDUM 1 – MEDICAL RECORDS

Components of a Medical Record (where applicable, the record must contain):

- Animal or group identification and the date of procedure
- Descriptions of any illness, injury, distress and/or behavioral abnormalities and the resolution of the noted problem
- All drugs administered including dose, route, frequency and duration of treatment
- A description of the surgical procedure and identification of the surgeon(s)
- Ongoing findings during anesthetic monitoring
- Notation of any variation from normal and expected events during anesthetic and recovery periods, including the actions taken
- Assessment for pain and distress
- Actions taken to alleviate pain and distress, including non-pharmacologic interventions and the response to those actions
- Documentation of euthanasia or other disposition
- Documentation of necropsy findings

ADDENDUM 2 – WASTE HANDLING

Bio-Waste

Biohazardous waste is defined as any solid waste that causes or has the capability of causing an infectious disease or that can reasonably be suspected of harboring human pathogenic organisms. Generally it means discarded material from teaching and research laboratories, and not household or office trash, waste from Food Services, Physical Plant, bedding, litter and manure from noninfectious animals.

The term includes but is not limited to:

- All non-liquid animal/human tissue and body parts
- Laboratory and veterinary waste which contains human disease-causing agents
- Human blood, human blood products, body fluids and items saturated and/or dripping with human blood
- Potentially infectious agents (i.e., bacteria, viruses, fungi, prions)
- Human Pathogens
- Oncogenic Viruses
- Animal Cell Cultures
- Plant Pathogens
- Labware (not defined as a sharp) that has come into contact with the aforementioned waste streams (i.e. broken or unbroken glassware that were in contact with infectious agents, contaminated plastic pipettes, pipette tips, Petri dishes, centrifuge tubes, eppendorf tubes, disposable gloves and wipes)
- Organisms or products with recombinant DNA biotechnology and genetic manipulation
- Cultures and stocks of infectious agents
- Lab animal waste and bedding
- Infectious microbiological waste (including contaminated disposable culture dishes and disposable devices used to transfer, inoculate and mix cultures)
- Discarded live and attenuated vaccines
- Used slides and cover slips
- Specimen containers
- Syringes, hypodermic needles, scalpel blades and other sharps
- Preparations from genetically-altered living organisms

Lab Animals & Preserved Specimens

Lab animals that may be infectious or which have been preserved in formalin must be bagged in the red bio hazard bags and placed in bio-hazard boxes available through the [Director of Environmental Management](#) (6-8334). There must be no liquids and no leaks from the bags. A gelling agent is available from the Environmental Management office to add to the bags to eliminate free liquids. Double bagging is mandatory.

Because the disposal costs are based on cubic feet, boxes should be loaded to approach the 40-pound limit. It is imperative that the bottoms of the boxes be taped using shipping tape, running the tape 6" up each side. The tops will be taped by Environmental Management after the boxes are removed from the classrooms.

The animals must be removed from the formaldehyde (formalin) or the liquids must be poured off into another container. The liquids will be handled separately as a hazardous waste.

Non-infectious animals and those that have not been preserved may be double bagged in black plastic bags and disposed of into the dumpster. Because of the trash pick-up schedule, this waste should be placed in the dumpsters on Tuesdays and Thursdays. If it is anticipated that a large volume of animals will be generated at one time, the Director of Environmental Management should be contacted for additional guidance.

Any questions should be directed to the Director of Environmental Management 6-8334.

ADDENDUM 3 – METHODS OF ANIMAL IDENTIFICATION

All animals may be identified by microchip or for livestock eid tag, this is the preferred method.

Species	Type of Marker	Where Applied
Dogs	Collars w/tags, engraved Tattoo, (forceps or electric)	Around neck comfortably Inner surface of ear
Cats	Collars w/tags, engraved Neck bands	Around neck comfortably Around neck comfortably
Guinea Pigs	Dye Coded Ear Studs Coded Wing Clips Punched, coded Natural markings	Fur Close to head in ears Close to head in ears As required in ears Chart & records accordingly
Hamsters	tattoo (forceps or electric) Punches, coded	Inner surface of ears As required in ears
Mouse	Dye Tattoo (forceps or electric) Punched, coded	Fur Inner surface of ears As required in ears
Rats	Dye Tattoo (forceps or electric) Punches, coded	Fur Inner surface of ears As required in ears
Rabbits	Dye Ear tags (clips, wing) Ear studs leg bands	Fur Close to head in ears Close to head in ears Above hock rear legs
Monkeys>	Tattoo (forceps or electric) Chains, or bands, w/coded tags or discs	Adults, below clavicle (collar bone), forehead, lips. Young, on inner thigh Around waist comfortably
Frogs	Bead, w/nylon thread Punched, coded	On skin above dorsal sac In web of feet
Turtles	Filing Paint Punched, coded	Outer edges of carapace in code Back of carapace In feet
Fish	Natural markings Clips Isolation	Chart & record accordingly Dorsal, or ventral fins, sometimes the tail Individually housed
Ferrets	Dyes Tattoo Punches	Fur Inner surface of ears Coded in ears
Pigs (swine)	Tattoo	Inner surface of ears

	Punched Ear studs Ear clips	Coded in ears Close to head in ears Close to head in ears
Sheep	Tattoo Punches Ear studs Ear clips Collars, w/discs, engraved	Inner surface of ears Coded in ears Close to head in ears Close to head in ears Around neck comfortably
Goats	Same as for sheep	Same as for sheep
Chickens	Wing bands Wing clip Leg band Leg ring	Around wing above radial close to body (must not hamper activity) Anterior (front) edge of wings Closely but comfortably around legs Closely but comfortably around legs
Pigeons	Leg band also wing clips Leg ring	Same as for chicken Same as for chicken
Birds and Bats (all kinds)	Leg bands Wing clips	Closely but comfortably around legs Same as for chicken
Ducks	Wing clips Leg bands Leg rings Punches	Same as for chicken Same as for chicken Same as for chicken Coded to web of feet
Geese	Same as for ducks	Same as for ducks
Swans	Same as for ducks	Same as for ducks
Cattle	Punches Tattoo Collars, w/discs, engraved, and bells Natural colors Branding Ear clips	Coded in ears Inner surface of ears, lips or tongue Comfortably around neck Chart & record accordingly Dorsal section of shoulders & hips on either side Coded in ears, close to head
Horses	Same as for cattle	Same as for cattle

In addition to the animal itself being identified, a cage card must also accompany each animal or, in the case of rodents, frogs, etc., each pan or cage of animals. Where one or more animals are confined in a pan or pen the card shall have the number of animals and any distinctive physical features, marks, tattoos or tags attached to those animals.

MINIMUM SPACE RECOMMENDATIONS FOR ANIMALS IN RESEARCH

TABLE 1. Recommended Minimum Space for Commonly Used Laboratory Rodents Housed in Groups*

Animals	Weight, g	Floor Area/Animal, ^a in. ² (cm ²)	Height, ^b in. (cm)	Comments
Mice in groups ^c	<10	6 (38.7)	5 (12.7)	Larger animals may require more space to meet the performance standards.
	Up to 15	8 (51.6)	5 (12.7)	
	Up to 25	12 (77.4)	5 (12.7)	
	>25	≥15 (≥96.7)	5 (12.7)	
Female + litter		51 (330) (recommended space for the housing group)	5 (12.7)	Other breeding configurations may require more space and will depend on considerations such as number of adults and litters, and size and age of litters ^d .
Rats in groups ^c	<100	17 (109.6)	7 (17.8)	Larger animals may require more space to meet the performance standards.
	Up to 200	23	7 (17.8)	
	Up to 300	29	7 (17.8)	
	Up to 400	40	7 (17.8)	
	Up to 500	60	7 (17.8)	
	>500	≥70 (≥451.5)	7 (17.8)	
Female + litter		124 (800) (recommended space for the housing group)	7 (17.8)	Other breeding configurations may require more space and will depend on considerations such as number of adults and litters, and size and age of litters ^d .
Hamsters ^c	<60	10	6 (15.2)	Larger animals may require more space to meet the performance standards.
	Up to 80	13	6 (15.2)	
	Up to 100	16	6 (15.2)	
	>100	≥19 (≥122.5)	6 (15.2)	
Guinea pigs ^c	Up to 350	60 (387.0)	7 (17.8)	Larger animals may require more space to meet the performance standards.
	>350	≥101 (≥651.5)		

*The interpretation of this table should take into consideration the performance indices described in the Guide beginning on page 55.

^aSingly housed animals and small groups may require more than the applicable multiple of the indicated floor space per animal.

^bFrom cage floor to cage top.

^cConsideration should be given to the growth characteristics of the stock or strain as well as the sex of the animal. Weight gain may be sufficiently rapid that it may be preferable to provide greater space in

anticipation of the animal's future size. In addition, juvenile rodents are highly active and show increased play behavior.

^dOther considerations may include culling of litters or separation of litters from the breeding group, as well as other methods of more intensive management of available space to allow for the safety and well-being of the breeding group. Sufficient space should be allocated for mothers with litters to allow the pups to develop to weaning without detrimental effects for the mother or the litter.

TABLE 2. Recommended Minimum Space for Rabbits, Cats, and Dogs Housed in Pairs or Groups*

Animals	Weight ^a , kg	Floor Area/Animal, ^b ft. ² (m ²)	Height, ^c in. (cm)	Comments
Rabbits	<2	1.5 (0.14)	16 (40.5)	Larger rabbits may require more cage height to allow animals to sit up.
	Up to 4	3.0 (0.28)	16 (40.5)	
	Up to 5.4	4.0 (0.37)	16 (40.5)	
	>5.4 ^c	≥5.0 (≥0.46)	16 (40.5)	
Cats	≤4	3.0 (0.28)	24 (60.8)	Vertical space with perches is preferred and may require additional cage height.
	>4 ^d	≥4.0 (≥0.37)	24 (60.8)	
Dogs ^e	<15	8.0 (.074)	$\frac{\quad}{\quad}$ ^f	Cage height should be sufficient for the animals to comfortably stand erect with their feet on the floor.
	Up to 30	12.0 (1.2)	$\frac{\quad}{\quad}$ ^f	
	>30 ^d	≥24.0 (≥2.4)		

*The interpretation of this table should take into consideration the performance indices described in the Guide beginning on page 55.

^aTo convert kilograms to pounds, multiply by 2.2.

^bSingly housed animals may require more space per animal than recommended for pair- or group-housed animals.

^cFrom cage floor to cage top.

^dLarger animals may require more space to meet performance standards (see Guide text).

^eThese recommendations may require modification according to body conformation of individual animals and breeds. Some dogs, especially those toward the upper limit of each weight range, may require additional space to ensure compliance with the regulations of the Animal Welfare Act. These regulations (USDA 1985) mandate that the height of each cage be sufficient to allow the occupant to stand in a "comfortable position" and that the minimal square feet of floor space be equal to the "mathematical square of the sum of the length of the dog in inches (measured from the tip of its nose to the base of its tail) plus 6 inches; then divide the product by 144."

^fEnclosures that allow greater freedom of movement and unrestricted height (i.e., pens, runs, or kennels) are preferable.

TABLE 3. Recommended Minimum Space for Avian Species Housed in Pairs or Groups*

Animals	Weight, ^a kg	Floor Area/Animal, ^b ft. ² (m ²)	Height
Pigeons	—	0.8 (0.07)	Cage height should be sufficient for the animals to comfortably stand erect with their feet on the floor.
Quail	—	0.25 (0.023)	
Chickens	<0.25 Up to 0.5 Up to 1.5 Up to 3.0 ≥3.0 ^c	0.25 (0.023) 0.50 (0.046) 1.00 (0.093) 2.00 (0.186) ≥3.00 (≥0.279)	

*The interpretation of this table should take into consideration the performance indices described in the Guide beginning on page 55.

^aTo convert kilograms to pounds, multiply by 2.2.

^bSingly housed birds may require more space per animal than recommended for pair- or group-housed birds.

^cLarger animals may require more space to meet performance standards (see Guide text).

TABLE 4. Recommended Minimum Space for Nonhuman Primates Housed in Pairs or Groups*

Animals	Weight, ^a kg	Floor Area/Animal, ^b ft. ² (m ²)	Height, ^c In. (cm)	Comments
Monkeys ^d (including baboons)				Cage height should be sufficient for the animals to comfortably stand erect with their feet on the floor. Baboons, pats, monkeys, and other longer-legged species may require more height than other monkeys, as might long-tailed animals and animals with prehensile tails. Overall cage volume and linear perch space should be considerations for many neotropical and arboreal species. For brachiating species cage height should be such that an animal
Group 1	Up to 1.5	2.1 (0.20)	30 (76.2)	
Group 2	Up to 3	3.0 (0.28)	30 (76.2)	
Group 3	Up to 10	4.3 (0.4)	30 (76.2)	
Group 4	Up to 15	6.0 (0.56)	32 (81.3)	
Group 5	Up to 20	8.0 (0.74)	36 (91.4)	
Group 6	Up to 25	10 (0.93)	46 (116.8)	
Group 7	Up to 30	15 (1.40)	46 (116.8)	
Group 8	≥30 ^e	≥25 (≥2.32)	60 (152.4)	

				can, when fully extended, swing from the cage ceiling without having its feet touch the floor. Cage design should enhance brachiating movement.
Chimpanzees (Pan) Juveniles Adults ^f	Up to 10 >10	15 (1.4) ≥25 (≥2.32)	60 (152.4) 84 (213.4)	For other apes and large brachiating species cage height should be such that an animal can, when fully extended, swing from the cage ceiling without having its feet touch the floor. Cage design should enhance brachiating movement.

*The interpretation of this table should take into consideration the performance indices described in the Guide beginning on page 55.

^aTo convert kilograms to pounds, multiply by 2.2.

^bSingly housed primates may require more space than the amount allocated per animal when group housed.

^cFrom cage floor to cage top.

^dCallitrichidae, Cebidae, Cercopithecidae, and Papio.

^eLarger animals may require more space to meet performance standards (see Guide text).

^fApes weighing over 50 kg are more effectively housed in permanent housing of masonry, concrete, and wire-panel structure than in conventional caging.

TABLE 5. Recommended Minimum Space for Agricultural Animals*

Animals/Enclosure	Weight, ^a kg	Floor Area/Animal, ^b Ft ² (m ²)
Sheep and Goats 1	<25	10.0 (0.9)
	Up to 50	15.0 (1.65)
	>50 ^c	≥20.0 (≥1.8)
2-5	<25	8.5 (0.76)
	Up to 50	12.5 (1.12)
	>50 ^c	≥17.0 (≥1.53)
>5	<25	7.5 (0.67)
	Up to 50	11.3 (1.02)
	>50 ^c	≥15.0 (≥1.35)

Swine	1	<15	8.0 (0.72)
		Up to 25	12.0 (1.08)
		Up to 50	15.0 (1.35)
		Up to 100	24.0 (2.16)
		Up to 200	48.0 (4.32)
		>200 ^c	≥60.0 (≥5.4)
	2-5	<25	6.0 (0.54)
		Up to 50	10.0 (0.9)
		Up to 100	20.0 (1.8)
Up to 200		40.0 (3.6)	
>200 ^c		≥52.0 (≥4.68)	
>5	<25	6.0 (0.54)	
	Up to 50	10.0 (0.9)	
	Up to 100	20.0 (1.8)	
	Up to 200	40.0 (3.6)	
	>200 ^c	≥48.0 (≥4.32)	
Cattle	1	<75	24.0 (2.16)
		Up to 200	48.0 (4.32)
		Up to 350	72.0 (6.48)
		Up to 500	96.0 (8.64)
		Up to 650	124.0 (11.16)
		>650 ^c	≥144.0 (≥12.96)
	2-5	<75	20.0 (1.8)
		Up to 200	40.0 (3.6)
		Up to 350	60.0 (5.4)
		Up to 500	80.0 (7.2)
		Up to 650	105.0 (9.45)
		>650 ^c	≥120.0 (≥10.8)
	>5	<75	18.0 (1.62)
		Up to 200	36.0 (3.24)
		Up to 350	54.0 (4.86)
		Up to 500	72.0 (6.48)
		Up to 650	93.0 (8.37)
		>650 ^c	≥108.0 (≥9.72)
Horses	—	144.0 (12.96)	
Ponies	1-4	—	72.0 (6.48)
	>4/Pen	≤200	60.0 (5.4)
		≥200	≥72.0 (≥6.48)

*The interpretation of this table should take into consideration the performance indices described in the Guide beginning on page 55.

^aTo convert kilograms to pounds, multiply by 2.2.

^bFloor area configuration should be such that animals can turn around and move freely without touching food or water troughs, have ready access to food and water, and have sufficient space to comfortably rest away from areas soiled by urine and feces (see Guide text).

^cLarger animals may require more space to meet performance standards including sufficient space to turn around and move freely (see Guide text).

ADDENDUM 4 – USE OF EXPIRED DRUGS AND MEDICAL MATERIALS AND NON-PHARMACEUTICAL GRADE COMPOUNDS IN ANIMALS

Use of Expired Drugs and Medical Materials:

The use of any emergency drug or drug administered to relieve pain or distress (anesthetics and analgesics), including euthanasia agents, beyond its published expiration date is not consistent with acceptable or adequate veterinary practice and is not allowed under any circumstances. Expired medical materials such as saline solution, sutures, medical devices, etc., may be used in animals undergoing terminal procedures if their use does not adversely affect the animal's well-being or compromise the validity of the study. Expired medical materials may not be used in survival surgeries

Use of Pharmaceutical Grade Compounds:

In compliance with Federal Animal Welfare Regulations and guidance and standard veterinary medical practice; investigators must use pharmaceutical grade medications whenever they are available, even in acute/terminal procedures. Pharmaceutical grade compounds must be used in all situations where the health and well-being of the animal are at risk (anesthesia, analgesia, emergency drugs, euthanasia) and for routine veterinary care (non-research).

Additional Information and Specific Procedures

Expired Drugs and Materials:

Expired drugs and medical materials may be maintained in the laboratory for non-animal use provided they are:

- Clearly labeled "NOT FOR USE IN ANIMALS" and
- Stored in an area physically separate from supplies intended for live-animal use.

Use of Non-Pharmaceutical Grade Compounds:

The use of non-pharmaceutical grade chemical compounds in experimental animals may be a necessary and acceptable component of biomedical research. Non-pharmaceutical grade chemical compounds may be used for scientific investigation provided that a scientific justification is provided for specific review and approval by the IACUC. Acceptable reasons for use of non-pharmaceutical or chemical grade agents may be:

- Scientific necessity;
- Non-availability of an acceptable veterinary or human pharmaceutical-grade product.

NOTE: Cost savings alone is not an adequate justification for using non-pharmaceutical-grade compounds.

If the use of specific non-pharmaceutical grade drugs is required, the method of preparation of the drug and the storage conditions must be described in the animal use protocol and approved by the IACUC. In particular, a detailed description of the methods used to ensure sterility of the drug must be included (i.e., 0.22 micron filter, storage in sterile vials with rubber septum to maintain sterility). Consultation with Attending Veterinarian is strongly recommended.