

**Report to the Committees on Armed Services of the Senate and  
House of Representatives**

**on**

**Department of Defense Animal Cost  
and Use Programs 1993**

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## List of Acronyms

AAALAC	American Association for Accreditation of Laboratory Animal Care
AALAS	American Association of Laboratory Animal Science
APA	American Psychological Association
APS	American Physiological Society
ASBREM	Armed Services Biomedical Research Evaluation and Management
ASD(HA)	Assistant Secretary of Defense (Health Affairs)
ASTMP	Army Science and Technology Master Plan
AVMA	American Veterinary Medical Association
BAA	Broad Agency Announcement
DDR&E	Director, Defense Research and Engineering
DoD	Department of Defense
DTIC	Defense Technical Information Center
ELISA	Enzyme Linked Immunosorbent Assay
FDA	Food and Drug Administration
FY	Fiscal Year
G	Gravity
IACUC	Institutional Animal Care and Use Committee
IG	Inspector General
ILAR	Institute of Laboratory Animal Resources
JCAHO	Joint Commission for Accreditation of Health Organizations
JDL	Joint Directors of Laboratories
JTCG	Joint Technology Coordinating Groups
LAM	Laboratory Animal Medicine
NIH	National Institutes of Health
NMR	Nuclear Magnetic Resonance
OIG-DoD	Office of the Inspector General, Department of Defense
OSD	Office of the Secretary of Defense
QLIS	Quantitative Luminescence Imaging System
RDT&E	Research, Development, Test, and Evaluation
RFR	Radiofrequency Radiation
S&T	Science and Technology
SCID	Severe Combined Immunodeficiency Disease
SEB	Staphylococcus Enterotoxin B
SF	Special Forces
STO	Science and Technology Objective
TAPSTEM	Training and Personnel Systems Science and Technology Evaluation and Management
USAMRDALC	U.S. Army Medical Research, Development, Acquisition, and Logistics Command (Provisional)
USDA	United States Department of Agriculture
WRAIR	Walter Reed Army Institute of Research

## SECTION I INTRODUCTION

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The National Defense Authorization Act for Fiscal Year 1993, Report of the House Armed Services Committee, H.R. 5006, May 19, 1992, requested the Secretary of Defense to provide a comprehensive annual report to the Committees on Armed Services of the Senate and House of Representatives on animal cost and use programs. This report has been prepared in accordance with the specific requirements described in the committee report (HASC Report #102-527, page 151). The report covers all animal research conducted by the Department of Defense (DoD) including education, training, and testing both in DoD laboratories and by extramural projects funded by the Department for Fiscal Year 1993.

### **I.1. REQUIREMENTS FOR USE OF ANIMALS IN THE DoD**

The continued use of animals by the DoD in research, education, and training is absolutely essential to ensure sustained technological superiority of U.S. warfighting capabilities. The DoD's animal use programs ultimately translate into maintaining and improving military readiness, force structure and modernization. They contribute directly to ensuring that deployed service men and women may best attain an early and decisive victory with minimum casualties. Additionally, humanitarian benefits of the DoD investment in animal research are shared on an international basis to improve the quality of life of both humans and animals.

Although many alternatives to animal use have been discovered and applied by the Department, there remain situations in which there are no acceptable alternatives. While fundamental scientific and biomedical principles have been explored and understood using non-living and cell culture models, the complex interactions within the human (e.g., organ, endocrine, circulatory and related systems) and with the environment have not been effectively modeled for all areas of concern to the DoD. For example, disease has been and remains a major cause of death and disability in military conflicts. During Operations Desert Storm and Restore Hope, outbreaks of shigellosis and other diarrheal diseases, leishmaniasis and other parasitic diseases, and malaria continued to threaten the health and well being of our troops.

As a consequence, DoD must develop the materiel and technological means to best protect and sustain the health and well being of service men and women despite battle and disease-non-battle threats, and to provide the best medical treatment possible to those who become casualties. This responsibility underlies, for example, the need for DoD to conduct research, and to train and educate military health-care providers in the most effective medical management of battlefield casualties. Unlike medical counterparts found in civilian emergency medicine and trauma management, battlefield health care must very often be provided in an austere, harsh and hostile environment hours away from a definitive care hospital. Whereas an urban gunshot

patient in a modern civilian shock and trauma center will be supported and resuscitated by a full complement of medical staff with a plentiful supply of oxygen, fluids, medications, surgical intervention and nursing, the combat casualty may be supported only by a single aidman and the medical supplies he can carry.

Another visible area requiring DoD to use animals in research is the need to develop vaccines and drugs to protect, sustain and treat service men and women during military operations. Like health-care delivery, these research programs are focused on the disease causing threats most important to the military missions. Ethical concerns as well as the regulatory requirements of the Food and Drug Administration (FDA) necessitate that candidate vaccines and drugs be demonstrated to be safe in both laboratory and animal models prior to initiation of human studies. The statutory basis for such ethical and FDA regulations is the legitimate concern of ensuring human protection from dangerous and ineffective treatments. Indeed, during the final stages of vaccine and drug development, large-scale testing is conducted using human volunteers, often individuals who are naturally exposed to the disease in question. Table I-1 is a representative list of drugs, vaccines and other future products from DoD research that critically depend on using animal subjects.

## I.2. DoD POLICY GOVERNING ANIMAL RESEARCH

While essential to the protection of military personnel, animal research is considered a trust. The DoD has consistently adhered to direction (DoD Directive 3216.1, "The Use of Animals in DoD Programs") to follow the most stringent Federal regulations that govern the use of animals in order to prevent unnecessary suffering and to minimize the numbers of animals used. All animal research must conform to requirements of the 1966 Animal Welfare Act (P.L. 89-544) as amended in 1976 (P.L. 94-279) and 1985 (P.L. 99-198), as well as the National Institutes of Health *Guide for the Care and Use of Laboratory Animals*, (fifth edition, 1985, NIH86-23) and the requirements of the applicable regulations of the United States Department of Agriculture (USDA). Although the Animal Welfare Act does not apply to mice of the genus *Mus* and rats of the genus *Rattus*, the DoD voluntarily conducts research with these exempt species with the same procedures defined in the Animal Welfare Act for

### Products Available for Use

Japanese Encephalitis vaccine  
 Insect/Arthropod repellent lotion  
 Rift Valley fever killed vaccine  
 Eastern & Western Equine Encephalitis vaccines  
 Venezuelan Equine Encephalitis vaccine  
 Pyridostigmine Nerve Agent Pretreatment  
 Skin decontaminating kit, M291  
 Convulsant antidote for nerve agent  
 Mefloquine, antimalarial  
 Halofantrine, antimalarial  
 Medical aerosolized nerve agent antidote

### Products in Advanced Development

Malaria vaccines - blood stage  
 Diarrheal Disease Vaccines: *Shigella*, enterotoxigenic  
*E. coli*, *V. cholera*, *Campylobacter*  
 Hepatitis A vaccine  
 Botulinal Toxoids & antitoxins  
 Meningococcal Group B vaccine  
 Vaccinia-vectored Korean Hemorrhagic fever vaccine  
 Argentine hemorrhagic fever vaccine  
 Q-fever vaccine  
 Tularemia live vaccine  
 Smallpox vaccine, cell culture derived  
 Rift Valley fever live vaccine  
 Chikungunya fever vaccine  
 Antimalarial drugs WR238,605 & WR6026  
 Topical skin protectant for chemical agents  
 Microencapsulated antibiotic, ampicillin, dental  
 Hypertonic saline dextran  
 Nerve agent antidote, multichambered autoinjector  
 Schistosome topical antipenetrant  
 Nerve agent antidote system (HI-6)  
 Antimicrobial dermal dressing

### Candidate Products for Advanced Development

Topical antileishmanial lotion  
 Azithromycin antimalarial drug  
 Botulinum toxoid heptavalent  
 Ricin toxoid  
 Staphylococcal Enterotoxin B toxoid  
 Saxitoxin Countermeasure  
 Rapid Bioagent ID system, fiber optic biosensor  
 Malaria Sporozoite Vaccine

Table I-1 Examples of DoD Materiel Products that Require Animal Use

other mammals. At the same time, DoD biomedical researchers have aggressively developed novel procedures to replace, reduce, and refine the use of animal subjects during experimentation.

### **I.3. SCOPE OF REPORT**

This report is a thorough review of animal use in research, education, training and testing in the DoD. It was prepared by a panel of veterinarians and scientists involved in animal research and training and individuals involved in the oversight of animal care and use from each of the three services. The report is divided into seven sections including this introduction. This report includes: information on Accreditation of DoD laboratories by the American Association for Accreditation of Laboratory Animal Care (AAALAC) (Section II); Service and DoD animal use in research, education, training and testing; and, the cost of animal based research vs. other research cost (Section III); DoD initiatives to promote alternative methods that replace, reduce, or refine animal use (Section IV); and animal use oversight procedures to avoid unintended duplication of research or unnecessary research (Section V); glossary (Section VI); and a list of references in order of citation (Section VII). Several appendices are included that provide more detailed information to support these sections.

#### **I.3.1 Accreditation of DoD Laboratories by AAALAC**

DoD animal use facilities are reviewed in Section II. All DoD laboratories that conduct animal research will be required to apply for AAALAC accreditation; 60% of DoD laboratories already have received accreditation, a record that exceeds the average for civilian research laboratories registered with the USDA. Animal use programs in the DoD strive to meet all the requirements of AAALAC. However, the age of many DoD animal research facilities predates many of the current engineering standards and is an obstacle to full AAALAC accreditation. Certain laboratories are awaiting renovation or construction of new facilities to meet AAALAC standards for physical housing. Despite the physical limitations of some facilities, all laboratories are required to establish rigorous animal husbandry programs to provide the best possible housing and care of research animals. In keeping with the spirit of the Animal Welfare Act and guidance from AAALAC, limitations of older buildings and mechanical systems do not necessarily imply that research animals are exposed to unhealthy conditions. Such facilities require more intense animal husbandry programs to care for the animals and often require the added expense of sophisticated housing that provides a sanitary microenvironment for the animals. DoD invites AAALAC inspection of all facilities and programs to ensure that the best possible care is provided to DoD animals, regardless of the constraints of the physical facilities. The recently completed Inspector General report on animal use in DoD facilities confirmed the effectiveness of animal husbandry programs in DoD facilities and concluded that although not all facilities were AAALAC accredited, animals in DoD facilities were maintained in healthy environments and treated humanely. As stated in the report, "The inspection teams were completely satisfied with the health and welfare of the animals in DoD research facilities. ... All the personnel assigned the care of the

animals were competent, interested, and committed to the humane care of the animals."

### I.3.2 Service and DoD Animal Use in Research, Education, Training and Testing, and the Cost of Animal Based Programs vs. Other Research Programs

A profile of DoD animal use and costs is provided in Section III. During 1993, the cost of animal-based research, development, testing evaluation (RDT&E) was approximately 0.4% of the total expenditure for RDT&E. As a result of various new methods to replace animal models, the number of animals used in intramural DoD research has declined 40% from 1987 to 1993. DoD policy (DoD Directive 3216.1, "The Use of Animals in DoD Programs") specifically prohibits the use of nonhuman primates in development work for nuclear, biological, or chemical offensive weapons. This policy has been extended to include dogs or cats; and, no dogs or cats may be used for the purpose of training students or other personnel in surgical or other medical treatment of wounds produced by any type of weapon. In addition, in 1969 the United States biological warfare program was terminated by Executive Order, and subsequently the offensive chemical warfare program has been abolished. The vast majority of the expense of biomedical research with animals has been for development of vaccines and drugs for the prevention and treatment of diseases or the toxic effects of biological and chemical weapons that have become an increasing threat to our forces. Table I-2 summarizes the major animal use statistics for DoD research.

<u>Total Animal Use by Agency</u>			No. of Animals	% of Total
DoD Total			553,700	
Tri-Service			77,331	14
Army			417,626	75
Navy			36,102	7
Air Force			22,705	4
<u>Total Animal Use by Species</u>			No. of Animals	% of Total
Mice			366,700	65
Rats			52,769	9
Guinea Pigs			9,981	2
Hamsters			8,747	2
Rabbits			4,862	1
Goats			2787	<1
Pigs			2170	<1
Nonhuman Primates			2210	<1
Dogs			735	<1
Ferrets			307	<1
Cats			211	<1
Sheep			383	<1
Other mammals			7,366	1.3
Avians			1050	<1
Other nonmammals			93,754	17
<u>Total Animal Use by Category</u>			No. of Animals	% of Total
Medical RDT&E			417,062	75
Non-Medical RDT&E			80,424	14
Clinical Investigation			24,590	4
Adjuncts/Alternatives			22,945	4
Training & Instructional			8,380	2
Breeding Stock			299	<1
Offensive Weapons Testing			0	0
<u>Total Animal Use Cost</u>				% of Cost in
	Animal-Based Program Cost	Total Cost of Programs		Animal Use Programs
RDT&E	\$157,698K	\$37,560,016K		0.4
Education	\$21,732K	\$87,947K		25
Training	\$309K	\$2,076K		15

Table I-2 Summary of DoD Animal Use Statistics

### 1.3.3 DoD Initiatives to Promote Alternative Methods that Replace, Reduce, and Refine the Use of Animals

DoD efforts to replace, reduce, and refine the use of animals in research are reviewed in Section IV. Animal research is an essential part of the scientific process, but it is always undertaken after due consideration of alternatives. Each protocol that proposes to use animals in research or training must explain the need for whole animal research and defend the choice of species as the most scientifically valid model. Often, economies of time and resources are gained when scientifically valid alternatives to animal use are available. Our review of current animal research reveals that scientists in the DoD have developed or adopted many alternative methods because of ethical considerations and other inherent benefits. One DoD organization, the U.S. Army Medical Research, Development, Acquisition and Logistics Command (Provisional), has established a major Science and Technology Objective to develop replacement, reduction, and refinement strategies for the use of animals in research. This objective has an annual budget of approximately \$600,000. The DoD sponsors conferences and workshops to promote alternatives to animal research. The DoD sponsors a five year grant with the Institute of Laboratory Animal Resources of the National Research Council to develop institutional training materials, education, and publications in support of DoD laboratory animal care and use programs. The Institutional Animal Care and Use Committee (IACUC) process also includes a strong emphasis on consideration of alternatives in all new protocols. Table I-3 describes several examples of new procedures that greatly replace, reduce and refine the use of animals.

Innovative statistical techniques have been developed to reduce the numbers of animals and to replace the classical LD<sub>50</sub> test.

An *in vitro* screening test for drugs to treat malaria has been developed under contract that conserves 4,000 mice per year.

Microsomal homogenate from one rat liver allows 30 experiments and saves 29 animals for each 30 experiments for a total annual savings of 2,300 rats.

A number of protocols now pool control animals across experiments or use historical controls to save on total animal use.

*In vitro* culture of the malaria parasite in human blood cells serves as a source for genetic material to advance the development of a vaccine for malaria.

*In vitro* test using peripheral blood from humans has been developed to test the effectiveness of a Staphylococcal Enterotoxin B toxoid, replacing the use of primates.

Rodent and swine models are being developed to replace the use of nonhuman primates in studies of disease.

Cell culture *in vitro* methods have been developed for passage of disease-causing viruses.

Neuronal cell cultures are used to study the mechanisms of nerve cell injury *in vitro* and to screen for new drugs for neuronal protection against toxins and traumatic injury.

Video tapes are used for adjunct training of technicians and investigators for common animal use procedures, ie., venipuncture, handling, restraint, etc.

**Table I-3 Examples of DoD Initiatives for Replacement, Reduction, and Refinement of the Animals Used in Research**

### 1.3.4 Animal Use Oversight and Procedures to Avoid Unintended Duplication of Research and Unnecessary Research

DoD animal use oversight is reviewed in Section V. All DoD facilities and extramural institutions sponsored by the DoD must submit all proposed uses of animals to an IACUC. Forty of forty-five DoD operated animal use sites have established their own IACUC to review all proposed animal uses to ensure compliance with the Animal Welfare Act; of the five sites without an IACUC, three sites have such low animal use that they submit their protocols to their parent organization

for review; one site is collocated at Wright-Patterson Air Force Base and uses its IACUC; and one facility does not use live animals in its research. The goal of the IACUCs is to strike a reasonable balance between the requirements for animal welfare, the benefits of animal use for advancing solutions to important DoD problems, and the concerns of the community. DoD Directive 3216.1 specifies that DoD IACUCs shall conform to the provisions of the Animal Welfare Act. Each IACUC serves as an independent decision-making body of the institution and establishes policy for the care and use of animals at that facility in accordance with applicable DoD Directives, Federal law and regulations. They review all proposed animal uses as described in detailed protocols. The protocol must justify the use of animals, including consideration of alternatives, justify the choice of species and the number of subjects, and include a literature search and assurance that the work does not needlessly duplicate prior experimentation. The protocol specifies the procedures to be used with the animals, the methods to avoid or minimize pain, the qualifications of all persons conducting procedures with the animals, and the disposition of the animals at the termination of the work. The IACUC ensures that all personnel using animals are properly trained and, if necessary, establishes a training program to support the staff. The IACUC inspects facilities and animal care programs at least twice annually and prepares a written report, including a plan to address all significant deficiencies. The IACUC enforces compliance with the procedures specified in the protocols by conducting inspections and by hearing and investigating reports of deviation from approved procedures. Finally, the IACUC serves as an impartial investigator of reports of violations of good animal practices and is empowered to suspend the use of animals for investigations not conducted in accordance with Animal Welfare Act or institutional policy.

All DoD IACUCs include an outside member who is not affiliated with the facility and is specifically charged with the responsibility to provide a community perspective on all proposed animal uses. The outside member can perform unannounced site visits and participates in all discussions and votes on all protocols. Non-affiliated members come from a variety of backgrounds including biologists, chaplains, homemakers, health-care professionals of various specialties, veterinarians, and non-technical professions. The non-affiliated member is invited to participate in introductory and continuing training to ensure that they are fully knowledgeable of the requirements for humane care and treatment of animals.

Responsibility for oversight of the Department's science and technology programs rests with the Director, Defense Research and Engineering (DDR&E). Her staff, in conjunction with representatives from the Services, annually review all science and technology efforts to ensure they are fully coordinated and without unnecessary duplication of effort. The preponderance of animal use within the Department occurs in biomedical programs. These activities receive specific oversight from the Armed Services Biomedical Research and Evaluation Management (ASBREM) Committee, which was created by Congressional direction in 1981. The ASBREM is co-chaired by the DDR&E and the Assistant Secretary of Defense (Health Affairs). The overall

biomedical effort is carefully integrated and scrutinized for duplication of effort by seven subordinate joint technology coordinating groups reporting to the co-chairpersons.

In conclusion, it is the policy of DoD that all animal utilization will be conducted in full compliance with the Animal Welfare Act. Use of animals in research is essential to protect the health and lives of Servicepersons, and DoD will be engaged in biomedical research that involves the use of animals for the foreseeable future.

## SECTION II

# ACCREDITATION OF DEFENSE DEPARTMENT LABORATORIES BY THE AMERICAN ASSOCIATION FOR ACCREDITATION OF LABORATORY ANIMAL CARE

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This section responds to the Committee's request that the Secretary of Defense explain why all Department of Defense (DoD) laboratories are not accredited and to move toward accreditation of all DoD laboratories. Since June 1, 1984, with the publication of the Joint Regulation on *The Use of Animals in DoD Programs* (Appendix A), the DoD has implemented more stringent animal care and use requirements than those required by statute. The Joint Regulation established uniform procedures, policies and responsibilities for the use of animals in DoD programs. It also covered transportation, care, use, review, reporting, and other animal husbandry areas for animals used in: research, development, test, and evaluation (RDT&E); clinical investigation; diagnostic purposes; and instructional programs or exhibitions in the Military Departments and Defense Agencies. Importantly, The Joint Regulation exceeds statutory requirements in that it requires all DoD organizations having animals (other than for military working, recreational, and ceremonial purposes) to seek accreditation by the American Association for Accreditation of Laboratory Animal Care (AAALAC).

The Joint Service Regulation also cites the National Institutes of Health (NIH) publication, "*Guide for the Care and Use of Laboratory Animals*," which is the principal document used by AAALAC in its accreditation process. The animal care and husbandry standards and requirements contained in the Guide are designed to provide an environment that ensures that proper care and humane treatment are given to all animals used in research, testing, and education. This care requires scientific and professional judgment, which is based on knowledge of the husbandry needs of each species, as well as the special requirements of the research program.

AAALAC accreditation, widely accepted by the scientific community, is viewed as a highly desirable feature of the Department's animal care and use programs. The Association is highly respected as an independent organization that evaluates the quality of laboratory animal care and use. A copy of the AAALAC instructions for completing the description of the institutional animal care and use program as part of the application for AAALAC accreditation is provided as Appendix B. Accreditation covers all aspects of animal care to include: institutional policies; laboratory animal husbandry; veterinary care; facility physical plant; support facilities; and special areas of breeding colony operations and animal research involving hazardous agents such as radioactive substances, infectious agents, or toxic chemicals.

The non-biased, independent, external peer review which is fundamental to continuing AAALAC accreditation is valuable to any size program. AAALAC findings highlight program strengths and identify potential weaknesses. Laboratories

maintaining accreditation demonstrate a high degree of accountability and program excellence. AAALAC standards stress the appropriate appointment, composition, and empowerment of an Institutional Animal Care and Use Committee (IACUC). This Committee is responsible for monitoring and evaluating all aspects of the institution's program which use animals for teaching and/or research purposes. The scope of IACUC functions is addressed in Section V of this report.

DoD utilizes external peer review for the evaluation of many of its programs, such as drug screening laboratories, and review of military medical facilities by the Joint Commission for Accreditation of Health Organizations. At the same time, DoD recognizes the diversity of mission operations and global reach of the military mission. There are situations where external peer reviews are not cost effective due to the remote locale, limited scope of operations, or host nation sovereignty. In these cases, equivalency standards can apply and be effectively monitored. The Joint Service Regulation and Service-conducted inspections of facilities implement the requirements of the Animal Welfare Act and the *Guide for the Care and Use of Laboratory Animals*. As noted in the Office of the Inspector General, Department of Defense (OIG-DoD) "Review of the Use of Animals in DoD Medical Research Facilities," February 1994, best practices were found in both AAALAC and non-AAALAC accredited DoD facilities.

There are 51 DoD facilities that deal with animal use. Six of these are offices that control the extramural programs. Of the 45 DoD research, education, training and testing facilities, there are three instances where two facilities share a single animal care facility. Of the 42 separate animal facilities, 25 facilities or 60% are accredited by AAALAC (OIG-DoD, "Review of the Use of Animals in DoD Medical Research Facilities," February 1994). This compares favorably with the accreditation rate for the 1474 United States Department of Agriculture (USDA) registered animal facilities; 554 or 38% are accredited by AAALAC. Information on AAALAC accreditation by facility is given in Appendix C.

In keeping with the Joint Regulation, the DoD has accredited the majority of its research laboratories. However, as documented by the DoD Inspector General's report to Congress, a number of Department research facilities are dated in regards to their physical plant. These facilities have been historically regarded by the DoD as insurmountable obstacles to AAALAC accreditation until they are renovated or replaced. However, the AAALAC philosophy of accreditation is steadily evolving from a strictly physical facility perspective (engineering standards) to a more comprehensive evaluation of the total laboratory animal care and use program (performance standards). Facilities are still an important consideration in the accreditation process, but are no longer the paramount element. Consequently, research units that were previously regarded as unaccreditable until major facilities renovations or upgrades were completed, are now actively pursuing AAALAC accreditation on the basis of comprehensive, high quality laboratory animal care and use programs. However, there remain several DoD laboratories that require major construction or renovation prior to achieving full AAALAC accreditation. The lack of accreditation or deficiencies in the physical plant at several DoD facilities does not

imply that animals are exposed to unhealthy conditions. The OIG-DoD's report "Review of the Use of Animals in DoD Medical Research Facilities," February 1994 confirmed the effectiveness of animal husbandry programs in DoD facilities and concluded that although not all facilities were AAALAC accredited, animals in DoD facilities were maintained in healthy environments and treated humanely.

## SECTION III

# SERVICE AND DoD ANIMAL USE IN RESEARCH, EDUCATION, TRAINING AND TESTING, AND THE COST OF ANIMAL-BASED PROGRAMS VS. OTHER RESEARCH

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This Section provides an in-depth report on Service and Department of Defense (DoD) animal use in research, education, training and testing.

### III.1. METHODS

Information was solicited and received from DoD agencies, military Commands and extramural sites involved in the performance and/or funding of animal care and use programs. DoD facilities included those located outside of the United States.

Animal was defined as any whole nonhuman vertebrate, living or dead, which was used for research, development, test, and evaluation (RDT&E), clinical investigations, diagnostic procedures, and/or instructional programs. Only live animals or whole dead animals as defined that were on hand in the facility or acquired during fiscal year (FY) 1993 were included. Animal organs, tissues, cells, blood, fluid components, and/or by-products purchased or acquired as such animal/biological components were not reported. This definition *does not* include animals used or intended for use as food for consumption by humans, animals used for ceremonial purposes, nor military working animals and their training programs.

DoD and service accounting systems do not contain resource subcategories to support provision of specific cost data for all direct and indirect costs associated with animal use programs. Each facility provided its own best estimate of these animal program costs.

### III.2. RESULTS

Information concerning total DoD utilization of animals by each Service is presented in figure III-1. DoD animal use by species is presented in figure III-2. The majority (94%) of animals used by the DoD consists of rodents, reptiles, amphibians and fish. Additional information on the types of species used by each service and the Tri-Service laboratories is presented in figures III-3 - III-6. Six categories of animal utilization were identified to include adjuncts to animal use research and/or alternatives to animal investigations, animal breeding stock, clinical investigations, medical research and development, non-medical research and development, and training and instruction. Figure III-7 illustrates that 75% of the animals used by the DoD for FY93 were in medical research. There was no use of DoD animals reported in FY93 for offensive weapon testing. Figures III-8 - III-11 provide additional information on animal use by category for each service and the Tri-Service laboratories. The total DoD species use by category is presented in figure III-12.

service and the Tri-Service laboratories. The total DoD species use by category is presented in figure III-12.

The costs of animal use programs relative to total research, education, training and testing programs are presented in tables III-1 through III-5. The tables provide data concerning Departmental research and development funding of animal use programs at each facility engaged in animal use programs. In addition, any non-DoD research and development funding received to support these programs has been indicated. Research and development funds are identified within the Department as Major Force Program 6, or P-6 funds. Training and education activities utilizing animals are supported with Major Force Program 8, or P-8 funds. These funds are also presented for those activities engaged in training and education. If non-DoD training and education funds are received for support of these latter programs, they are also displayed. Finally, the percentage of the total funds that are utilized by each facility for animal use programs is presented. There is considerable variation in this percentage which reflects the different missions performed in these facilities. Those facilities whose primary mission is medical research have higher percentages of animal use than laboratories that have a non-biological research mission.

Table III-5 is the DoD-wide total of animal use program dollars as compared to total program dollars. For RDT&E programs, those using animals accounted for 0.4% of the DoD-wide FY93 RDT&E budget.

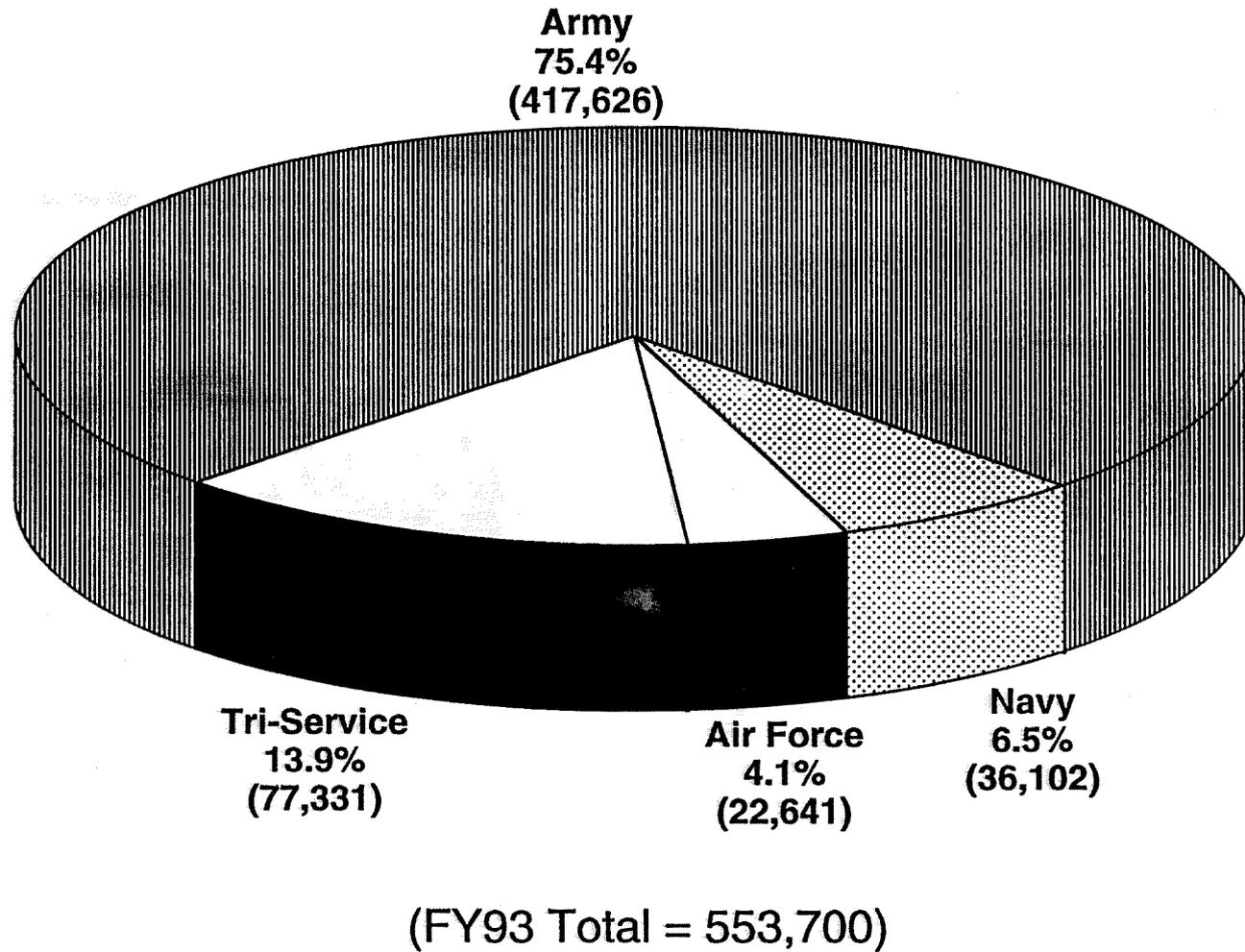
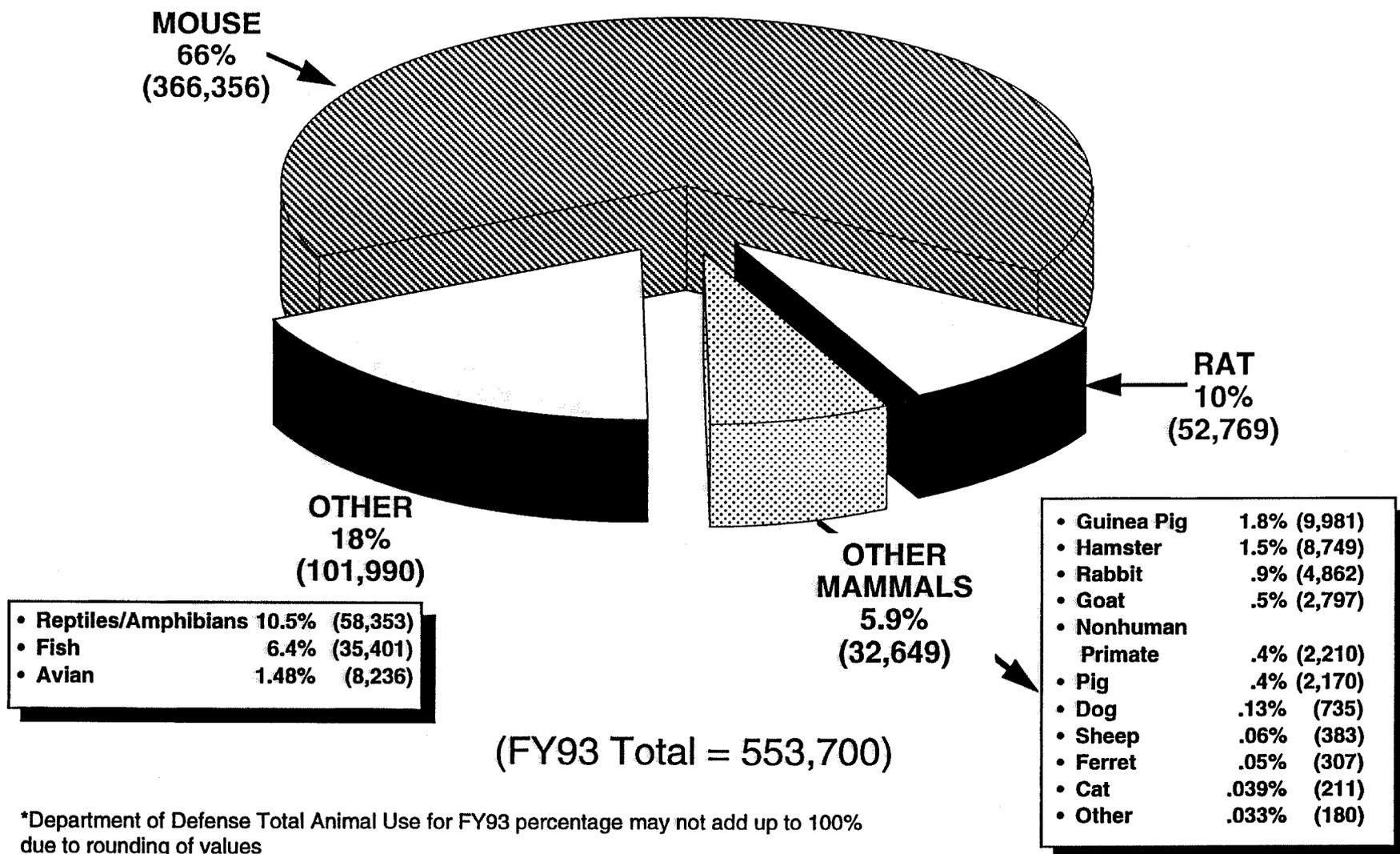
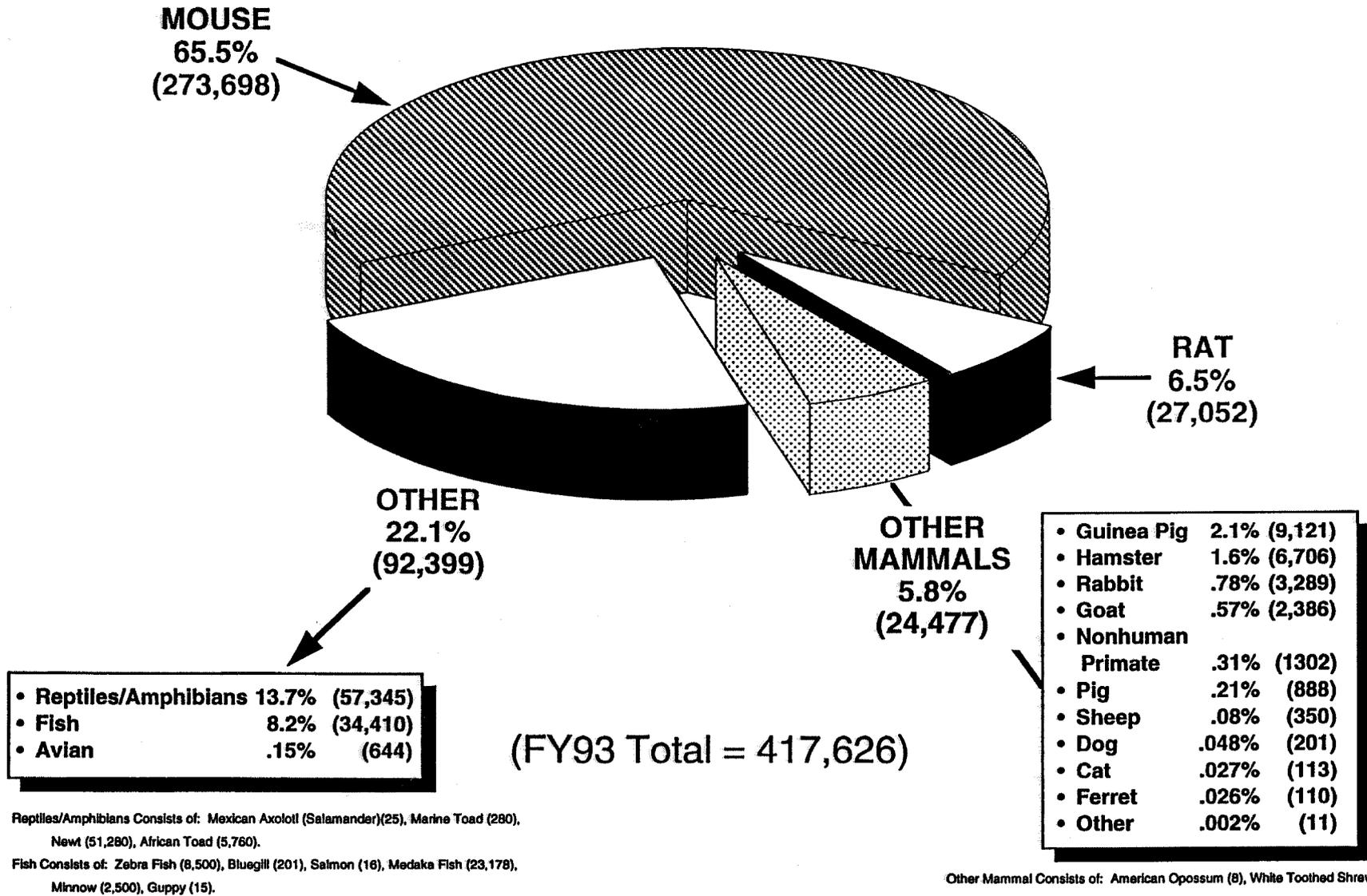


Figure III-1 Total DoD Intramural and Extramural Animal Use by Branch

III-4

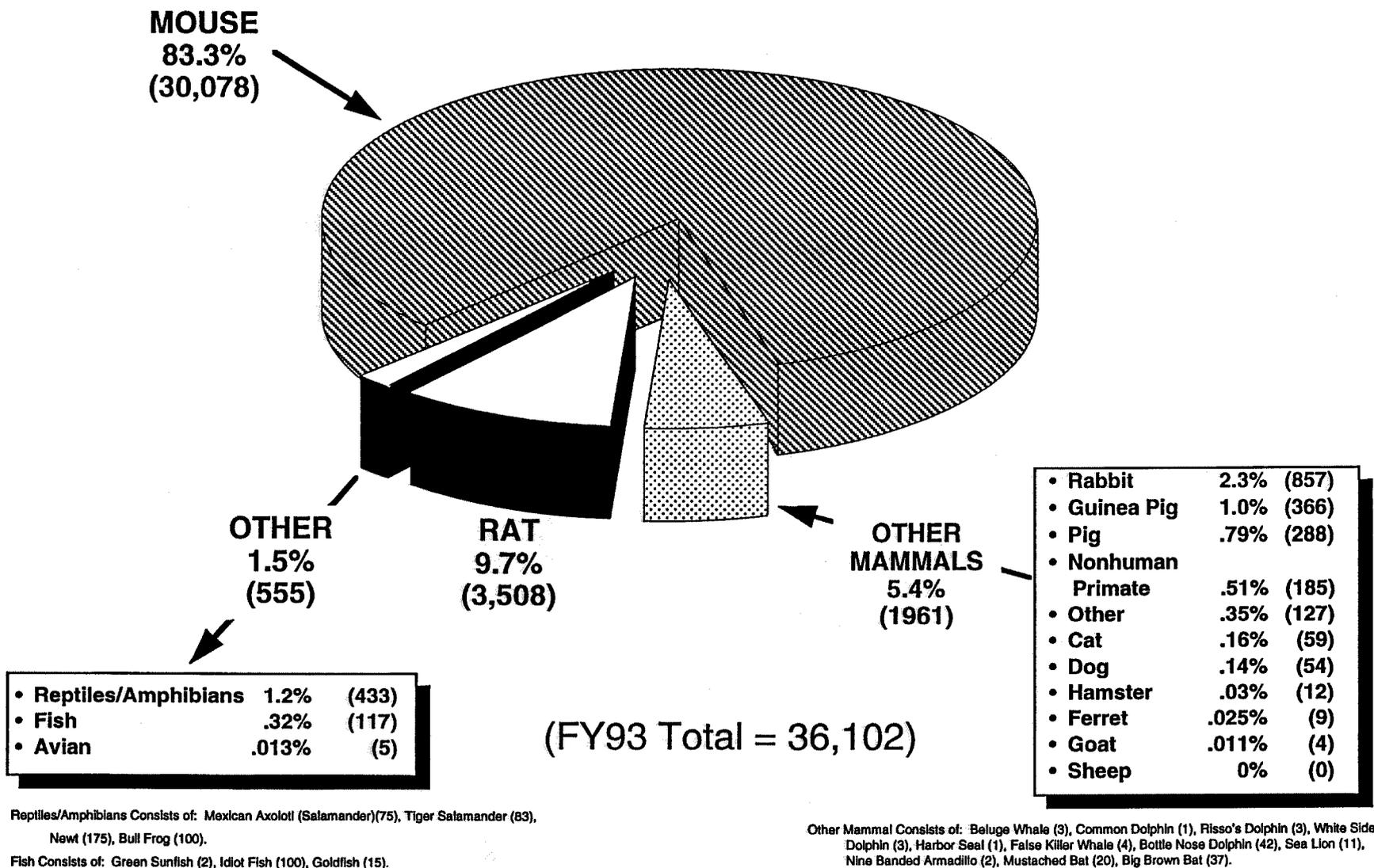


**Figure III-2 Total DoD Intramural and Extramural Animal Use by Species FY93**

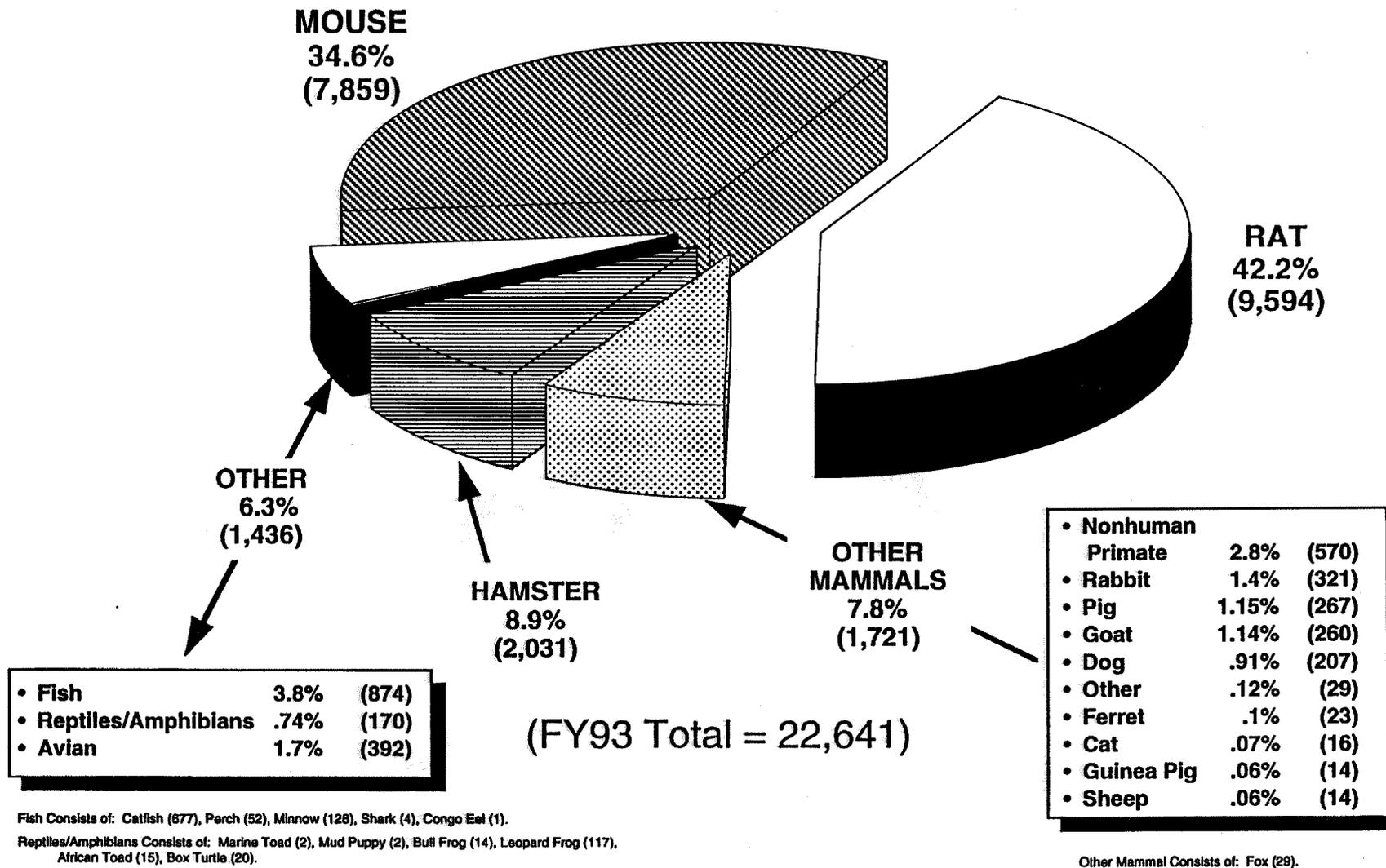


**Figure III-3 Total Army Intramural and Extramural Animal Use by Species FY93**

III-6

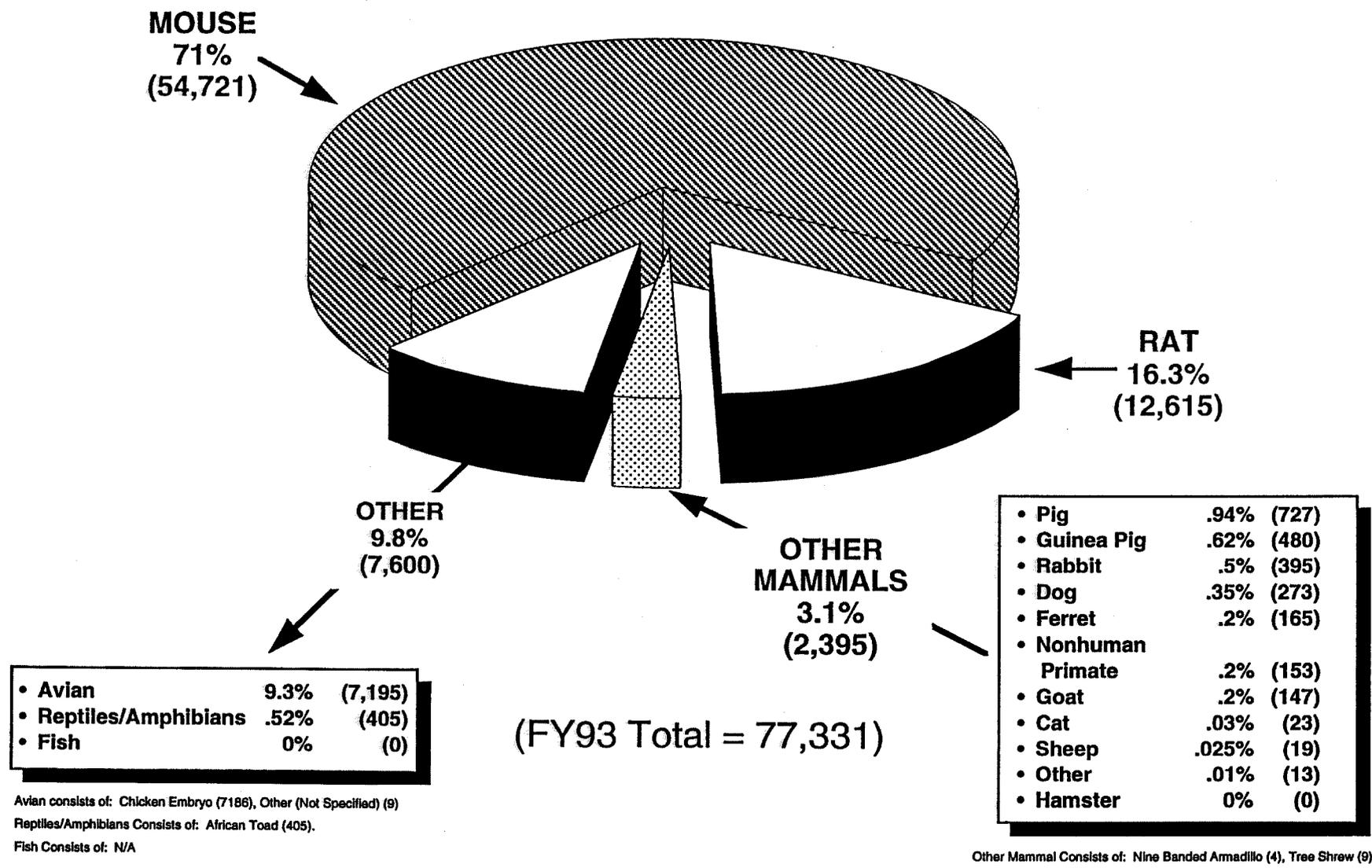


**Figure III-4 Total Navy Intramural and Extramural Animal Use by Species FY93**

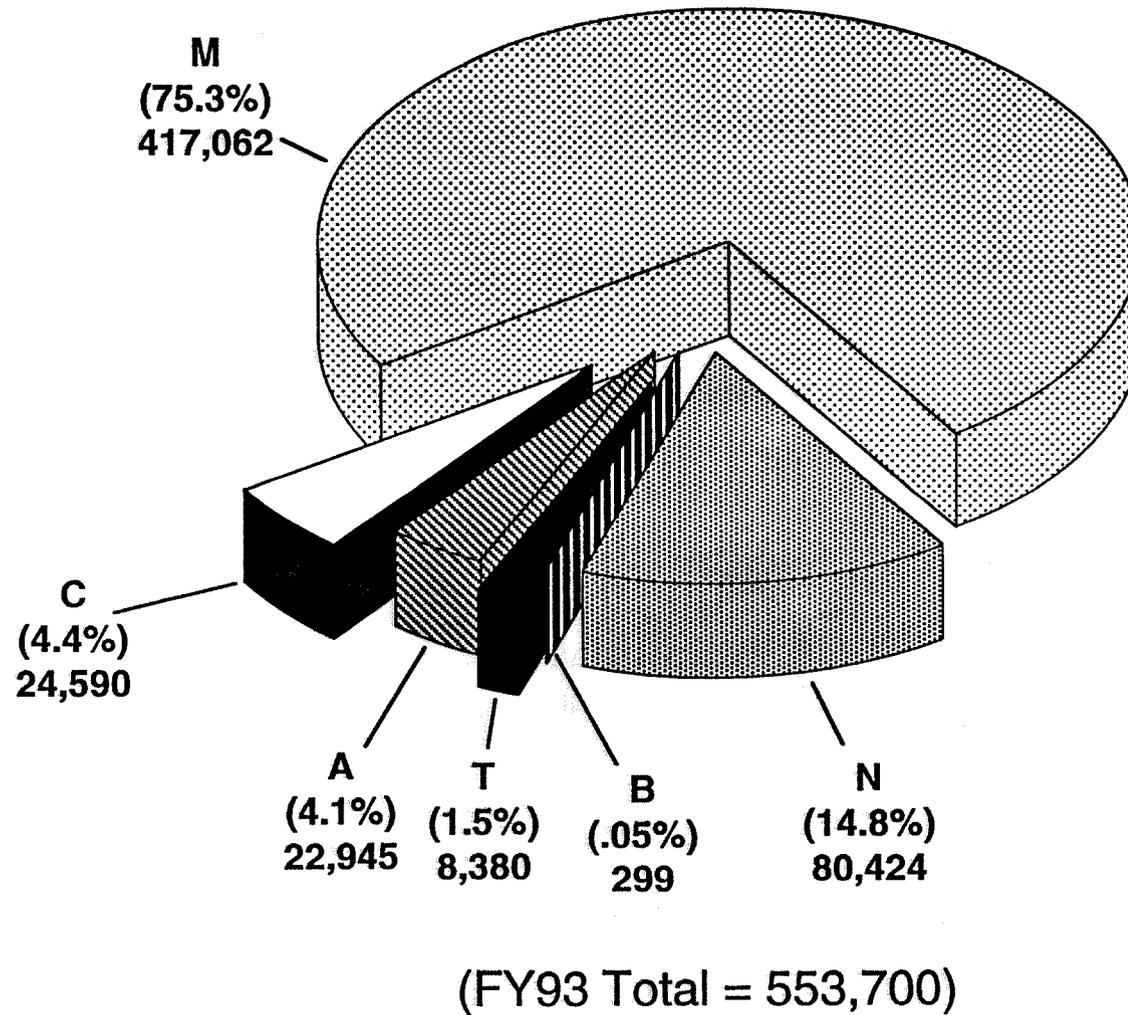


**Figure III-5 Total Air Force Intramural and Extramural Animal Use by Species FY93**

8-III



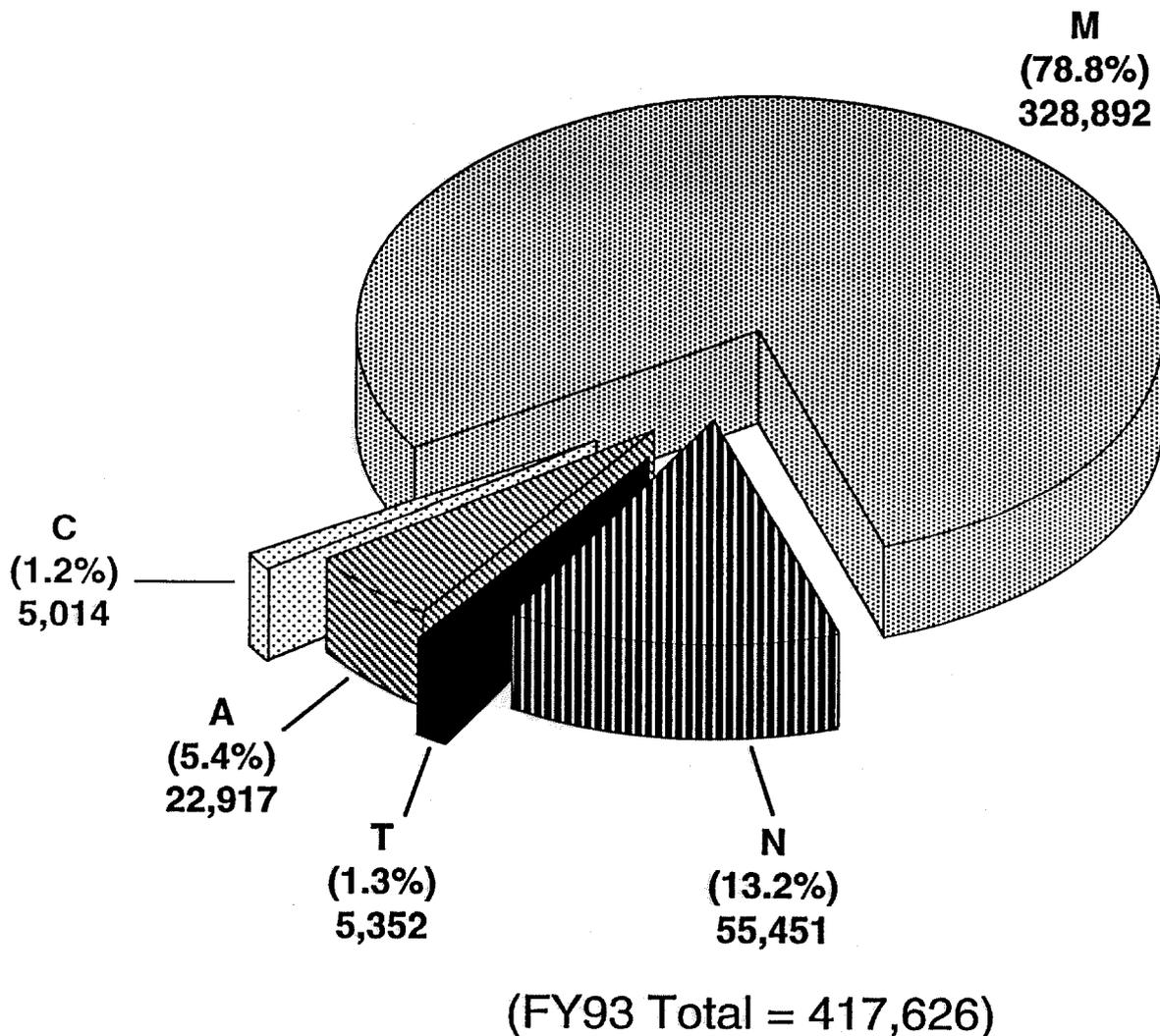
**Figure III-6 Total Tri-Service DoD Facility Intramural and Extramural Animal Use by Species FY93**



A: Adjuncts to Animal Use Research and/or Alternatives to Animal Investigation, B: Animal Breeding Stock, C: Clinical Investigations, M: Medical RDT&E, N: Non-Medical RDT&E, T: Training & Instructional.

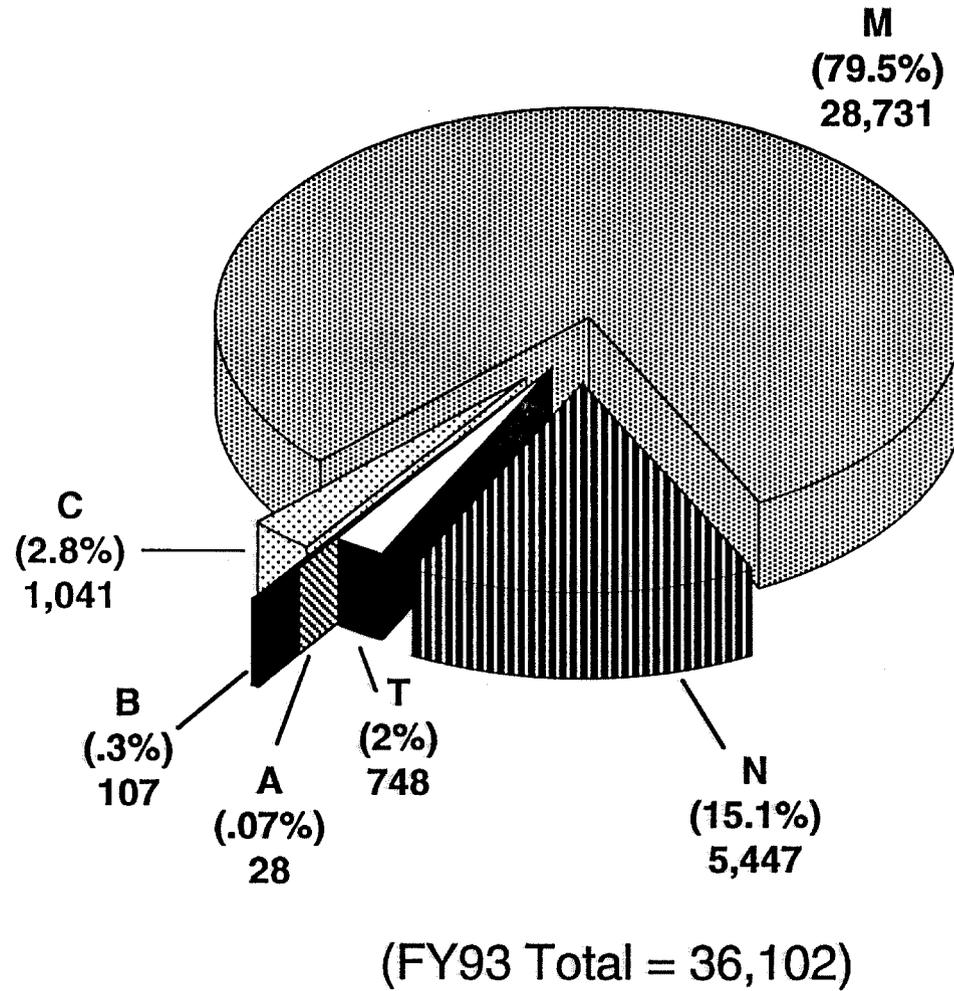
Figure III-7 Total DoD Intramural and Extramural Animal Use by Category

III-10



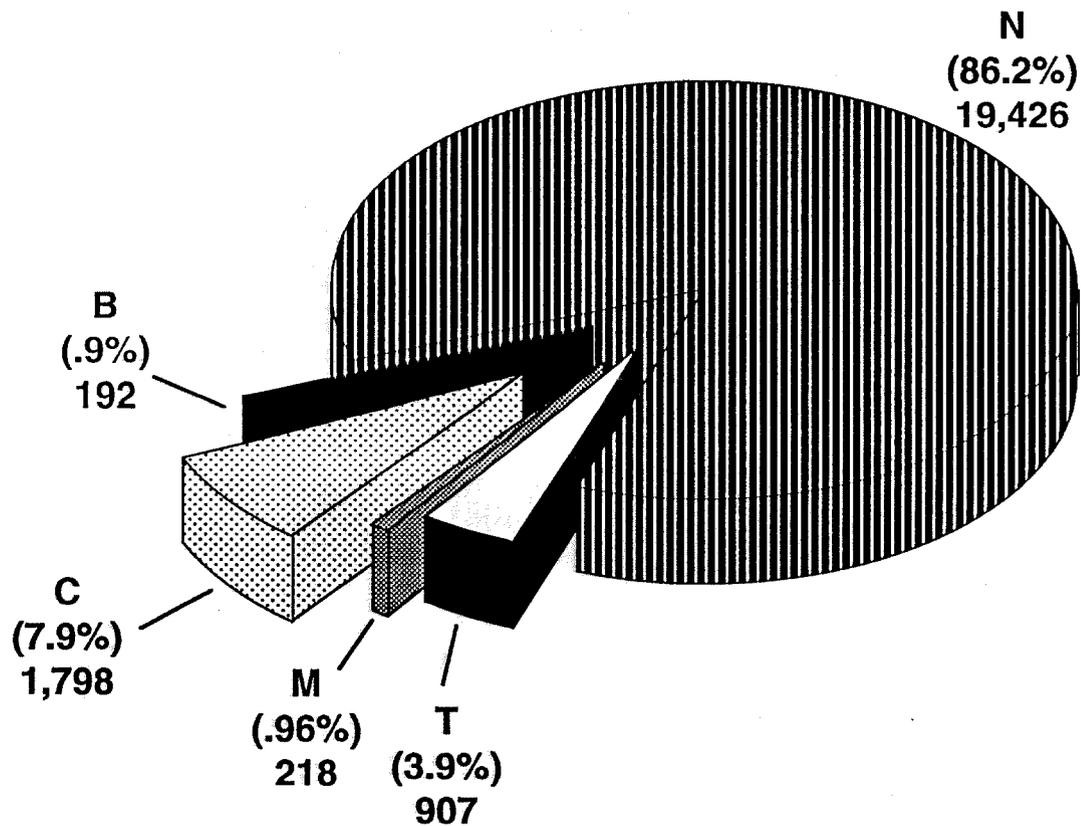
A: Adjuncts to Animal Use Research and/or Alternatives to Animal Investigation,  
C: Clinical Investigations, M: Medical RDT&E, N: Non-Medical RDT&E, T: Training & Instructional.

Figure III-8 Total Army Intramural and Extramural Animal Use by Category



A: Adjuncts to Animal Use Research and/or Alternatives to Animal Investigation,  
B: Animal Breeding Stock, C: Clinical Investigations, M: Medical RDT&E,  
N: Non-Medical RDT&E, T: Training & Instructional.

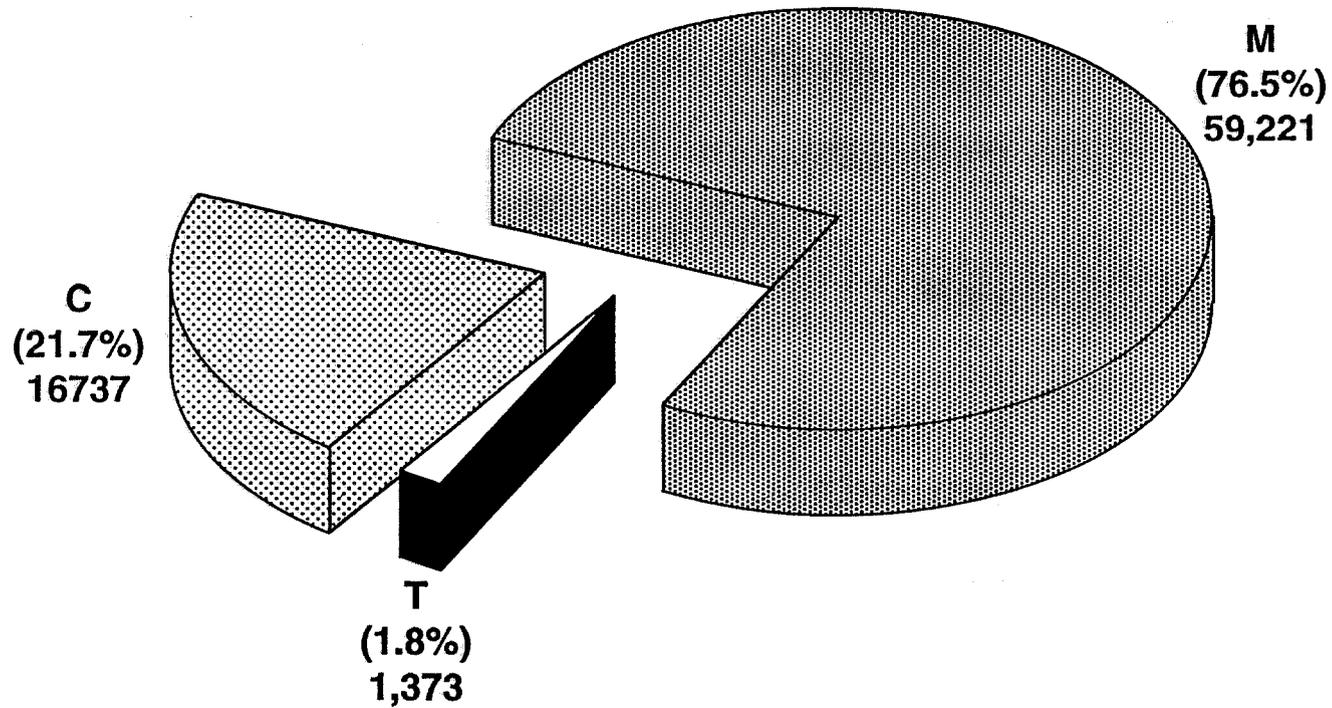
Figure III-9 Total Navy Intramural and Extramural Animal Use by Category



(FY93 Total = 22,641)

B: Animal Breeding Stock, C: Clinical Investigations, M: Medical RDT&E,  
N: Non-Medical RDT&E, T: Training & Instructional.

Figure III-10 Total Air Force Intramural and Extramural Animal Use by Category



(FY93 Total = 77,331)

C: Clinical Investigations, M: Medical RDT&E, T: Training & Instructional.

Figure III-11 Total Tri-Service DoD Facility Intramural and Extramural Animal Use by Category

III-14

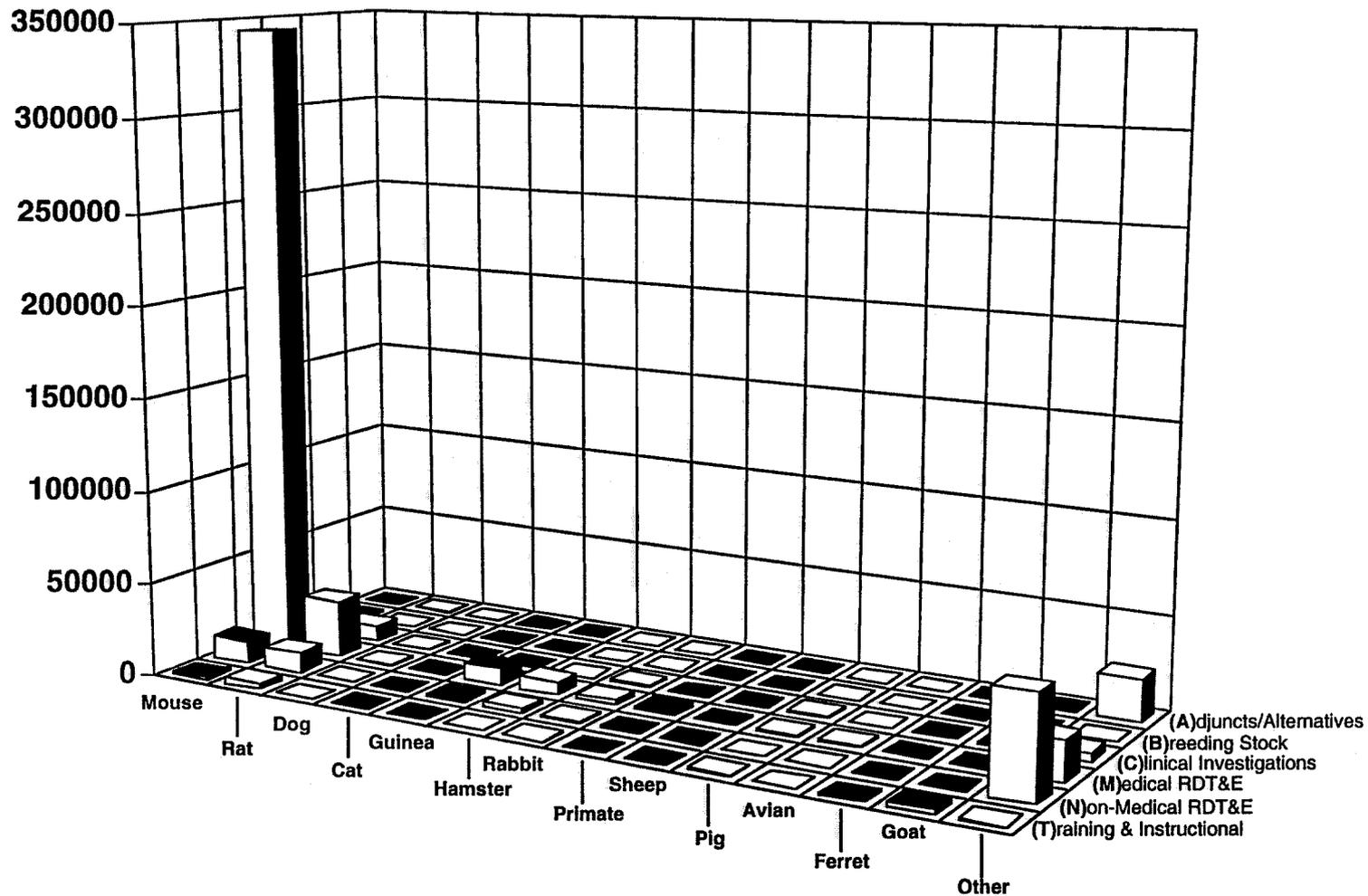


Figure III-12 Total DoD Intramural and Extramural Species Use by Category

**TABLE III-1 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS - ARMY  
Research**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
U.S. Army Research Institute of Environmental Medicine	2,185	0	2,185	8,008	6	8,014	27
U.S. Army Medical Research Institute of Chemical Defense	6,563	0	6,563	19,514	24	19,538	34
U.S. Army Medical Research Institute of Infectious Diseases	12,882	0	12,882	27,391	0	27,391	47
U.S. Army Aeromedical Research Laboratory	559	0	559	7,764	0	7,764	7
U.S. Army Institute of Surgical Research	396	0	396	7,396	0	7,396	5
U.S. Army Biomedical Research and Development Laboratory	4,360	0	4,360	6,075	0	6,075	72
Walter Reed Army Institute of Research (WRAIR)	12,200	0	12,200	45,985	236	46,221	26
U.S. Army Medical Research Unit/3501, Brazil (WRAIR)	1	0	1	583	0	583	0.2
U.S. Army Medical Research Unit, Kenya (WRAIR)	31	0	31	288	0	288	11
Armed Forces Research Institute of Medical Sciences, Thailand (WRAIR)	366	11	397	5,943	655	6,598	6
U.S. Army Dental Research Detachment	871	0	871	2,461	0	2,461	35
U.S. Army Research Laboratory Human Research and Engineering	0	0	0	19,761	0	19,761	0
U.S. Army Edgewood Research, Development and Engineering Center (U.S. Army Chemical and Biological Defense Command)	1,208	0	1,208	161,499	0	161,499	1
Army Research Office, Research Triangle Park (Extramural Contracts)	281	0	281	77,433	0	77,433	0.4
Letterman Army Institute of Research (Closure Expense, Closed Effective Oct 93)	0	0	0	3,890	0	3,890	0
U.S. Army Medical Materiel Development Activity (Contract Monitoring)	0	0	0	4,836	5	4,841	0
U. S. Army Medical Research, Development, Acquisition and Logistics Command (Provisional) (Extramural Contracts)	58,563	0	58,563	144,175	410	144,585	41
<b>TOTALS</b>	<b>100,486</b>	<b>11</b>	<b>100,497</b>	<b>543,002</b>	<b>1,336</b>	<b>544,338</b>	<b>18</b>

III-15

DOD Animal Cost and Use Programs 1993

**TABLE III-1 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS - ARMY (Continued)  
Education**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
Walter Reed Army Medical Center	483	28	509	3,768	735	4,503	11
William Beaumont Army Medical Center	79	0	79	1,235	478	1,713	5
Tripler Army Medical Center	223	174	397	687	174	861	46
Fitzsimons Army Medical Center	226	0	226	1,823	185	2,008	11
Madigan Army Medical Center	20	122	142	476	279	755	19
Dwight David Eisenhower Army Medical Center	248	0	248	675	0	675	37
Brooke Army Medical Center	44	0	44	805	125	930	5
<b>TOTALS</b>	<b>1,323</b>	<b>322</b>	<b>1,645</b>	<b>9,469</b>	<b>1,976</b>	<b>11,445</b>	<b>14</b>

III-16

**TABLE III-1 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS - ARMY (Continued)  
Training**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
Army Medical Department Center & School	54	0	54	12,300	0	12,300	0.4
Special Warfare Training Group	255	0	255	857	0	857	30
<b>TOTALS</b>	<b>309</b>	<b>0</b>	<b>309</b>	<b>13,157</b>	<b>0</b>	<b>13,157</b>	<b>2</b>

**Testing**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
U.S. Army Dugway Proving Ground	775	0	775	53,964	289	54,253	1
Army Environmental Hygiene Agency	704	0	704	28,402	0	28,402	2
<b>TOTALS</b>	<b>1,479</b>	<b>0</b>	<b>1,479</b>	<b>82,366</b>	<b>289</b>	<b>82,655</b>	<b>2</b>

III-17

DOD Animal Cost and Use Programs 1993

**TABLE III-1 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS - ARMY (Continued)  
Summary**

III-18

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs in Animal Use Programs (Column D/G=H)
Army Research in Facilities with Animal Use Programs	100,486	11	100,497	543,002	1,336	544,338	18
Army Testing in Facilities with Animal Use Programs	1,479	0	1,479	82,366	289	82,655	2
Total Army RDT&E*	101,965	11	101,976	6,057,072	1,625	6,058,697	2
Army Education in Facilities with Animal Use Programs	1,323	322	1,645	9,469	1,976	11,445	14
Army Training in Facilities with Animal Use Programs	309	0	309	13,157	0	13,157	2

\* RDT&E Programs (R-1), Department of Defense Budget for Fiscal Year 1995, February 1994

**TABLE III-2 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS - NAVY  
Research**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs in Animal Use Programs (Column D/G=H)
Naval Aerospace Medical Research Laboratory	684	0	684	5,383	16	5,399	13
Naval Dental Research Institute	630	0	630	1,619	0	1,619	39
Naval Medical Research Institute	9,355	0	9,355	55,298	114	55,412	17
U.S. Naval Medical Research Unit #2, Indonesia	81	0	81	4,118	0	4,118	2
U.S. Naval Medical Research Unit #3, Cairo Egypt	1,180	630	1,810	6,871	720	7,591	24
U.S. Naval Medical Research Institute Detachment #3800, Peru	401	0	401	1,956	0	1,956	21
Naval Medical Research Institute Toxicology Division	1,432	0	1,432	3,019	0	3,019	47
Naval Command, Control & Ocean Surveillance Center RDTE	4,600	0	4,600	328,988	0	328,988	1
Office of Naval Research (Extramural Contracts)	6,937	0	6,937	31,148	0	31,148	22
Naval Medical Research and Development Command (Extramural Contracts)	4,514	0	4,514	36,027	0	36,027	13
<b>TOTALS</b>	<b>29,814</b>	<b>630</b>	<b>30,444</b>	<b>474,427</b>	<b>850</b>	<b>475,277</b>	<b>6</b>

**Education**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs in Animal Use Programs (Column D/G=H)
Naval Medical Center, Clinical Investigation Program, Oakland, CA	38	0	38	120	0	120	32
Naval Medical Center, Clinical Investigation Program, San Diego, CA	517	0	517	601	0	601	86
Naval Medical Center, Clinical Investigation Program, Portsmouth, VA	121	0	121	427	0	427	28
<b>TOTALS</b>	<b>676</b>	<b>0</b>	<b>676</b>	<b>1,148</b>	<b>0</b>	<b>1,148</b>	<b>59</b>

III-19

DOD Animal Cost and Use Programs 1993

**TABLE III-2 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS - NAVY (Continued)  
Summary**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
Navy Research in Facilities with Animal Use Programs	29,814	630	30,444	474,427	850	475,277	6
Navy Testing in Facilities with Animal Use Programs	0	0	0	0	0	0	0
<b>Total Navy RDT&amp;E*</b>	<b>29,814</b>	<b>630</b>	<b>30,444</b>	<b>8,857,441</b>	<b>850</b>	<b>8,858,291</b>	<b>0.3</b>
Navy Education in Facilities with Animal Use Programs	676	0	676	1,148	0	1,148	59
Navy Training in Facilities with Animal Use Programs	0	0	0	0	0	0	0

\* RDT&E Programs (R-1), Department of Defense Budget for Fiscal Year 1995, February 1994

**TABLE III-3 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS - AIR FORCE  
Research**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
Armstrong Laboratory, Wright Patterson AFB/ Brooks AFB	10,500	273	10,773	192,558	914	193,472	6
Aerophysics Systems Flight Office	164	0	164	7,121	0	7,121	2
Air Force Office of Scientific Research (Extramural Contracts)	4,200	0	4,200	202,000	0	202,000	2
<b>TOTALS</b>	<b>14,864</b>	<b>273</b>	<b>15,137</b>	<b>401,679</b>	<b>914</b>	<b>402,593</b>	<b>4</b>

**Education**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
Keesler Medical Center, 81st Medical Group	80	2	82	492	42	534	15
Wilford Hall Medical Center	1,174	44	1,218	3,470	901	4,371	28
David Grant USAF Medical Center 60th Med Group	182	21	203	322	280	602	34
U.S. Air Force Academy	3	0	3	92	0	92	3
<b>TOTALS</b>	<b>1,439</b>	<b>67</b>	<b>1,506</b>	<b>4,376</b>	<b>1,223</b>	<b>5,599</b>	<b>27</b>

III-21

DOD Animal Cost and Use Programs 1993

**TABLE III-3 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS -AIR FORCE (Continued)  
Summary**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs in Animal Use Programs (Column D/G=H)
Air Force Research in Facilities with Animal Use Programs	14,864	273	15,137	401,679	914	402,593	4
Air Force Testing in Facilities with Animal Use Programs	0	0	0	0	0	0	0
Total Air Force RDT&E*	14,864	273	15,137	12,866,924	914	12,867,838	0.1
Air Force Education in Facilities with Animal Use Programs	1,439	67	1,506	4,376	1,223	5,599	27
Air Force Training in Facilities with Animal Use Programs	0	0	0	0	0	0	0

\* RDT&E Programs (R-1), Department of Defense Budget for Fiscal Year 1995, February 1994

**TABLE III-4 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS  
TRI-SERVICE DOD FACILITIES  
Research**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
Armed Forces Institute of Pathology	820	288	1,108	29,247	720	29,967	4
Armed Forces Radiobiology Research Institute	15,082	318	15,380	17,292	318	17,610	87
<b>TOTALS</b>	<b>15,882</b>	<b>606</b>	<b>16,488</b>	<b>46,539</b>	<b>1,038</b>	<b>47,577</b>	<b>35</b>

**Education**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs In Animal Use Programs (Column D/G=H)
Uniformed Services University of the Health Sciences	5,905	11,172	17,077	53,499	16,256	69,755	24
<b>TOTALS</b>	<b>5,905</b>	<b>11,172</b>	<b>17,077</b>	<b>53,499</b>	<b>16,256</b>	<b>69,755</b>	<b>24</b>

III-23

DoD Animal Cost and Use Programs 1993

**TABLE III-4 COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS  
TRI-SERVICE DOD FACILITIES (Continued)  
Summary**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs in Animal Use Programs (Column D/G=H)
Research in Tri-Service Facilities with Animal Use Programs	15,882	606	16,488	46,539	1,038	47,577	35
Testing in Tri-Service Facilities with Animal Use Programs	0	0	0	0	0	0	0
Total Tri-Service Defense Agency RDT&E*	15,882	606	16,488	9,764,807	1,038	9,765,845	0.2
Education in Tri-Service Facilities with Animal Use Programs	5,905	11,172	17,077	53,499	16,256	69,755	24
Training in Tri-Service Facilities with Animal Use Programs	0	0	0	0	0	0	0

\*RDT&E Programs (R-1), Department of Defense Budget for Fiscal Year 1995, February 1994

**TABLE III-5 DOD COSTS OF ANIMAL USE PROGRAMS RELATIVE TO  
TOTAL RESEARCH, EDUCATION, TRAINING, AND TESTING PROGRAMS  
Summary**

Institution (Column A)	DOD Funding Animal Use Programs (K\$) (Column B)	Non-DOD Funding Animal Use Programs (K\$) (Column C)	Total Funding Animal Use Programs (K\$) (Column B+C=D)	DOD Funding Total Program RDT&E or Training (K\$) (Column E)	Non-DOD Funding Total Program (K\$) (Column F)	Total Program Costs (K\$) (Column E+F=G)	% of Program Costs in Animal Use Programs (Column D/G=H)
DoD Research in Facilities with Animal Use Programs	161,046	1,520	162,566	1,465,647	4,138	1,469,785	11
DoD Testing in Facilities with Animal Use Programs	1,479	0	1,479	82,366	289	82,655	2
Total DoD RDT&E*	162,525	1,520	164,045	37,827,598	4,427	37,832,025	0.4
DoD Education in Facilities with Animal Use Programs	9,343	11,561	20,904	68,492	19,455	87,947	24
DoD Training in Facilities with Animal Use Programs	309	0	309	13,157	0	13,157	2

\* RDT&E Programs (R-1), Department of Defense Budget for Fiscal Year 1995, February 1994

## SECTION IV

# DEFENSE DEPARTMENT INITIATIVES TO PROMOTE ALTERNATIVE METHODS THAT REPLACE, REDUCE AND REFINE THE USE OF ANIMALS

This section responds to the Committee's direction that the Secretary of Defense describe initiatives to promote alternative approaches that bring about a reduction in animal usage. Alternatives, as articulated in "The Principles of Humane Experimental Technique" (Russell and Burch, 1959), are defined as methods that Replace, Reduce and Refine the use of animals. In addition to these *Three Rs*, the Department of Defense (DoD) advocates a fourth *R*, "Responsibility", for implementing these alternative methods.

Department policy with regard to animal alternatives is promulgated in DoD Directive 3216.1 which indicates that "it is DoD policy that...alternatives to animal species should be used if they produce scientifically satisfactory results...". This policy is implemented in the Joint Service Regulation on the Use of Animals in DoD Programs, which delegates responsibility to the local commander for utilization of alternatives to animals.

Retrospective data on DoD animal use during 1987, 1989 & 1991 (Weichbrod, 1993) were compared to an analogous subset of 1993 data. This subset was restricted to United States Department of Agriculture reportable species and rodents used at intramural sites in the Continental United States. These data demonstrate the Department's aggressive and effective application of these *Four Rs* and are reflected in a 40% (figure IV-1) decrease of intramural animal use in research over the past seven years.

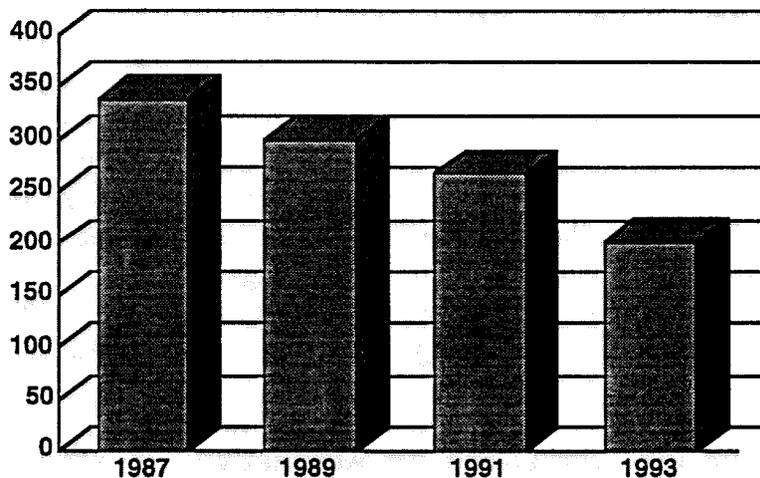


Figure IV-1 DoD Intramural Total Animal Use FY87-93

To illustrate the Department's initiatives to promote these *Four Rs*, this section provides a description of such initiatives within DoD's research laboratories and medical treatment centers. The following list is not all inclusive, as the number of specific examples of implementing alternative methods that can be documented for DoD's research projects is large. Rather, it illustrates the scope, diversity, and spirit of DoD's *Four Rs* initiatives. This section will demonstrate a broad-based movement, where feasible, towards the use of biotechnology and other innovative alternatives to replace and reduce animal use as well as refinement in methods used in essential animal studies.

#### **IV.1. RESPONSIBILITY**

The DoD has established a variety of initiatives and targeted programs that are currently in place to promote alternative methods that will replace, reduce and refine the use of animals. These programs are designed to target individual and institutional awareness by providing educational opportunities, professional training and fiscal resources towards implementing the *Four Rs* approach to minimizing animal use.

##### **IV.1.1 Science and Technology Emphasis on Alternatives to Animal Subjects of Research**

An example of the Department's direction on seeking alternatives to animal use is the fiscal year (FY) 1993 Army Science and Technology Objective (STO) entitled, *Reducing Reliance on Human and Animal Subjects of Research*. The specific task to "Develop refinement, reduction and replacement strategies for projects currently reliant on the use of animals" supports this STO and is designed to provide a positive mechanism for researchers to explore and implement alternatives to the use of animals. This provides both the impetus for alternatives implementation, as well as a mechanism for funding such research. In FY94, this Army STO was revised and strengthened. The title for this objective for FY94 is *Reducing Reliance on Animals for Research and Improving Experimental Conditions Using Animals* (ASTMP, FY 1994). The U.S. Army Medical Research, Development, Acquisition, and Logistics Command (Provisional) (USAMRDALC) budgets \$600,000 per year for this objective, which is available to support alternatives to animal use research in all three services.

Army STOs provide guidance, means, and high visibility to major Army technology initiatives. The Department of the Army, in coordination with the Director of Defense Research and Engineering (DDR&E), Office of the Secretary of Defense (OSD), publishes the *Army Science and Technology Master Plan* (ASTMP) as guidance to Army laboratories and research, development and engineering centers and to non-Army organizations supporting the Army science and technology (S&T) base.

##### **IV.1.2 Conferences and Workshops on Alternatives to Animal Use**

The DoD promotes responsibility for alternatives to animal use by augmenting formal education and training programs, and sponsors major meetings and

conferences on the subject. In 1990, an important conference on alternatives to animal use, "DoD Initiatives in Alternatives to Animal Testing," was held at Aberdeen Proving Ground. This was followed by a three-day symposium in 1992 entitled "Current Concepts and Approaches on Animal Test Alternatives" with 35 scientific platform sessions and 22 scientific poster presentations. This international symposium was attended by nearly 300 military and civilian scientists from four countries. The symposium was praised as a success by Dr. Martin Stephens of the Humane Society of the United States (Appendix D). Proceedings of the 1992 symposium were published in September 1993 and are available through the Defense Technical Information Center. The Department's continuing commitment to promoting responsibility for alternatives to animal use, even in an environment of constrained resources, is reflected by scheduling another such conference on 24-27 May 1994.

#### **IV.1.3 National Research Council, Institute of Laboratory Animal Resources (ILAR), Educational Programs**

The DoD's priority and continuing commitment to promoting individual and institutional responsibility for alternatives to animal use are reflected in continuing financial support of the ILAR educational program of the National Research Council. The principal thrust of the ILAR grant is development of institutional training materials, educational courses and publications in support of the Department's laboratory animal care and use programs. This ILAR information is used in various military research facilities as an important adjunct to existing investigator training and technical education programs on animal care and use. The ILAR information and programs have generated strong animal alternative provisions for military-specific research. The Department funded a five-year ILAR grant (DAMD17-87-G-7021) for this program and has renegotiated a five-year extension to this effort committing diminishing research funds to maintain this important collaboration. Annual funding for this DoD-sponsored ILAR program is in excess of \$100,000.

#### **IV.1.4 Institutional Animal Care and Use Committee (IACUC) Emphasis**

Title 9 (Animals and Animal Products), Subchapter A (Animal Welfare), Parts 1-4 of the Code of Federal Regulations has specific provisions for addressing the issue of alternatives during the research animal protocol review process. The DoD has been a leader in forming lawfully constituted and functioning IACUCs at its biomedical research facilities. Accordingly, DoD IACUCs consider alternatives to the proposed use of animals as an important review consideration.

#### **IV.1.5 Veterinary Staff Expertise and Assistance Visits**

The major biomedical research commands of the Military Departments each have credentialed laboratory animal medicine (LAM) veterinarians serving in key staff positions. In addition to being advisors to the Commanders on issues related to animal welfare and alternatives to animal use, these veterinarians provide oversight and structure to the command's animal care and use programs. These officers also make periodic staff assistance visits to subordinate facilities that use animals and

evaluate each laboratory animal care and use program. Consideration of the use of alternatives is reviewed on these staff assistance visits.

An important aspect of their responsibility is to review extramural animal use protocols, insuring that alternatives to animal use and personnel training issues have been addressed. The solicitation of extramural efforts through the Broad Agency Announcement (BAA) is very specific in requiring all applications using animals to address the question of alternatives. The following statement is included in the BAA.

"It is USAMRDALC policy that alternatives to the use of animal models be thoroughly investigated prior to submission of any protocol involving research animals. Offerers are required to identify the services that were used to obtain information on alternatives in this research. The USAMRDALC reserves the right to request evidence that an alternative search was performed."

These extramural applications are reviewed by military veterinary staff.

#### **IV.1.6 Professional Veterinary Training in LAM**

The presence of specialty trained, veterinary, LAM expertise in biomedical research institutions strongly correlates to effective animal use alternatives programs. This is especially true in the critical area of refinements. The DoD has long been a leader in training veterinarians in the field of LAM, the biomedical and veterinary specialty most closely associated with laboratory animal welfare and laboratory animal care and use programs. Many of the nationally prominent leaders of several laboratory animal associations were formally trained in, or closely associated with, DoD LAM training programs. Examples are the President-elect and several past presidents of the American College of Laboratory Animal Medicine, several past presidents of the American Association of Laboratory Animal Science (AALAS), and current Secretary-Treasurer of the American Society of Laboratory Animal Practitioners. This traditional DoD strength in LAM expertise strongly enhances both animal care and use and animal alternatives programs.

#### **IV.1.7 AALAS Technician and Laboratory Animal Science Training**

There are a number of DoD research facilities that sponsor formal training programs leading to certification of animal care and research personnel as AALAS laboratory animal technicians. This specialized training is offered to both government and non-government animal technicians. It is an important mechanism for ensuring highly qualified animal care and research technicians in Defense laboratories. Individual DoD institutions have sponsored formal seminars for research personnel where experts from the National Agricultural Library explain in detail the resources available for exploring various animal alternatives in the laboratory. The Walter Reed Army Institute of Research (WRAIR) sponsors laboratory animal workshops that provide comprehensive technical training on animal use and related issues. Improving the technical expertise of laboratory animal technicians and investigators is

a significant refinement element for the use of animals in the laboratory. These workshops are available to all DoD and National Institutes of Health laboratories. As an example, the workshop on the use of rodents is offered 14 times per year. In addition, WRAIR offers quarterly, a workshop on ethical and administrative issues relating to animal use. The AALAS technicians course curriculum and the WRAIR workshop curriculum include formal training and information on alternatives to animal use.

## **IV.2. DOD INITIATIVES TO REPLACE, REDUCE AND REFINER THE USE OF ANIMALS**

The following specific examples are a representative listing of alternatives methodologies practiced in DoD facilities. They are categorized as Replacement, Reduction, and Refinement initiatives. Because of the multi-faceted aspects of many of these examples, some logically belong in more than one category.

### **IV.2.1 Replacement**

The replacement alternative addresses supplanting animal use with non-living systems, analytical assays, cell-culture systems, and with animals that are lower on the phylogenetic scale. Additionally, human subjects are used when experimental drugs and other procedures progress to human trials. Such trials are conducted in accordance with Title 45 United States Code, Section 46, "Protection of Human Subjects".

#### ***IV.2.1.A Replacement using biochemical or physical methods***

- Membrane feeding systems have been developed that replace the need to feed some types of blood-feeding flies and mosquitos on rodent hosts.

- Development of Polymerase Chain Reaction and Mammalian Cell Selection Assays for short-term genetic toxicity testing replaces animal use in carcinogenesis and mutagenesis studies.

- Efforts are ongoing to develop a polymerase chain reaction assay for Q fever that could eliminate the need for the use of a mouse bioassay.

- Quantitating bacterial endotoxin with an *in vitro*, Limulus Amebocyte test is used to replace *in vivo* pyrogen testing in rabbits.

- Use of predictive anthropomorphic dummies and manikins, eg. ADAM (ejection seat reactive live load manikin) and AIRMAN (a fragment capture live fire manikin) has replaced the use of animals in these studies.

#### ***IV.2.1.B Replacement using computer simulations***

- Computer models to replace rhesus monkeys and baboons for toxicological studies are being developed.

- Development of computational models of dolphin echolocation (sonar) for inclusion in the development of hardware systems will replace use of animals as object detectors.

- Development for Special Forces (SF) medical training personnel of advanced computer technology using Virtual Reality, Holographic Imaging, and Telepresence Surgery techniques should replace the use of animals in SF surgical training.

- Computer models are being developed for predicting carcinogenesis induced by ionizing radiation replacing the need to use animals.

#### ***IV.2.1.C Replacement using in vitro cell culture***

- *In vitro* cell culture methods have been developed for passage of Hepatitis E virus eliminating use of animals for virus propagation.

- Development of a macrophage cell line to replace animals in evaluation of cytotoxicity and genotoxicity of respirable particles is in progress.

- Development of a fish liver cell culture model for evaluating metabolism of Xenobiotic compounds replaces the use of mammalian animal models.

- Study of the effects of growth factors on human fibroblasts is being conducted in cell culture media replacing the dogs and pigs utilized in previous studies.

- Development of a cell culture system to pass human breast cancer cells eliminates the need for initially passing these cells in a nude mouse model.

- Use of immortalized tissue culture systems or isolated lobster neuronal cells to investigate radiation effects and free radical damage to the nervous system at the molecular level are used to replace similar protocols using rats and guinea pigs.

- Wound-healing studies on space shuttle flights STS-45, 55 and 56 used a cell culture flight module instead of live rats.

- Development of human skin cell and animal processing plant skin models for assessing cellular mediator and tissue damage from environmental heat has replaced mammalian laboratory animal use.

#### ***IV.2.1.D Replacement with non-mammalian species***

- Development of an aquatic bioassay using the medaka fish (*Oryzias latipes*) to assess human carcinogenic health risks replaces laboratory animal use for tumor immunodiagnosis.

**IV.2.1.E Replacement with human tissue, or volunteers as protocols progress to human trials**

- Many procedures including conjunctival impression cytology, salt and water balance and intestinal permeability, neuroendocrine assessment, nutritional support, testing of topical treatments and studies of *in vitro* activated keratinocytes in autografts in thermal injury research were previously performed in animals but have now progressed to human use protocols, eliminating the use of animals.

- Biomechanical analysis of the strength of plate fixation devices for long bone fracture repair is being performed with human cadaver bones and metal substitutes thereby replacing animal studies.

**IV.2.1.F Replacement with discarded tissue from other laboratories or food processing plants**

- Pigs feet obtained from a local plant are used for teaching surgical suturing procedures, which replaces the need for use of live animals.

- Sheep parts purchased from a processing plant are used to train dentists on periodontal surgical procedures replacing the use of live animals for training.

- Ocular researchers are using eyes purchased from local cattle processing plants for studies instead of live rabbits.

**IV.2.2 Reduction**

Decreasing the numbers of animals used through the use of statistical or innovative design strategies, while preserving the scientific integrity of the biological model, is a major emphasis of the reduction alternative to animal use.

**IV.2.2.A Reduction by use of alternative screening methods to study efficacy in biological testing**

- Development of a Quantitative Luminescence Imaging System (QLIS) for screening radiofrequency radiation (RFR) biological effects in cells reduces the number of laboratory animals needed.

- Establishment of a tissue culture system to evaluate initial exposure levels of toxic substances, such as ammonia, or nitrogen and sulfur oxides, in lung and throat secretions reduces the use of animals in subsequent therapy studies.

- Development of an *in vitro* test using human peripheral blood could determine the effectiveness of toxoid in a staphylococcus enterotoxin B (SEB) vaccine and measure the effectiveness of potential treatments to SEB poisoning. If validated, this would significantly reduce the animals used in SEB research.

- Use of bacteria, algae, crustaceans, earthworms, flatworms, and a toxicity estimation software program functions as a screening mechanism in toxicity testing, highlighting those chemicals or materials necessitating further testing with fish or higher vertebrates. This eliminates many compounds from further testing and reduces laboratory animal use.

- Use of cell culture or molecular biology in preliminary studies of basic mechanisms of cardiovascular disease. An example is the use of an immortal cell line in molecular research on the effects of oxygen on the chemotactic response of macrophages to oxygen, reducing the need for whole animal studies.

- Development of fish (rainbow trout, zebra danjo fish & medaka) as predictive models for epigenetic carcinogens has reduced mammalian animal use in carcinogenesis studies.

- Development of an *in vitro* test for cytoadherence by malaria-infected erythrocytes to human melanoma cells, umbilical vein cells, and endothelial cells greatly reduces the need for nonhuman primates.

- Development of a SCID (severe combined immunodeficiency disease) mouse model where transplanted human liver tissue, a target for malarial sporozoite infection, can not be rejected, permits the evaluation of potential malarial vaccine candidates in a non-monkey model.

- Development of an *in vitro* drug screening system using infected human cells to replace the mouse malaria lethality model, eliminating the need for 4000 mice per year.

- *In vitro* drug screening, drug release kinetics, etc., result in reduction of drug candidates for numerous toxins reducing *in vivo* testing in rodent models up to 90% in some studies.

- Significant effort to develop DNA probes to detect *Rickettsia tsutsugamushi* in mammalian (including human) and chigger tissues should result in a 50% decrease in animal use for isolation and detection of this infectious agent.

- Development of an *in vitro* cultured human hepatoma cell line to assess radical and curative prophylactic activity of antimalarial drugs is in progress. This has the potential to reduce the number of monkeys needed for assessing antimalarial drugs and related compounds.

- *In vitro* techniques using human bone marrow cell culture to demonstrate propagation of Dengue viruses in these cells have reduced the number of monkeys needed for viral propagation by 25%.

- Development of a mosquito model using *in vitro* Dengue antigen detection techniques to pre-screen Dengue candidate vaccines should reduce the number of nonhuman primates needed for evaluation of vaccine candidates.

- Development of a reliable cell culture system for evaluating *Rickettsia tsutsugamushi* antibiotic resistance has reduced the need for animals for drug resistance studies by 50%.

- DNA probes have been developed to screen human *E. coli* isolates for pathogenicity. Only those positive to *in vitro* screening are tested in animals to confirm pathogenicity; this greatly decreases the numbers of animals used.

- Use of ELISA (enzyme linked immunosorbent assay) tests as a first screen in cellular mediator (interleukin 1) studies has reduced the number of mice previously required by 90%.

- The nervous systems of invertebrate sea slugs are used to study the effect of chemical and toxic agents on the electrical properties of nerve cells. This preliminary work reduces the number of vertebrates needed for subsequent study.

- Development and use of amphibian models (*Xenopus laevis* - frog) for assessing teratogenesis assays significantly reduce mammalian animal use.

#### **IV.2.2.B Reduction by substitution of *in vitro* or *ex vivo* methods**

- Synthetic *in vitro* or *ex vivo* systems like artificial bimembrane layers, cell or tissue culture systems, and isolated diaphragm muscle preparations replace or reduce the need for live, whole animal experiments in medical chemical defense research.

- Perfection of an *in vitro* method for growing *Plasmodium falciparum* (the most important human malaria that affects only man and certain monkey species) in human red blood cells has greatly reduced the number of nonhuman primates needed for this research.

- Development of specialized insect and vertebrate cell lines have reduced the need for intracerebral inoculation of suckling mice for the isolation of arboviruses.

- Use of transformed (immortal or self-propagating) cell cultures as an alternative to primary cell cultures that require frequent harvesting of tissues from animals.

- The use of monoclonal antibodies from hybridoma cells to replace animal-derived polyclonal antibody preparations greatly reduces animal requirements.

- *In vitro* techniques to orally infect mosquitoes with Dengue viruses have reduced the number of mice and monkeys needed for viral propagation by 25%.

- Training programs for urology residents utilizing lasers for bladder treatments are initially performed with pig bladders purchased from a processing plant. This reduces the number of animals used for surgical training.

***IV.2.2.C Reduction by substitution of another species of animal, or human volunteers as protocols progress into human trials***

- Studies have been performed to develop mouse and guinea pig models to replace the monkey as an aerosol model for botulism, staphylococcal enterotoxin B, and plague intoxication, which greatly reduces the number of monkeys needed for biological product toxicity and protective efficacy testing.

- Progression of a model of anti-malaria protective immunity into humans, where protective immunity is induced in human volunteers by injected irradiated malarial sporozoites, has reduced the need for animal use in malaria research.

- Although cynomolgus monkeys are the only known model for Hepatitis E infection, rats, lesser bandicoots (rat-like animal) and swine are being evaluated as alternate models to reduce the need for monkeys.

***IV.2.2.D Reduction by substitution of computer simulations or other technologies***

- Use of bioengineering tools to measure physiological parameters on human subjects in operational and experimental gravity (G) tolerance environments may result in a decrease in the number of animals currently used in G tolerance work.

- A research effort is aimed at developing physiological-based, computer models/algorithms to predict *in vivo* distribution, uptake, and elimination of toxic chemicals, thus reducing the need for animals.

- Development of a computer model simulating *in vivo* absorption, distribution, metabolism, and toxic effects of nerve agents and vesicants and validated against *in vivo* pharmacokinetics data in guinea pigs for the nerve-agent soman will significantly reduce the number of animals used in nerve-agent research.

- Training of professionals by interactive videos and innovative teaching techniques, e.g., laparoscopic instruments on sponges, reduces the use of animals.

- Integration of mathematical modeling and aeromedical cardiovascular nonhuman primate research should reduce animal use.

- A computer modeling program reduces the use of sheep in weapon blast overpressure research.

- A computer modeling program that identifies active sites on large molecular weight toxin molecules for intervention with therapeutic drugs is underway. This effort will substantially reduce the numbers of animals used in biotoxin studies.

### **IV.2.3 Refinement**

The refinement alternative for animal use addresses the need to ensure that the maximum humane use of each animal is obtained through proper protocol design and efficient utilization of animals, or through the modification of the experimental design to reduce the ethical cost associated with the study.

#### ***IV.2.3.A Refinement to protocols that reduce pain***

- *Ex vivo* cardiovascular response studies (using tissues in isolated systems) of toxins, eliminate potential pain and distress for animals that would be used in whole animal systems.

- Refinement of methodologies associated with the feeding of arthropod vectors (chiggers) on rodents reduces discomfort to the animals. Use of an unobtrusive barrier system to prevent escape of the chiggers eliminates the need for the attachment of a cumbersome feeding capsule on the anesthetized animal.

- Studies performed to compare less reactogenic adjuvant regimens and alternative sites to foot pad injections in guinea pigs for evaluating hypersensitivity reactions (inflammation and swelling) from candidate Q Fever vaccines decrease potential discomfort associated with evaluation of vaccine candidates.

- Sophisticated technology such as Nuclear Magnetic Resonance Imaging is used to follow biochemical changes occurring over time in rats and other animals. This non-invasive procedure results in the use of far fewer animals and a more physiologically normal model.

- Development and evaluation of micro-encapsulated, time-released anesthetics and analgesics potentially beneficial to casualties on the battlefield have been performed. If perfected, these compounds will provide long-acting analgesia or anesthesia for animals on research projects where anesthesia or analgesia is not currently feasible.

- An evaluation of the feasibility and effectiveness of using topical analgesia (pain relief) on rabbits in Draize eye irritancy testing, and in systemic analgesia during Sereny' Testing (inflammation bioassay) on guinea pigs was performed. This provides the ability to perform a test while decreasing pain and distress without altering the outcome.

- A transdermal (applied to the skin) delivery system of analgesia to relieve pain in dogs was evaluated. Provides an extended analgesia or anesthesia for animals on

research projects, and will be of benefit in human and veterinary medicine for the relief of pain.

#### ***IV.2.3.B Refinement to protocols that reduce distress***

- Development of telemetric surgical procedures for implantation of sensors, allows non-stressful measurement of clinically relevant physiological parameters in non-clinical vaccine and drug efficacy studies. This not only decreases stress associated with manipulative measurements, but the radio-transmitted measurements vastly improve the quality and quantity of data available. Additionally, use of the telemetry allows physiological assessment for efficacy trials, makes intervention with analgesia more feasible, and significantly reduces the use of lethality as the primary endpoint.

- Video tapes are used for adjunct training of technicians and investigators for common animal use procedures, i.e., venipuncture, handling, restraint, etc.

- Novel antibody production and collection techniques in rabbits and goats with plasma collection chambers reduce potential distress associated with venipuncture procedures and reduce, and, in some cases, eliminate immunoadjuvant use.

- Use of slings for studies requiring restraint of pigs and extensive conditioning of the swine prior to initiation of the study result in a significant refinement by reducing potential distress.

- DoD facilities use social housing systems, e.g., multiple animal housing or gang caging, where feasible, which expand intraspecies interactions, and use environmental enrichment strategies that extend to many species that are not specifically mandated by animal welfare legislation. These housing strategies increase the quality of life for the animals.

- A flexible polyethylene mesh restraint device that is more comfortable and is well tolerated by rodents replaces the use of rigid restrainers previously used for maintenance of arthropod (mosquito) vectors.

- A project is underway that plays back natural nonhuman primate vocalizations and analyzes the effectiveness of this as an environmental enrichment strategy.

- Development of a hyphema (fluid in the anterior chamber) model in rabbits has been using a non-invasive laser beam to open intraocular vessels and to create the hyphema instead of the standard surgical procedure previously required. This procedure eliminates post-surgical distress.

- Study endpoints are adjusted to reduce the need to proceed to death as a defined protocol objective. An example is the evaluation of the neurotoxicity of

candidate therapeutic radioprotective compounds in mice using decrements or changes in motor behavior and coordination as a definitive endpoint rather than death.

- A non-lethal model of botulism that detects intoxication by sciatic nerve paralysis in mice is under development and will be a significant refinement to the current mouse bioassay.

#### ***IV.2.3.C Refinement in research models and animal alternatives***

- Professional biostatisticians are used by IACUCs to collaborate with scientists on experimental design and to review proposals in committee to ensure that only the minimal numbers of animals needed for statistical validity are approved for use.

- Extensive use of purpose-bred, e.g., nude mice, hairless guinea pigs, etc., microbiologically and genetically defined, research animals yields better animal models and more meaningful and relevant research results.

### **IV.3. SUMMARY**

Each year new techniques and capabilities improve the handling, treatment, and use of animals in research and testing, and potentially reduce the need for animals in those same endeavors. Animal use alternatives including refinement, reduction, and replacement constitute key initiatives in the biomedical research, testing, education, and training programs of the Department of Defense. The number of large animals used by the military departments over the past decade has been very significantly reduced and some large species are rarely used at all.

## SECTION V

# ANIMAL USE OVERSIGHT AND PROCEDURES TO AVOID UNINTENDED DUPLICATION OF RESEARCH AND UNNECESSARY RESEARCH

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This section responds to the House Armed Services Committee's direction that the Secretary of Defense describe animal use oversight and procedures to avoid unintended duplication of research and unnecessary research. Accordingly, this section speaks to the Military Department's mechanisms and procedures for oversight, management and direction of research planning and the actual conduct of research requiring the use of animals as subjects. For the purposes of this report and consistent with the President's National Defense Budget Request, research is defined as those Congressionally authorized science and technology (S&T) base activities - *Title II, Research, Development, Test and Evaluation (RDT&E)* - of the Military Departments, and for which funds are appropriated, within program elements 6.1 (Basic Research), 6.2 (Exploratory Development) and 6.3 (Advanced Development).

### **V.1. DETERMINATION OF DEPARTMENT OF DEFENSE (DoD) NEEDS FOR ANIMAL RESEARCH**

Determining research needs and research plans is a comprehensive process integrated into DoD's planning, programming and budgeting processes. Integral elements of these processes are the Department's Research and Development Descriptive Summaries submitted to Congress in justification of the budget request. These summaries provide the Office of the Secretary of Defense, the Office of Management and Budget, and the Congress significant descriptive summary detail of every research project's past accomplishments, planned accomplishments and future plans.

Each Defense research laboratory tailors its organization, staffing, and related infrastructure within available resources to best meet its S&T mission and to support each Commander's accountability, responsibility and authority. Although the specific elements and processes of individual protocol review may differ, the general process is summarized as follows.

An investigator develops a research protocol in support of Departmental S&T guidance and other supplementing guidance developed within the chain-of-command, both external and internal to the laboratory. Augmenting the formal S&T coordination and review process is a literature search of the Defense Technical Information Center (DTIC) database. DTIC maintains a database of ongoing and completed research at the work unit level of detail. Prior to initiation of an in-house or extramural Defense research project, a DTIC database search must be completed to verify non-duplication of previous or on-going research. Review and certification that this requirement has been met are conducted differently by each Service, and are integral elements of the

review and approval process for initiating a research project. While work units must address the requirement for a DTIC search, protocols also routinely incorporate information from other automated and on-line databases (i.e., Medline, AGRICOLA, Toxline, etc) and the scientific literature and knowledge gained through participation in scientific meetings, symposia, and workshops of other on-going or completed research. For research requiring animals, the Institutional Animal Care and Use Committee (IACUC) requires two specific elements to be addressed. First, in accordance with the Animal Welfare Act, specific databases must be reviewed for alternatives to painful procedures. Additionally, protocols submitted to an IACUC must contain reviews of the current literature to document the necessity for use of animals in the protocol and to prevent duplication of research.

Since protocols require the utilization of Defense resources, individual protocols are routinely subjected to review for factors such as military relevancy, necessity, scientific merit, and relative research priority. Such reviews are normally conducted within the laboratory's command-and-control structure and are routinely characterized by the features of peer review systems.

The facility's IACUC functions to review all new research protocols involving the care and use of animals to ensure that: (a) it is based on sound scientific principles, (b) the number of animals used is the absolute minimum required to achieve the purpose, (c) the lowest species of animal is selected as the appropriate model, (d) there is appropriate use of analgesics and anesthetics, if required, and if not used, there is adequate justification, (e) the research is not duplicative, (f) the personnel conducting the research are qualified by training and experience to conduct the research, and (g) the scientific question to be answered is of sufficient importance to warrant the use of animals.

## **V.2. OVERSIGHT OF ANIMAL CARE AND USE FACILITIES**

There are three major oversight agencies for animal care and use programs at DoD research facilities: Military Inspection agencies, IACUC and the American Association for Accreditation of Laboratory Animal Care (AAALAC).

### **V.2.1 Military Departments Agencies**

Each Military Department has a component or components responsible for routine inspection of its research facilities. The inspections are conducted formally and reports are prepared.

The Army's ultimate oversight responsibility is divided between two major commands--the U.S. Army Medical Command (Provisional) and the U.S. Army Materiel Command. Subcommand staff actually perform the inspections. In the U.S. Army Medical Command (Provisional), inspections are accomplished by veterinarians in the U.S. Army Medical Research, Development, Acquisition, and Logistics Command (Provisional) (Animal Use Officer) and the U.S. Army Medical Department Center and School (Veterinary Programs Manager). In the U.S. Army Materiel

Command, inspections are accomplished by a veterinarian assigned to the U.S. Army Chemical and Biological Defense Command. Ultimate oversight responsibility in the Navy resides in the Office of the Surgeon General of the Navy. The oversight is accomplished through the Naval Medical Research and Development Command, the Health Services Education and Training Command (Clinical Investigations), and the Inspector General at the Naval Bureau of Medicine and Surgery. Air Force oversight is accomplished by the office of the Director of Medical Inspection, Air Force Inspection Agency.

### **V.2.2 IACUC**

A common research review element of all research laboratories in which animals are used as subjects of research is the IACUC's review of the research protocol. DoD Directive 3216.1 requires that all DoD facilities using animals in research comply with the Animal Welfare Act. The Animal Welfare Act requires the Chief Executive Officer to appoint an IACUC, qualified through the experience and expertise of its members, to assess the research facility's animal program, facilities, and procedures. Forty of 45 DoD operated animal use sites have established their own IACUC to review all proposed animal uses to ensure compliance with the Animal Welfare Act. Of the five sites without an IACUC, three sites have such low animal use that they submit their protocols to their parent organization for review; one site is collocated at Wright-Patterson Air Force Base and uses its IACUC; and one facility does not use live animals.

Each IACUC is chaired by a highly qualified individual. The backgrounds of the chairpersons of these IACUCs are identified in Appendix E. The Animal Welfare Act requires an IACUC have at a minimum three members. DoD IACUCs had an average of eight committee members each. In addition, each IACUC has at least one Doctor of Veterinary Medicine member with training or experience in laboratory animal science and medicine.

The Animal Welfare Act further requires that at least one member of the IACUC not be affiliated with the institution in any way other than as a member of the Committee. This individual cannot be a member of the immediate family of a person who is affiliated with the facility, and this individual is expected to provide representation for general community interests in the proper care and treatment of animals. This outside member can perform unannounced site visits and participates in all discussions and votes on all protocols. All 40 IACUCs had a community representative on their committee. All IACUCs reported that selection of this community representative was made to ensure that the individual represents the community interests.

The IACUC is responsible for assessing the research facility's animal care program, the research facilities, and the facility procedures. There are eight Federally-mandated IACUC functions. At least once every six months, it reviews the research facility for humane care and use of animals and inspects all the animal facilities, including animal study areas and satellite facilities. The IACUC must prepare written

reports of its evaluations and submit the reports to the Institutional Official (facility commander for DoD facilities) of the research facility. These reports need to specifically address compliance with the Animal Welfare Act, to identify any departures from the Act, and to include an explanation for this departure. The report must distinguish between significant and minor deficiencies. All DoD IACUCs document their meetings and activities, including the results of inspections, complaints, actions, and training. They review and investigate concerns involving the care and use of animals at the research facility resulting from complaints received from the public and from reports of noncompliance received from laboratory personnel. To facilitate the reporting of complaints or concerns, facilities commonly place signs in public areas and in animal study areas advising both the public and personnel who work with animals how to contact members of the IACUC and/or the Inspector General (IG) whenever an issue of humane treatment of animals arises. Facilities reported a wide variety of proactive efforts to both inform the public on how to contact responsible individuals as well as programs to ensure that those who work with animals are fully apprised of the requirement to provide humane and ethical care (Appendix F). Additionally, IACUCs are mandated to make recommendations to the Institutional Official regarding any aspect of the research facility's animal program, facility, or personnel training; review and approve, require modification to, or withhold approval of new research protocols involving the use of animals; review and approve, require modification to, or withhold approval of proposed significant changes regarding the care and use of animals in ongoing research protocols; and suspend an activity involving animals when they determine that the activity is not being conducted in accordance with the approved protocol.

In addition to the oversight functions of the IACUC, the DoD provides extensive veterinary and animal care services for DoD facilities. Veterinarians with specialization in laboratory animal medicine (LAM) direct the programs for animal care and use. These experts serve as a valuable resource to the research staff and the IACUC to ensure that all research methods and maintenance procedures are consistent with the latest principles of animal medicine, current interpretations, and implementing regulations of the Animal Welfare Act. The DoD sponsors several programs for training veterinarians in LAM, including a nationally recognized four-year residency program and long-term civilian training in LAM culminating in either a masters or doctoral degree. Approximately 25% of the members of the American College of Laboratory Medicine participated in DoD sponsored training programs. In addition, the DoD also trains animal care specialists (Military Occupation Specialty 91T) that assist in the daily care and treatment of laboratory animals. Over the last 26 years, the DoD has trained over 3000 animal care specialists. The DoD research institutions also send laboratory staff members to workshops sponsored by the National Institutes of Health, other Federal agencies, and private institutions dedicated to the proper use of research animals.

The IACUCs actively provide informational material to all members including the non-affiliated member to ensure that each member is fully knowledgeable on the humane care and treatment of animals. All sites reported providing introductory and

continuous training to members including the community representative. The type of training provided to IACUC members is detailed in Appendix G.

The community representative, as well as other members of the IACUC, is encouraged to make *No Notice* visits to the research facility to evaluate the care provided to animals. All sites engaged in live animal research allow and encourage the members of the IACUC to make unannounced visits. Twenty-four unannounced visits were made by non-affiliated members during fiscal year (FY) 1993.

### **V.2.3 AAALAC**

This is a nonprofit organization to promote high quality standards of animal care, use and welfare through the accreditation process. Participation in the accreditation process is voluntary. The AAALAC accreditation process provides scientists and administrators with an independent, rigorous assessment of the organization's animal care and use program. Sixty percent of the animal care programs at the 45 DoD research, education, training, and testing facilities using animals are accredited. The AAALAC accreditation process is discussed in Section II.

### **V.2.4 Community Visits**

All facilities have a public affairs office, either at the facility or on the base, which can and does facilitate visits to the facility by the public and the press. During FY93 there were 28 such visits to DoD animal use facilities.

### **V.2.5 Additional Oversight**

Within the DoD, individuals may raise animal welfare concerns about the necessity of animal research with the IACUC, facility commanders, and the IG as well as with others, both within and outside (e.g., Waste, Fraud and Abuse Hotline) of the formal chain of command.

The purpose of the non-affiliated member and ombudsman is augmented by the Department's IG. An ombudsman is defined by Webster's dictionary as a government official charged with investigating citizens' complaints against the government. The Humane Society of the United States, a witness at the April 7, 1992 hearing on The Use of Animals in Research by the Department of Defense before the House Committee on Armed Services, offered the ombudsman program at the Massachusetts Institute of Technology as an example of a model program. This program consists of an ombudsman assigned to the university president's office to hear all complaints regardless of their nature. These include but are not limited to personnel complaints, sexual harassment, animal welfare, etc. The DoD assigns this responsibility to its IG and respective Inspectors General of the Military Departments. In addition, military bases and large organizations on military bases have their own Inspectors General who fulfill this function.

As directed by DoD Directive 3216.1, all use of non-human primates requires an additional centralized review by a committee external to the research facility.

### **V.3. CHAIN OF COMMAND OVER ANIMAL CARE AND USE FACILITIES**

The chain of command is a system designed to resolve problems at the lowest possible level. It provides the control and communication between components of organizations. Each link in the chain of command is a level of responsibility and authority that extends from the President of the United States, as Commander in Chief, down to each supervisory level. Different levels within the chain have different responsibilities and authority. Each level in the chain is responsible for a lower level and accountable to a higher one. Everyone in the military is a part of the chain of command. This report documents the various chains of command for each facility that uses animals in research. The chain of command for each facility using animals for research, education, testing and training is provided in Appendix H.

### **V.4. AVOIDANCE OF UNINTENDED DUPLICATION OF RESEARCH**

Both the DoD and the Congress have a long history of concern about the potential for unintended duplication of Defense research. Within the past decade, the Department has initiated significant improvements in its mechanisms for coordination, joint planning and review of its research programs.

Congress, in 1981, expressed concerns about the potential for unnecessary duplication of biomedical research among the Military Departments (H.R. 96-1317). This resulted in the DoD proposing an Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee to coordinate biomedical research planning and the conduct of biomedical research among the Military Departments. Congress fully endorsed and built upon this proposal by establishing DoD Lead Agencies for major elements of the biomedical research programs for which there were either no, or very few, service-unique requirements (H.R. 97-332). For example, the Army was designated as the DoD Lead Agency for military infectious disease and combat maxillofacial research while the Navy was designated DoD Lead Agency for preventive and emergency dentistry research. The ASBREM Committee established Joint Technology Coordinating Groups (JTTCGs), consisting of directors of biomedical research programs and representatives of biomedical research laboratories, to coordinate all DoD biomedical research planning and execution. The ASBREM Committee process has proven to be highly effective at eliminating unnecessary duplication of biomedical research.

The ASBREM Committee process became the model for joint DoD coordination initiatives. Responsibility for joint coordination, planning, execution and review of the Departments' S&T programs was assigned to joint oversight bodies: the Joint Directors of Laboratories (JDL), the ASBREM Committee, the Training and Personnel Systems Science and Technology Evaluation and Management (TAPSTEM) Committee, and the Joint Engineers. The resulting technology area responsibilities

are shown in figure V-1. Joint S&T oversight bodies are assisted in execution of their responsibilities by subordinate S&T coordinating groups that are focused on coordination of specific technology areas. For example, the ASBREM Committee is supported by the JTCGs (figure V-2) and the JDL is supported by separate technology panels.

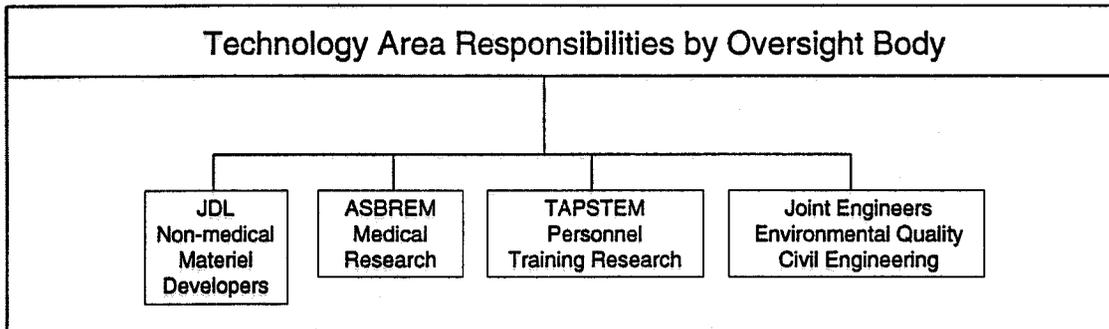


Figure V-1 DoD Technology Area Responsibilities

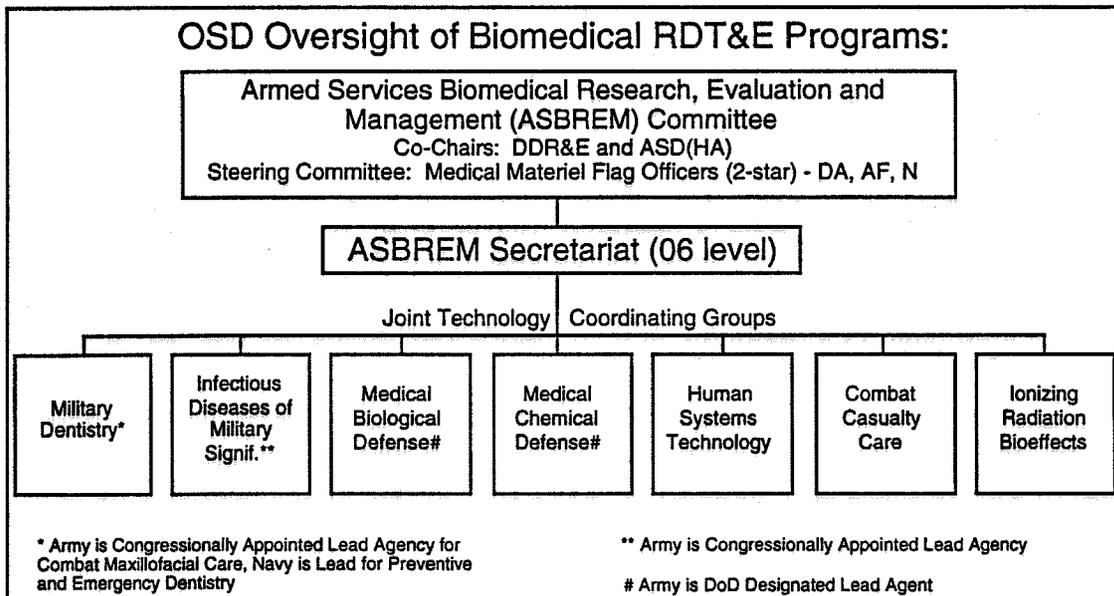


Figure V-2 Structure of Armed Services Biomedical Research, Evaluation, and Management Committee

#### V.4.1 Less Formal Disincentives for Unintended Duplication of Research

In addition to these more formal coordination and review processes to eliminate unintended duplication of research, there are a number of less formal mechanisms that provide significant disincentives for research duplication. Competition, both in-house and extramural, for research support is a prominent feature of S&T; each year large numbers of scientifically meritorious research proposals cannot be funded because of funding shortages. Professional stature of individual scientists or engineers among their peers is accrued in proportion to their individual and original contributions to the scientific literature. There is little if any reward for duplicating the work of others; such actions often have significant negative impacts on how the

scientist or engineer is viewed by peers and on the ability to secure research support. Additionally, within the DoD civilian personnel system, scientists' and engineers' pay grades are determined in-part by the level of their individual scientific and technological contributions. This peer review system provides career and financial incentives to original contribution since it rewards the relative magnitude of the contributions and scientific impacts with eligibility for higher pay grades. One outcome of research is publication of a manuscript in a professional journal or presentation to a professional meeting. These peer-reviewed journals critique the research during the review process leading to an overall enhancement of the research process as well as validating the scientific merit and necessity of the research. During FY93 there were more than 1400 animal-based research publications and presentations accepted by non-DoD professional peer groups and over 120 publications and presentations made to DoD groups alone. Appendix I lists representative journals in which the DoD published articles that resulted from animal research. These less formal, relatively unquantifiable, disincentives substantially augment and buttress the Department's formal mechanisms for regulating and avoiding unnecessary research duplication within its S&T programs. These are but a few of the many less formal considerations that provide substantial individual and institutional barriers against unwarranted duplication of research.

## **V.5. AVOIDANCE OF UNNECESSARY RESEARCH**

The same factors that effectively prevent unwarranted duplication of research are also applied to prevent unnecessary research. Additionally, through Cooperative Research and Development Agreement mechanisms, the Department has increased its emphasis on leveraging and exploiting for Defense needs, the S&T investments by other Federal agencies, U.S. industry, and academic institutions, as well as by the international scientific community. Past descriptions of Defense S&T "spin off" have been supplanted by programs intended to "spin-on" accomplishments by others as well as to optimize the dual-use potential of the Defense S&T investment. The foundation of the Defense S&T strategy is application of S&T accomplishments to sustain Defense technological superiority through efficient and responsive modernization of our warfighting capabilities.

## **V.6. SUMMARY**

Research performed by the DoD is reviewed, both formally and informally, by various offices and committees before it is funded or implemented. These reviews serve to determine the necessity to the mission, oversight of animal use and avoidance of unintended duplication of research. Over the past decade the DoD, with the Congress, has streamlined and greatly improved coordination of its S&T activities so as to avoid unnecessary duplication and to provide a focused program of research responsive to the DoD's needs. The IACUC is responsible for the oversight of animal care and use and also prevents unwarranted duplication of research involving animals. Each DoD facility's IG is an effective means of investigation for concerns about the necessity of animal use, as well as the ethical treatment and humane care of animals used in DoD research. Additionally, the IACUC provides training and

information about animal care and use, and assures the humane use of animals in research.

## SECTION VI GLOSSARY

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**Adjuvant:** An agent mixed in a vaccine to enhance the immunological protection afforded.

**Alternatives to Animal Use:** For purposes of this assessment, "alternatives" are defined as encompassing any subjects, protocols, or technologies that replace the use of laboratory animals altogether; reduce the number of animals required; or refine existing procedures or techniques so as to minimize the level of stress endured by the animal. These technologies involve the continued, but modified, use of animals; use of living systems; use of chemical and physical systems; and use of computers.

**American Association for Accreditation of Laboratory Animal Care (AAALAC):** A voluntary private organization that, by April 1985, provided accreditation for 483 institutions. AAALAC accreditation is based on the provisions of the NIH *Guide for the Care and Use of Laboratory Animals*, and is recognized by the Public Health Service.

**Analgesic:** An agent that relieves pain without causing loss of consciousness.

**Anesthetic:** An agent that causes loss of the sensation of pain. Anesthetics may be classified as topical, local, or general.

**Animal:** For purposes of this assessment, animal is defined as any nonhuman member of five classes of vertebrates: mammals, birds, reptiles, amphibians, and fish. Within this group, two kinds of animals can be distinguished, warm-blooded animals (mammals and birds) and cold-blooded animals (reptiles, amphibians, and fish). Under this definition, invertebrates are not included.

**Animal Care and Use Committee (ACUC):** See Institutional Animal Care and Use Committee (IACUC).

**Animal Use:** The use of animals for research purposes. Three aspects of animal use are dealt with in this assessment: in behavioral and biomedical research; in testing products for toxicity; and in the education of students at all levels. This assessment does not cover animal use for food and fiber; animal use to obtain biological products; or animal use for sport, entertainment, or companionship.

**Animal Welfare Act:** This act, passed in 1966 and amended in 1970, 1976, and 1985, was originally an endeavor to stop traffic in stolen animals that were being shipped across State lines and sold to research laboratories. Amendments to the act have expanded its scope to include housing, feeding, transportation, and other aspects of animal care; however, the act bars regulation of the conduct of research

and testing by USDA. Animals covered by the act, as currently enforced, are dogs, cats, hamsters, rabbits, guinea pigs, nonhuman primates, and marine mammals.

**Antibody:** Proactive proteins produced by lymphocytes (type of white blood cell) that can specifically bind foreign substances.

**Biological Model:** A surrogate or substitute for a process or organ of interest to an investigator. Animals or alternatives can serve as biological models.

**Biological Testing:** The repetitive use of a standard biological test situation or protocol employing different chemicals or different test parameters. Such test protocols are more stereotyped than those used in research, and may be more amenable to the institution of a computerized data retrieval system.

**Biomedical Research:** A branch of research devoted to the understanding of life processes and the application of this knowledge to serve humans. A major user of animals, biomedical research affects human health and the health care industry. It is instrumental in the development of medical products such as drugs and medical devices, and in the development of services such as surgical and diagnostic techniques. Biomedical research covers a broad spectrum of disciplines, such as anatomy, biochemistry, biology, endocrinology, genetics, immunology, nutrition, oncology, and toxicology.

**Blast Overpressure:** The concussion that results when weapons such as artillery pieces are fired. Soldiers firing these weapons can be severely injured by the local pressure effects resulting from weapon use.

**Carcinogen:** An agent or process that significantly increases the incidence of abnormal, invasive, or uncontrolled cell growth in a population. Carcinogens fall into three classes: chemicals, viruses, and ionizing radiation. A variety of screening assays have been developed to detect chemical carcinogens, including the *Salmonella*-mediated mutagenesis assay (Ames test), the sister chromatid exchange assay, and traditional laboratory animal toxicity tests.

**Carcinogenesis:** The process by which a change to a cell occurs that leads to cancer.

**Cell Culture:** Growth in the laboratory of cells isolated from multicellular organisms. Each culture is usually of one type. Cell culture may provide a promising alternative to animal experimentation, for example in the testing of mutagenicity, and may also become a useful adjunct in repeated-dose toxicity testing.

**Chemotactic:** To attract by release of a chemical. For example, cells are attracted to a site of tissue damage by the release of chemicals by the injured cells.

**Computer Simulations:** The use of specially devised computer programs to simulate cells, tissues, fluids, organs, and organ systems for research purposes: to

develop mathematical models and algorithms for use in toxicity testing, and to simulate experiments traditionally done with animals, for educational purposes.

**Distress:** Usually the product of pain, anxiety, or fear. However, distress can also occur in the absence of pain. For example, an animal struggling in a restraint device may be free from pain, but may be in distress. Distress can be eased with tranquilizers.

**Draize Eye Irritancy Test:** A test that involves placing a single dose of a test substance into one eye of four to six rabbits (the other eye remains untreated) and observing its irritating effects. A promising alternative to this test is the chick embryo chorioallantoic membrane assay.

**Education:** The aspect of education dealt with in this assessment is the use of animals and alternatives in the teaching of life sciences to health professionals and preprofessionals, and research scientists.

**ELISA (Enzyme Linked Immunosorbent Assay):** An assay system that uses antibodies conjugated to enzymes. The amount of antibody attached to the molecule being analyzed can be detected by adding compounds that are cut by the enzyme releasing a colored product which can be quantified.

**Ex Vivo:** Outside the living body: denoting removal of an organ, tissue or cells.

**Guidelines for Animal Care and Use:** Various organizations outside the Federal Government have adopted their own guidelines -- e.g., the APA's *Guidelines for Ethical Conduct in the Care and Use of Animals*, which is the most comprehensive and has been endorsed by FASEB; the APS's *Guiding Principles in the Care and Use of Animals*; and the AVMA's *Animal Welfare Guiding Principles*. For Federal guidelines, see Interagency Research Animal Committee, NIH *Guide for the Care and Use of Laboratory Animals*, and PHS *Policy*.

**Institute for Laboratory Animal Resources (ILAR):** A component of the National Research Council, ILAR performs periodic surveys on the use of laboratory animals.

**Institutional Animal Care and Use Committee (IACUC):** An institutional committee that reviews research proposals and oversees housing and routine care of animals. The committee's membership generally includes the institution's attending veterinarian, a representative of the institution's administration, users of research animals, and one or more nonscientist and lay member.

**Invertebrate:** Any nonplant organism without a spinal column -- e.g., worms, insects, and crustaceans. Invertebrates account for 90 percent of the Earth's nonplant species. For the purposes of this assessment, invertebrates are not considered to be animals.

**In Situ:** In position.

**In vitro:** Literally, in glass; pertaining to a biological process or reaction taking place in an artificial environment, usually a laboratory. Human and animal cells, tissues, and organs can be cultured *in vitro*. *In vitro* testing may hold some promising alternatives to animal testing -- e.g., in testing for eye irritation and mutagenicity.

**In vivo:** Literally, in the living; pertaining to a biological process or reaction taking place in a living cell or organism.

**Macrophage:** A white blood cell that is very active in inflammatory responses and in engulfing foreign objects such as bacteria.

**Microorganism:** A minute microscopic or submicroscopic living organism, such as bacteria, viruses, and protozoa.

**Mutagen:** An agent that induces chemical changes in genetic material. Chemicals, viruses, and ionizing radiation can be mutagenic. Most carcinogens are mutagens, therefore many screening tests to detect carcinogens are designed to detect the mutagenic potential of the compound. Some mutagens are not direct-acting, requiring metabolic activation in the body before they exert their mutagenic potential.

**NIH Guide for the Care and Use of Laboratory Animals:** Revised in 1985, the *Guide* lays out detailed standards for animal care, maintenance, and housing. Its provisions apply to all research supported by NIH, and it is used by most animal research facilities, both within and outside the Federal Government. AAALAC and PHS also use it when assessing research facilities for accreditation.

**Nonliving Systems:** Inanimate chemical or physical systems used in testing.

**Oncology:** The study of tumors.

**Organ Culture:** The attempt to isolate and maintain animal or human organs in *in vitro* culture. Long-term culture of whole organs is not generally feasible, but they can be sustained in cultures for short periods (hours or days).

**Pain:** Discomfort resulting from injury or disease. Pain can also be psychosomatic, the product of emotional stress. Pain can be induced by mechanical, thermal, electrical, or chemical stimuli, and it can be relieved by analgesics or anesthetics.

**PHS Policy on Humane Care and Use of Laboratory Animals by Awardee Institutions:** Revised in 1985, the *Policy* applies to PHS-supported activities involving animals (including those of NIH). It relies on the *NIH Guide for the Care and Use of Laboratory Animals*, and uses institutional committees for the assessment of programs and maintenance of records.

**Polymerase Chain Reaction:** A molecular biological system in which pieces of genetic material can be synthesized in large amounts *in vitro*. This material can be

used in diagnostic testing, genetic studies, or for a large number of molecular biological purposes.

**Protocol:** The written plan of a scientific experiment or treatment.

**Reduction:** Considered an alternative to animals when fewer animals are used in research and education through changed practices, sharing of animals, or better design of experimental protocols.

**Refinement:** An alternative to animal use by better use and modification of existing procedures so that animals are subject to less pain and distress. Examples of such refinements are the administration of anesthetics and tranquilizers, humane destruction, and the use of noninvasive imaging techniques.

**Replacement:** An alternative to animal use, replacing methods using animals with those that do not. Examples include the use of a placenta instead of a whole animal for microsurgical training, the use of cell cultures instead of mice and rats, the use of non-living systems, and the use of computer programs.

**Research Facility:** Under the Animal Welfare Act, any individual, institution, organization, or postsecondary school that uses or intends to use live animals in research, tests, or experiments. Facilities that receive no Federal support for experimental work and that either purchase animals only within their own State or that maintain their own breeding colonies are not considered research facilities under the act, however.

**Sporozoite:** The infectious stage of the malarial parasite that is transmitted by mosquitoes.

**Testing:** Standardized procedures that have been demonstrated to predict certain health effects in humans and animals. Testing involves the frequent repetition of well-defined procedures with measurement of standardized biological endpoints. A given test may be used to evaluate many different substances and use many animals. Testing is used to establish the efficacy, safety, and toxicity of substances and procedures.

**Tissue Culture:** The maintenance *in vitro* of isolated pieces of a living organism. The various cell types are still arranged as they were in the original organism and their differential functions are intact.

**Toxicity Testing:** The testing of substances for toxicity in order to establish conditions for their safe use. There are now more than 50,000 chemicals on the market and 500 to 1,000 new ones are introduced each year.

**Vesicant:** A chemical agent that causes burns and tissue destruction both internally and externally.

**Veterinary Medicine:** The maintenance and improvement of the health and well-being of animals, particularly the 30 to 40 different species of animals of economic, ecological, and environmental importance. Veterinary medicine is closely allied with veterinary research.

SECTION VII  
REFERENCES  
(IN ORDER OF CITATION)

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National Defense Authorization Act for Fiscal Year 1993, Report of the House Armed Services Committee, H.R. 5006, May 19, 1992

Department of Defense Directive 3216.1, "The Use of Animals in DoD Programs," February 1, 1982

Title 7, United States Code, Sections 2131-2156, The Laboratory Animal Welfare Act of 1966, PL 89-544, as amended PL 94-279, 1976, and PL 99-198, 1985

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Joint Regulation (Army Regulation 70-18; Secretary of the Navy Instruction 3900.38B; Air Force Regulation 169-2; Defense Advanced Research Projects Agency Instruction 18; Defense Nuclear Agency Instruction 3216.1B; Uniformed Services University of the Health Sciences Instruction 3203), "The Use of Animals in DoD Programs," June 1, 1984

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H.R. 96-1317, Department of Defense Appropriation Bill, 1981; Representative Addabbo, House Committee on Appropriations; 96th Congress, 2nd Session September 11, 1980

H.R. 97-332, Department of Defense Appropriation Bill, 1985; House Committee on Appropriation; 99th Congress, 1st Session October 24, 1985

## APPENDIX A

### Joint Regulation: The Use of Animals in DoD Programs

Departments of the Army, the Navy, and the Air Force; Defense Advanced Research Projects Agency; Defense Nuclear Agency; and the Uniformed Services University of the Health Sciences  
 Washington, DC  
 1 June 1984

\*Army Regulation 70-18  
 \*SECNAVINST 3900.388  
 \*AFR 169-2  
 \*DARPAINST 18  
 \*DNAVINST 3216.1B  
 \*USUHSINST 3203

Research and Development

The Use of Animals in DOD Programs

**Summary.** This regulation, as revised, has been retitled "The Use of Animals in DOD Programs." It creates uniform policies, procedures, and responsibilities among Department of Defense (DOD) components involved in the use of animals as outlined in this regulation. This regulation references pertinent Federal statutes and regulations and other standards related to the care and use of animals. It establishes policies regarding the care and use of animals. It also sets requirements for monitoring the care and use of animals whether performed by DOD personnel or contract or grant recipients. This regulation implements DOD Directive (DODD) 3216.1.

**Applicability.** This regulation applies to the active components of the military services. It also applies to Reserve Components engaged in activities involving the use of animals as defined in this regulation.

**Impact on New Manning System.** This regulation does not contain information that affects the New Manning System.

**Supplementation.** Army supplementation of this regulation is prohibited without prior approval of HQDA(DASG-RDZ),

WASH DC 20310. Send requests for exception, with justification, through command channels to HQDA(DASG-RDZ). Other DOD component supplements will be administered through the appropriate component offices listed in appendix A, according to individual component policies.

**Interim changes.** Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration date unless sooner superseded or rescinded.

**Suggested improvements.** The proponent agency of this regulation is the Office of The Surgeon General. Army users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA(SGRD-OP), Fort Detrick, MD 21701. Other DOD users should submit their comments and suggested improvements through the appropriate component offices listed in appendix A according to individual component policies.

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Appendix

- A. DOD Component Offices
- B. DOD—Federal Acquisition Regulation Supplement  
 Clause 52.235-7003

Glossary

1. Purpose

This regulation sets policies, procedures, and responsibilities for using animals in DOD programs. As revised, this regulation covers transportation, care, use, review, reporting, and certain public affairs aspects for—

- a. Research, development, test, and evaluation (RDTE).
- b. Clinical investigation.
- c. Diagnostic purposes.
- d. Instructional programs or exhibitions in military departments and Defense agencies (DOD components).

2. References

Related publications are listed below. (A related publication is merely a source of additional information. The user does not have to read it to understand this regulation.)

- a. AFR 125-5 (USAF Military Working Dog (MWD) Program).
- b. AR 40-654 (Veterinary Services Nutritional Standards for Military Working Dogs).
- c. AR 40-905 (Veterinary Health Services).

\*This regulation supersedes AR 70-18, 8 October 1976; SECNAVINST 3900.38A, 21 March 1977; AFR 169-2, 15 October 1982; DNAVINST 3216.1B, 4 June 1982; and USUHSINST 3203, 17 December 1982.

d. AR 40-920/AFR 163-9 (Veterinary Laboratory Services).

e. AR 190-12 (Military Police Working Dogs).

f. AR 700-81/AFR 400-8/NAVINST 10570.1/MCO 105-0.1 (DOD Dog Program).

g. NIH 80-23 (Guide for the Care and Use of Laboratory Animals), Institute of Laboratory Animal Resources, National Resource Council. (This guide is available from the Division of Research Resources, National Institutes of Health, Bethesda, MD 20205.)

h. NIH 80-1520 (National Primate Plan), Interagency Research Animal Committee. (This plan is available from the Division of Research Resources, National Institutes of Health, Bethesda, MD 20205.)

i. SECNAVINST 3900.41 (Procurement, Transport, and Maintenance of Marine Mammals).

### 3. Explanation of abbreviations and terms

Abbreviations and special terms used in this regulation are explained in the glossary.

### 4. Responsibilities

a. The Under Secretary of Defense for Research and Engineering (USDR&E) will—

(1) Issue policies and procedural guidance under DODD 3216.1 concerning animal use.

(2) Allocate nonhuman primate resources to DOD agencies when their requirements exceed the number of animals available for DOD use.

(3) Designate a veterinarian as the DOD representative to the Interagency Research Animal Committee (IRAC). (This was formerly the Interagency Primate Steering Committee.) This person must have the proper rank or grade and experience. He or she must also be a diplomate of the American College of Laboratory Animal Medicine.

b. The Surgeons General of the Army, Navy, and Air Force; the Directors, Defense Advanced Research Projects Agency and Defense Nuclear Agency; and the President, Uniformed Services University of the Health Sciences will—

(1) Supervise the use of animals by their DOD components and implement this regulation.

(2) Establish a joint working group to identify and conserve nonhuman primate resources. The working group will be chaired by the DOD representative to the IRAC. This group will—

(a) Share primates and data.

(b) Transfer primates between DOD components.

(c) Establish primate breeding programs.

(3) Establish and provide representatives to a joint technical working group (JTWG). The JTWG will assist in the—

(a) Periodic review of the care and use of animals in DOD programs.

(b) Matters related to developing and issuing joint regulations implementing DODD 3216.1.

c. The Army Assistant Surgeon General for Research and Development (DASG-RDZ), as executive agent, will—

(1) Develop, with other DOD components, plans and procedures to insure adequate supplies of nonhuman primates and other species needed to meet DOD requirements. Plans will be sent to the USDR&E for approval.

(2) Develop and issue joint regulations to implement DODD 3216.1.

d. The Chief, US Army Veterinary Corps, will serve as consultant to the USDR&E for technical and professional matters concerning this regulation.

e. DOD component offices listed in appendix A will administer this regulation.

f. Local commanders will insure that—

(1) RDTE, clinical investigation, diagnostic procedures, or instructional programs are conducted in laboratories that conform to the standards and guidelines cited in this regulation. If there is conflict between the standards of humane care and use of animals, the most humane standards will be used.

(2) Local animal care and use, procurement, and transportation policies and procedures comply with this regulation.

(3) Animals used or intended to be used will experience no unnecessary pain, suffering, or stress, and their use will meet valid DOD requirements.

(4) Alternatives to animal species will be used if they produce scientifically satisfactory results.

(5) Dogs, cats, or nonhuman primates are not used in research conducted to develop nuclear, biological, or chemical weapons.

### 5. Accreditation

All DOD organizations having animals (other than military working, recreational, and ceremonial) will seek accreditation by the American Association for Accreditation of Laboratory Animal Care (AAALAC).

### 6. Statutes, regulations, and standards

a. The Laboratory Animal Welfare Act of 1966, as amended, and its implementing regulations require licensing of dealers, identification of animals, maintenance of records, submission of reports, and compliance with standards for the humane handling, care, treatment, and transportation of animals by dealers and research facilities (sections 2131-2156, title 7, United States Code (7 USC 2131-2156) and parts 1-4, title 9, Code of Federal Regulations (CFR 1-4)).

b. The Endangered Species Act of 1973, as amended,

and its implementing regulations provide a program, under the Department of the Interior, for conserving threatened and endangered species (16 USC 1531-1543) (50 CFR 10-14, 17, and 217-222). The Marine Mammal Protection Act of 1972, as amended, and its implementing regulations provide a similar program, under the National Oceanic and Atmospheric Administration, for marine mammals and marine mammal products (16 USC 1361-1384) (50 CFR 10-14, 18, and 216). These acts require the US Government to acquire permits, maintain records, make reports, and perform inspections on the care and handling of animals.

c. The Lacey Act prohibits the importation of certain wild animals or their eggs if the Secretary of the Interior determines that they are injurious to humans, the interests of agriculture, or other specified national interests. These wild animals and their eggs are identified within the Lacey Act documentation (18 USC 42) (50 CFR 16 and subpart B).

d. Regulations on the use of harmful or dangerous viruses, serums, toxins, and other similar agents in animals used in research facilities producing or testing biological products are presented in 21 USC 154 and 9 CFR 117.

e. Regulations on the import and export of animals, their shipment interstate and intrastate, and the requirements for their quarantine and inspection are presented in the following documents: 5 USC 301; 19 CFR 120; 21 USC 111-113, 114a, 115-117, 120-126, and 151-158; 9 CFR 71-97 and 122; 42 USC 216 and 264-272; and 42 CFR 71-72.

f. The Department of Health and Human Services provides additional guidance on housing, caring for, and using laboratory animals. Guidance is in NIH 80-23, "Guide for the Care and Use of Laboratory Animals."

g. The Department of Health and Human Services provides guidance on the supply and use of laboratory primates in NIH 80-1520, "National Primate Plan."

## 7. Animal use proposals

a. Proposals, whether conducted or sponsored by DOD components, that involve using animals will be written. They will include the following information:

- (1) Objectives.
- (2) Discussion of the need to perform the experiment, procedure, or demonstration.
- (3) Review or summary of the scientific literature or experience that led to the proposal.
- (4) Rationale for using the animal species and proposed numbers.
- (5) Design of the experiment, procedure, or demonstration.

b. The description of methods used in animal experiments, procedures, or demonstrations should be

complete and sufficient to indicate that pain and discomfort are minimized without compromising objectives of the experiment. Justification must be given for not using proper drugs when the procedures may cause pain or discomfort.

## 8. Animal care and use procedures

a. The local commanders of each DOD organization conducting or sponsoring activities involving animals in RDTE, clinical investigation, diagnostic procedures, or instructional programs will form a committee(s) to oversee the care and use of animals.

b. Committee(s) appointed by the local commander will be made up of at least three members. At least one person will not be involved in the proposed project and at least one member will be a veterinarian. Committee(s) will submit recommendations and be responsible to the local appointing official.

c. The committee(s) will—

(1) Periodically review all aspects of animal care to insure established policies, standards, and regulations are complied with.

(2) Review all protocols or proposals to insure that—

(a) The information sought by the use of animals is sufficiently important to warrant their use.

(b) The design of the experiment, procedure, or demonstration is adequate.

(c) The maximum amount of information consistent with good scientific research practice is obtained.

(d) The minimum number of animals needed for scientific validity is used.

(e) The model selected is the most suitable, based on consideration of the the experimental design, potential alternatives, and laboratory limits.

(f) The use of drugs to minimize pain or discomfort is adequate.

(g) Established policies on the use of animals are complied with.

d. Commanders responsible for working animals or recreational or ceremonial animals will regularly review and oversee their activities. The oversight will involve the local official attending veterinarian.

## 9. Centralized review of nonhuman primate use

a. Proposals involving the use of nonhuman primates will receive an additional centralized review by the proper DOD component office (app A). This review will conform with the criteria of NIH 80-1520. A centralized review will confirm that—

(1) The proposed research can be done only with nonhuman primates and that no other species or test system could produce comparable results.

(2) The species of nonhuman primates proposed for

use is the most suitable and that some more plentiful species would not be adequate.

(3) The number of nonhuman primates proposed is the minimum that will produce scientifically acceptable results.

(4) The nonhuman primates will not be euthanized during or at the end of the study except in cases requiring this as part of the investigation.

(5) If euthanasia is needed, positive action will be taken to share body material when feasible.

b. Each DOD organization using animals will establish review procedures and apply the criteria outlined in paragraph 6a and b. Protocols or proposals that involve using nonhuman primates must be reviewed and approved. The local DOD organization will send one copy of each protocol or proposal to the proper DOD office for centralized review.

#### 10. Contracts and grants

a. RDTE, clinical investigation, diagnostic procedures, or instructional programs involving animals sponsored by a grant, award, loan, or contract from a DOD component will be conducted in facilities that conform to the standards and guidelines cited in this regulation. When conflict between the standards for humane care and use of animals exists, the most humane standards will be used.

b. Each DOD component sponsoring RDTE, clinical investigations, diagnostic procedures, or instructional programs involving animals will insure that the following criteria are met:

(1) Proposals or protocols are prepared according to paragraph 7 and reviewed using the criteria summarized in paragraph 8c and, where applicable, as outlined in paragraph 9.

(2) The care and use of animals are in compliance with prescribed standards and policies and that recipients of funds provide appropriate assurances of compliance. Assurances will include written statements from the recipient's animal care and use committee or other responsible official. Written statements will certify that the laboratories are accredited by AAALAC or that the care and use of animals will be done according to NIH 80-23 or other applicable Federal permits or regulations. The written assurances will also state that the protocol or proposal has been reviewed and approved by the local animal care and use committee or attending veterinarian. Site visits to assess animal care and use will be made as appropriate; the site visit team will include a person knowledgeable in laboratory animal science.

c. All contracts or grants by DOD that may involve using laboratory animals will contain clause 52.235-7003 of the DOD—Federal Acquisition Regulations Supplement (DOD—FAR) (app B).

#### 11. Animal programs in foreign countries

To the extent that the local situation permits, research in foreign countries conducted by DOD personnel or sponsored by DOD funds will comply with the requirements of this regulation.

#### 12. Use of DOD facilities

The use of animals jointly with or on behalf of other DOD, Federal, or civilian agencies in DOD facilities will comply fully with this regulation.

#### 13. Release of information

a. If information about investigations using animals is released in a timely manner, public understanding and acceptance is likely to increase. This is especially so when it is shown that investigation results—

(1) Help solve military problems.

(2) Contribute to improved health and welfare of man and domestic animals.

b. Releasing information about an experiment involving animals before the experiment is completed should be the exception rather than the rule.

c. Material proposed for release to both the scientific community and the public will contain full information relevant to humane procedures used.

d. Publications describing the use of animals involving RDTE, clinical investigation, or instruction will include a statement of compliance with the Animal Welfare Act, when applicable. Publications should also include a statement declaring adherence to the principles enunciated in NIH 80-23.

e. Special attention must be devoted to insuring that all material (written, oral, and visual) will be acceptable to a wide audience, including lay as well as scientific readers, regarding specific techniques involving animals.

f. DOD components will develop public affairs policies, including the specific criteria mentioned in this paragraph. Local commanders will use these criteria when reviewing publishable written and presented materials involving animals.

#### 14. Reports and inspections

a. DOD organizations do not register with the Secretary of Agriculture under the Animal Welfare Act but organizations holding or using animals subject to that Act are subject to inspection. Such organizations will submit reports to the US Department of Agriculture (USDA) as required by USDA regulations implementing the Animal Welfare Act.

b. All DOD organizations using animals subject to this regulation will submit copies of each USDA report, and other data as directed, to the proper office cited in appendix A.

## Appendix A DOD Component Offices

Assistant Surgeon General for Research and Development  
Department of the Army  
ATTN: DASG-RDZ  
Washington, DC 20310

Commander  
Aerospace Medical Division (AFSC)  
ATTN: AMD/RD  
Brooks Air Force Base, TX 78235

Commander  
Naval Medical Command (MEDCOM-02E)  
Washington, DC 20372

Director  
Defense Advanced Research Projects Agency  
ATTN: Administrative Office  
1400 Wilson Boulevard  
Arlington, VA 22209

Director  
Defense Nuclear Agency  
ATTN: OAMA  
6801 Telegraph Road  
Alexandria, VA 22310

President  
Uniformed Services University of the Health Sciences  
ATTN: ADO  
4301 Jones Bridge Road  
Bethesda, MD 20814

## Appendix B Department of Defense—Federal Acquisition Regulations Supplement Clause 52.235-7003

Extracted from the DOD—Federal Acquisition Regulations Supplement

35.071(d) Care of Laboratory Animals. In compliance with law and in furtherance of the Department of Defense policy that all aspects of investigative programs involving the use of experimental or laboratory animals be humanely conducted in accordance with recognized principles, the following clause shall be included in all contracts awarded in the United States, its possessions, and Puerto Rico, which may involve the use of such animals.

### 52.235-7003 CARE OF LABORATORY ANIMALS (1974 APR)

(a) Before undertaking performance of any contract involving the use of laboratory animals, the Contractor shall register with the Secretary of Agriculture of the United States in accordance with Section 6, P.L. 89-544, Laboratory Animal Welfare Act, 24 August 1966 as amended by P.L. 91-579, Animal Welfare Act of 1970, 24 December 1970. The Contractor shall furnish evidence of such registration to the contracting officer.

(b) The Contractor shall acquire animals used in research and development programs from a dealer licensed by the Secretary of Agriculture or from exempted sources in accordance with the Public Laws enumerated in (a) above.

(c) In the care of any live animals used or intended for use in the performance of this contract, the Contractor shall adhere to the principles enunciated in the "Guide for Care and Use of Laboratory Animals" prepared by the Institute of Laboratory Animal Resources, National Academy of Sciences—National Research Council, and in the United States Department of Agriculture's regulations and standards issued under the Public Laws enumerated in (a) above. In the case of conflict between standards, the higher standard shall be used. Contractor reports on portions of the contract in which animals were used shall contain a certificate stating that the animals were cared for in accordance with the principles enunciated in the "Guide for Care and Use of Laboratory Animals" prepared by the Institute of Laboratory Animal Resources, NAS-NRC, and/or in the regulations and standards as promulgated by the Agricultural Research Service, USDA, pursuant to the Laboratory Animal Welfare Act of 24 August 1966, as amended (P.L. 89-544 and P.L. 91-579).

*Note:* The Contractor may request registration of his facility and a current listing of licensed dealers from the Regional Office of the Animal and Plant Health Inspection Service (APHIS), USDA, for the region in which his research facility is located. The location of the appropriate APHIS Regional Office as well as information concerning this program may be obtained by contacting the Senior Staff Officer, Animal Care Staff, USDA/APHIS, Federal Center Building, Hyattsville, Maryland, 20782.

(End of clause)

## Glossary

### Section I

#### Abbreviations

AAALAC.. American Association for Accreditation of  
Laboratory Animal Care  
DAR ..... Defense Acquisition Regulations  
DOD ..... Department of Defense  
DODD..... Department of Defense directive  
JTWG ..... joint technical working group  
RDTE ..... research, development, test, and  
evaluation  
USDA ..... US Department of Agriculture  
USDR&E .. Under Secretary of Defense for Research  
and Engineering  
USUHS .... Uniformed Services University of the  
Health Sciences

### Section II

#### Terms

##### Alternatives

Any system or method that covers one or more of the following:

- a. Replacing the use of laboratory animals altogether.
- b. Reducing the number of animals required.
- c. Refining an existing procedure or technique to minimize the level of stress endured by the animal.

##### Animal

Any living nonhuman vertebrate used for RDTE, clinical investigations, diagnostic procedures, and instructional programs or exhibitions.

##### Clinical investigation

All activities supported by clinical investigative funds.

##### Commander

Laboratory or unit commander, institute director, or other official having equivalent authority.

##### Dealer

Any person who, in commerce, for compensation or profit, delivers for transportation (or transports, except as a carrier), buys, sells, or negotiates the purchase or sale of animals.

##### Endangered species

A species or subspecies of mammal listed as "endangered" under the Endangered Species Act.

##### Exhibition

The use of animals, including working, recreational, or ceremonial animals, in displays, demonstrations, or ceremonies.

##### Injurious wildlife

Any wildlife for which a permit is required under the Lacey Act before being imported into or shipped between the continental United States and Alaska, Hawaii, the Commonwealth of Puerto Rico, or any possessions of the United States.

##### Instructional programs

All educational and training activities, except tactical training of personnel associated with military working dogs or other working, recreational, and ceremonial animals.

##### Marine mammal

Those species of the following orders, which are morphologically adapted to the marine environment, whether alive or dead, including but not limited to any raw, dressed, or dyed fur or skin: Cetacea (whales, dolphins, and porpoises) and Pinnipedia other than walrus (seals and sea lions).

##### Nonhuman primate

Any nonhuman member of the highest order of mammals, including prosimians, monkeys, and apes.

##### Research, development, test, and evaluation

All activities supported by RDTE funds.

##### Research facility

Any school (except an elementary or secondary school), institution, organization, or person that uses or intends to use live animals in research, tests, experiments, or instructional programs.

##### Threatened species

A species of mammal listed as "threatened" pursuant to the Endangered Species Act.

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By Order of the Secretary of the Army:

**JOHN A. WICKHAM, JR.**  
*General, United States Army*  
*Chief of Staff*

Official:

**ROBERT M. JOYCE**  
*Major General, United States Army*  
*The Adjutant General*

By Order of the Secretary of the Navy:

**M. R. PAISLEY**  
*Assistant Secretary of the Navy*  
*(Research, Engineering and Systems)*

By Order of the Secretary of the Air Force:

**CHARLES A. GABRIEL**  
*General, USAF*  
*Chief of Staff*

Official

**JAMES H. DELANEY**  
*Colonel, USAF*  
*Director of Administration*

Official

**ROBERT S. COOPER**  
*Director*  
*Defense Advanced Research Projects Agency*

Official

**RICHARD K. SAXER**  
*Lieutenant General, USA*  
*Director, DNA*

Official

**JAY P. SANFORD**  
*President, USUHS*

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*Navy*: Distribution: SNDL

A1 (Immediate Office of the Secretary) (ASSTSECNAV MRA and ASSTSECNAV RES)

A2A (Department of the Navy Staff Offices) (Chief of Naval Research only)

A3 (Chief of Naval Operations)

A4A (Chief of Naval Material)

A6 (Headquarters, U.S. Marine Corps)

21A (Fleet Commanders in Chief)

22A (Fleet Commanders)

23 (Force Commanders)

24 (Type Commanders)

E3A (Laboratory ONR)

FH1 (Medical Command)

FKA1G (Sea Systems Command Headquarters)

FKA6 (Research and Development Activities)

FM (Shore Activities under the Commander of the Director, Naval Investigative Service)

*Marine Corps*: Marine Corps Lists H & I

*Air Force*: F

*DARPA*: Special

*DNA*: Special

*USUHS*: Special

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FM (Shore Activities under the Commander of the Director, Naval Investigative Service)

*Marine Corps*: Marine Corps Lists H & I

*Air Force*: F

*DARPA*: Special

*DNA*: Special

*USUHS*: Special

Headquarters  
Departments of the Army, the Navy  
and the Air Force; Defense Advanced  
Research Projects Agency; Defense  
Nuclear Agency; and the Uniformed  
Services University of the Health  
Sciences  
Washington, DC  
1 August 1984

Army Regulation 70-18/SECNAVINST  
3900.38B/AFR 169-2/DARPAINST 18/  
DNAINST 3216.1B/USUHINST 3203  
Change 1

Effective Upon Receipt

Research and Development

## The Use of Animals in DOD Programs

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**Summary.** This is a change to AR 70-18/SECNAVINST 3900.38B/AFR 169-2/DARPAINST 18/DNAINST 3216.1B/USUHINST 3203, 1 June 1984. A change has been made in paragraph 9b.

**Suggested improvements.** The proponent agency of this regulation is the Office of The Surgeon General. Army users

are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA(SGRD-OP), Fort Detrick, MD 21701. Other DOD users should submit their comments and suggested improvements through the appropriate component offices listed in appendix A according to individual component policies.

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AR 70-18/SECNAVINST 3900.38B/AFR 169-2/DARPAINST 18/DNAINST 3216.1B/USUHINST 3203, 1 June 1984, is changed as follows:

*Page 3-4, paragraph 9b.* In line 3, change "paragraph 6a and b" to paragraphs 8 and 9."

# APPENDIX B

## AAALAC Instructions

## **APPENDIX B**

# **AMERICAN ASSOCIATION FOR THE ACCREDITATION OF LABORATORY ANIMAL CARE (AAALAC)**

## **INSTRUCTIONS**

### **DESCRIPTION OF INSTITUTIONAL ANIMAL CARE AND USE PROGRAM**

#### **FORMAT/INSTRUCTIONS**

##### **I. Introduction/Description**

1. The finalized Introduction and Description should include the subject headings and subheadings that are highlighted in bold print and underlined in the outline. The information requested may be presented in either paragraph or outline format.
2. It is imperative to respond to all items. If items are nonapplicable, please indicate.
3. For each stated heading/subheading, responses should be succinct yet provide sufficient detail so that persons not familiar with the program can understand and assess it. Each segment of the description should be complete.
4. Appendices and references to other sections, in lieu of an accurate description, are not acceptable. An accurate, but concise description is encouraged.
5. It is recommended that the Introduction and Description be entered and maintained on word processing equipment. This will facilitate additions or corrections that may occur during the site visit. In addition, this material may be used, with appropriate changes, for subsequent AAALAC site visits and internally as a resource document.

## **II. Appendices/Supplemental Information**

The following information is requested to be appended as a supplement to the Description. A summary of pertinent information contained in the appendices is also encouraged to be incorporated into the Description under appropriate headings:

1. Table of organization for the accreditable unit and the animal resource.
2. Composition (names, degrees, affiliation, position title), of the institutional animal care and use committee (IACUC).
3. Line drawing(s) of animal facilities on 8 1/2" x 11" pages.
4. Heating, ventilation and air conditioning (HVAC) data for each animal room/facility indicating: a) air exchange rates, b) source(s) of air, c) air recirculation rates if other than fresh air, d) relative pressure differentials, and e) date of most recent measurement/evaluation.
5. List of cage inventory and description, including size and materials.
6. List of current animal inventory and annual use by species.
7. Animal Usage Form (A blank form is included. Duplicate this form or make a similar form if necessary.)

To reflect the status of problematic issues and/or resolutions, the following information should be appended to the Program Description. This requirement may be waived in the absence of such issues, however, the information for the past three years should be made available for review at the site visit:

1. Pertinent minutes of IACUC meetings.
2. Reports of semiannual reviews of animal care facilities and programs by the IACUC.
3. Copies of pertinent USDA Inspection Reports.
4. Other relevant information to the animal care and use program.

### III. Typing Instructions

1. A diskette of this Outline (IBM compatible, WordPerfect 4.2 or 5.0 format) is available upon request at no charge. Inquiries are encouraged to facilitate preparation and updating.
2. Use the outline format for headings and subheadings as highlighted and underlined.
3. Information is to be provided on 8 1/2" x 11" paper with 1/2" left and right margins and 1" header and footer margins.
4. The report should be single spaced using block paragraphs.
5. A Table of Contents should accompany the Description, and pages should be numbered by section (i.e., I-1..., II-1...).
6. Matrix-dot printers should not be used unless equipped with letter-quality fonts.

### IV. Assembly/Mailing Instructions

1. Please provide four (4) sets of your completed Program Description.
2. Two-sided copies are encouraged to reduce both volume and mailing costs.
3. To facilitate copying and dissemination of the Description in the AAALAC office, **please do not staple, paper clip or otherwise bind your Description.** Use of a binder clip or rubber bands in the final assembly will be appreciated.
4. A cover sheet (letterhead) should accompany each copy of the Program Description addressing specific remarks or requests pertinent to the site visit. Please ensure that a telephone number and the AAALAC file number are indicated in the cover letter.

## FORMAT

### DESCRIPTION OF INSTITUTIONAL ANIMAL CARE AND USE PROGRAM

#### I. Introduction

- A. Name of Program Unit
- B. Overview and Purpose
- C. Description of the Organization (Attach organiz. chart plus any support comments needed.)
- D. Key Institutional Representatives
- E. Accreditation History
- F. Nature of Research, Testing, and Teaching Programs
- G. Annual Research Funding
- H. Summary of Facilities
- I. Other Units not Included in This Description
- J. Contract Facilities
- K. Other Relevant Background

#### II. Description

- A. Institutional Policies
  - 1. Monitoring the Care and Use of Animals
    - a. Institutional Animal Care & Use Committee
      - 1) Composition/Frequency of Meetings/Responsibilities of the Committee
      - 2) Review/Approval of Protocols
      - 3) Frequency of Committee Review

- b. Response to USDA Inspections
  - c. Other Procedures for Monitoring the Care & Use of Laboratory Animals
- 2. Veterinary Care
- 3. Personnel Qualifications
  - a. Animal Resource Professional / Management/ Supervisory Personnel
  - b. Animal Care Personnel
  - c. Research Staff
  - d. Use of Hazardous Agents
- 4. Personnel Hygiene
  - a. Protective / Work Clothing Provided
  - b. Shower/Change Facilities
  - c. Eating, Drinking & Smoking Policies
- 5. Occupational Health Program
  - a. Description of Program, including Personnel Included
  - b. Educational Program
  - c. Aspects Relating to Hazardous Agents
  - d. Protective Equipment / Clothing Provided
- 6. Experimentation Involving Hazardous Agents
- 7. Special Considerations
  - a. Restraint
  - b. Multiple Major Survival Surgery

**B. Laboratory Animal Husbandry**

**1. Housing**

**a. Social Environment**

**b. Activity**

**2. Food**

**a. Type & Source**

**b. Vendor Quality Control**

**c. Storage in Animal Facilities**

**d. Storage in Animal Rooms**

**e. How Food Is Provided**

**f. Quality Control Procedures**

**3. Bedding**

**a. Type and How Used**

**b. Storage Facilities / Vermin Control**

**c. Quality Control**

**4. Water**

**a. Source, Treatment & How Provided**

**b. Quality Control Methods**

**5. Sanitation**

**a. Cage Sanitation**

**1) Cage / Pen Litter Changing Frequency**

**2) Location Where Soiled Bedding Removed**

- 3) Washing / Sanitizing Frequency for:
  - a) Solid bottom cages
  - b) Cage tops
  - c) Suspended wire bottom / slotted floors
  - d) Cage racks & shelves
  - e) Cage pans under suspended cages
  - f) Floor pens, stalls, etc.
- 4) Cage Washing / Sanitizing Procedures
- 5) Cleaning / Sanitizing Agents Used
- 6) How Effectiveness of Cage Sanitation Is Monitored
- b. Sanitation of Feeding Implements
  - 1) Procedure & Frequency for Feeders
  - 2) Procedures & Frequency for Bottles
- c. Sanitation of Transport Cages & Vehicles
- d. Room Sanitation
  - 1) Frequency & Procedures
  - 2) Corridor and Support Area Cleaning
  - 3) Implements
  - 4) Separation of / Cleaning Implements by Room
- e. Waste Disposal Methods
  - 1) Soiled Bedding & Refuse
  - 2) Animal Carcasses
  - 3) Hazardous Wastes

- f. Vermin Control
  - 1) Program
  - 2) Notification of Animal Users
- 6. Animal Identification and Records
  - a. Methods for Identification of Each Species
  - b. Procedures for Maintaining Individual Records
- 7. Provisions for Emergency, Weekend and Holiday Care
  - a. Procedures for Weekend / Holiday Care
  - b. Procedures for Contacting Responsible Animal Care and/or Veterinary Personnel
  - c. Procedures for Monitoring Animal Facility Mechanical Systems

C. Veterinary Care

- 1. Preventive Medicine
  - a. Animal Procurement
  - b. Quarantine, Stabilization & Isolation
    - 1) Receiving & Initial Evaluation Procedures
    - 2) Quarantine Facilities for Purpose-Bred Animals
    - 3) Quarantine Facilities for Random-Source Animals
    - 4) Isolation Facilities for Ill Animals
  - c. Separation by
    - 1) Species

- 2) Source
- 3) Health Status
2. Surveillance, Diagnosis, Treatment & Control of Animal Diseases
  - a. Program
    - 1) Daily Observation of Animals
    - 2) Procedure for Providing Veterinary Care
    - 3) Medical Records Maintenance Procedures
      - a) Documenting observations & treatments
      - b) Responsibility for medical records
    - 4) Preventative medicine programs for each species.
    - 5) Animal Health Monitoring
  - b. Diagnostic Resources
    - 1) Clinical Laboratory
    - 2) Necropsy/Histology
    - 3) Use of Available Diagnostic Resources Including Commercial Labs
    - 4) Radiology
3. Anesthesia and Analgesia
  - a. Agents Used for Each Species
  - b. Guidelines Provided by the Veterinarian
  - c. Monitoring the Use of Analgesics & Anesthetics
  - d. Training & Experience of Personnel Who Perform Anesthesia

- e. Safety Procedures for Use of Explosive or Flammable Agents
- f. Waste Anesthetic Gas Scavenging
- 4. Survival Surgery and Postsurgical Care
  - a. Non-Rodent Mammalian Species
    - 1) Professional Supervision; Where Performed
    - 2) Description of the Program
    - 3) Major Support Equipment Available
    - 4) Training & Experience of Personnel Performing Surgery
    - 5) Postoperative Care Responsibility/Maintenance of Post-Op Care Records
  - b. Rodent Species
    - 1) Facilities for Survival Rodent Surgery
    - 2) Types of Procedures Performed
    - 3) Techniques Used to Prevent Infection
- 5. Euthanasia
  - a. Methods for Each Species
  - b. Training & Experience of Personnel
- D. Physical Plant (Repeat this section for each facility.)
  - 1. General Arrangement & Condition of Animal Rooms
    - a. Location and General Arrangements
      - 1) Location of Animal Facility
      - 2) Physical Relationship with Research Labs

3) General Type of Animal Facility Design

4) Specialized Animal Housing Systems

5) Cubicle Availability & Design

b. Functional Space

1) Total Net Sq. Ft. of Room Space, Excluding Corridors & Mechanical Area

2) Acreage of Farm Space

3) Number of Animal Rooms & Sq. Footage in the Following Areas:

a) Indoor space, A/C & heated

b) Indoor space, heated, no A/C

c) Indoor space, not environmentally controlled

d) Outdoor kennels, etc.

e) Pasture

2. Support Areas

1) Receiving

2) Rodent/Rabbit Quarantine

3) Random Source Animal Quarantine

4) Isolation for Sick Animals

5) Aseptic Surgery

6) Necropsy

7) Radiology

8) Diet Kitchen

- 9) Feed Storage
- 10) Bedding Storage
- 11) Cage Wash
- 12) Clean Cage Storage
- 13) Incinerator
- 14) Diagnostic Lab
- 15) Animal Procedural Space
- 16) Personnel Facilities
- 17) Lounge Facilities
- 18) Administrative Space
- a. Cage Sanitation Facilities
  - 1) Location
  - 2) General Features
  - 3) Equipment
- b. Facilities for Aseptic Surgery
  - 1) Areas for :
    - a) Surgery
    - b) Animal preparation
    - c) Sterile supply preparation & storage
    - d) Surgeon preparation
    - e) Postoperative care

2) General Construction Features of Operating Room

- a) Interior surfaces
- b) Ventilation system
- c) Lighting
- d) Outlets
- e) Scavenging
- f) Fixed equipment

3) Number of Surgical Procedures Performed Each Year

3. General Features of Animal Rooms (Describe each facility separately.)

- a. Composition of floors, walls, ceilings
- b. Doors
- c. Plumbing Features
- d. Lighting System
- e. Heating, Ventilation and Air Conditioning (HVAC) System  
(Include temp. & humidity control - indiv. room or zone, AC/hr., % fresh makeup air, relative air pressure, energy recovery systems. Describe how ventil. rates, temp. & humid. are monitored. Provide engineering documentation.)
- f. Receptacles

4. Other Features & Facilities

- a. Emergency Power
  - 1) What Features Are on System:
  - 2) History of Power Outages: (Include any animal losses associated with failures.)

- b. Storage Areas (feed, bedding, drugs, equipment)
- c. Noise Control / Environmental Monitoring / Security
  - 1) Design Features to Reduce Noise
  - 2) Alarm / Security Systems
- d. Miscellaneous Animal Care & Use Equipment
  - 1) Transport Vehicles
  - 2) Other Animal Care Related Equipment Available

**E. Special Considerations**

**1. Genetics & Nomenclature**

- a. Program for Advising Investigators on Selection of Animals Based on Genetics
- b. Program for Advising Investigators on Use of Standardized Nomenclature
- c. Breeding Colony Maintenance
  - 1) Species, Stocks, & Strains
  - 2) Breeding Scheme
  - 3) Genetic Monitoring Program
  - 4) Use of Substrain Designation When Reporting Experimental Results

**2. Facilities and Procedures for Animal Research Involving Hazardous Agents**

- a. Agents Used (In each of the following, indicate the Biosafety Level (I, II, or III) for each agent, the conc., route of admin., duration of exposure, & how long animal is maintained.)
  - 1) Radioactive Substances

- 2) Infectious Agents
  - 3) Toxic Chemicals
  - b. Facilities
    - 1) Availability of Specialized Containment
    - 2) Other Containment Areas
  - c. Animal Care Program
3. Farm Animals

### ANIMAL USAGE

In order to assist the site visitors in their evaluation of the animal care and use program, please provide the information requested below. Information, organized by species should be given on all animals used in research, teaching or testing, including those which may be used or housed in laboratories outside the animal care facility. Of particular interest is information on those animals which are used in research projects involving recovery surgical procedures, behavioral or other testing requiring chairing or other forms of restraint, or exposure to potentially hazardous materials.

PRINCIPAL INVESTIGATOR	LOCATION OF USE	TYPE OF PROCEDURE	APPROXIMATE NUMBER/YEAR
---------------------------	--------------------	----------------------	----------------------------

## APPENDIX C

### Status of AAALAC Accreditation of DoD Facilities

## **Appendix C**

### **Status of AAALAC Accreditation of DoD Facilities**

#### **I. DoD Facilities Accredited by AAALAC for Fiscal Year 1993**

##### **I.1 DoD Facilities:**

- Armed Forces Institute of Pathology, Washington, D.C.
- Armed Forces Radiobiology Research Institute, Bethesda, MD
- Uniformed Services University of the Health Sciences, Bethesda, MD

##### **I.2 U.S. Army Facilities:**

- U.S. Army Research Institute of Environmental Medicine, Natick, MA
- U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD
- U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick, MD
- U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL
- U.S. Army Biomedical Research and Development Laboratory, Fort Detrick, MD
- U.S. Army Edgewood Research, Development and Engineering Center; U.S. Army Research Laboratory Human Research and Engineering Directorate, Aberdeen Proving Ground, MD (shared facility)
- William Beaumont Army Medical Center, Department of Clinical Investigation, Biological Research Service, El Paso, TX
- Tripler Army Medical Center, Tripler, Army Medical Command, Hawaii
- Fitzsimons Army Medical Center, Aurora, CO
- Laboratory Animal and Surgery Service, Department of Clinical Investigations, Madigan Army Medical Center, Tacoma, WA

- Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD
- U.S. 1st Army Special Warfare Training Group, Fort Bragg, Fayetteville, NC

### **I.3 U.S. Navy Facilities:**

- Naval Aerospace Medical Research Laboratory, Pensacola, FL
- Naval Dental Research Institute, Naval Training Center, Great Lakes, IL
- The Naval Medical Research Institute Toxicology Detachment, Wright-Patterson Air Force Base (uses accredited Air Force facility of Armstrong Laboratory at Wright-Patterson Air Force Base)
- Naval Medical Center, Microvascular Surgery Laboratory, Oakland, CA
- Naval Medical Center, Clinical Investigation Program, San Diego, CA
- Naval Medical Center, Clinical Investigation and Research, Portsmouth, VA

### **I.4 U.S. Air Force Facilities:**

- Armstrong Laboratory - Wright-Patterson, Wright-Patterson Air Force Base, OH
- Armstrong Laboratory - Brooks, Brooks Air Force Base, TX
- Clinical Research Laboratory, 81st Medical Group, Keesler Air Force Base, MS
- Clinical Investigation Directorate, Wilford Hall Medical Center, Lackland Air Force Base, TX
- Clinical Investigation Facility, 60th Air Mobility Command, Travis Air Force Base, CA

## **II. DoD Facilities Not Accredited by AAALAC for Fiscal Year 1993**

The following DoD research facilities were identified as non-AAALAC accredited during the review period covering fiscal year 1993 with a status summary regarding AAALAC accreditation or basis for not seeking AAALAC accreditation:

## II.1 U.S. Army Facilities:

- U.S. Army Institute of Surgical Research, Fort Sam Houston, Texas. This facility, which is involved in medical research programs, is pursuing AAALAC accreditation. New animal facilities are in construction in a joint program with Brooke Army Medical Center.
- Walter Reed Army Institute of Research, Washington, D.C. While this facility is currently seeking funds for construction of a new facility at Forest Glen, Maryland, it is pursuing AAALAC accreditation of the interim animal housing facilities.
- U.S. Army Dental Research Detachment, WRAIR, Washington, D.C. This facility will be collocated with the Naval Dental Research Institute, Great Lakes, Illinois as a result of the Base Realignment and Closure Act. It is presently housed at WRAIR and uses their animal facilities.
- U.S. Army Dugway Proving Ground, Dugway, Utah. Reconstruction of the research facility is scheduled to begin in October 1994; upon completion of construction program, the facility will seek AAALAC accreditation.
- Walter Reed Army Medical Center, Washington, D.C. This clinical investigations research facility will undergo renovation to the facility beginning in February 1994. After the renovation is completed at the end of 1994, the facility will pursue AAALAC accreditation.
- Dwight David Eisenhower Army Medical Center, Fort Gordon, Georgia supports a clinical investigation program and is pursuing AAALAC accreditation.
- Brooke Army Medical Center, Fort Sam Houston, Texas. The Department of Clinical Investigations is currently in the middle of a research facility construction program which includes a joint animal housing facility in collaboration with the U.S. Army Institute of Surgical Research. This facility will be completed in mid-year 1995. Following completion of the construction program AAALAC accreditation will be sought.
- The U.S. Army Medical Department Center and School, Fort Sam Houston, Texas is pursuing AAALAC accreditation.

Overseas facilities:

- U.S. Army Medical Research Unit, Brazil. One animal lab has been closed and the future of animal use at this facility is currently under consideration.
- U.S. Army Medical Research Unit, Kenya. This overseas research facility will not seek AAALAC accreditation. Beginning in fiscal year 1995, this facility will be conducting research only in human volunteer clinical studies.
- Armed Forces Research Institute of Medical Sciences, Thailand. This overseas facility conducts infectious diseases research in conjunction with the Royal Thai Army Institute of Pathology and is pursuing AAALAC accreditation.

**II.2 U.S. Navy Facilities:**

- The Naval Medical Research Institute Bethesda, MD requires renovation to its animal facility. Alternatives to construction are being considered including leasing of commercial facility space of adequate design to meet both research and animal housing requirements. The facility is pursuing AAALAC accreditation.
- Naval Command, Control, and Ocean Surveillance Center RDT&E Division, San Diego, California. This facility is involved in non-medical research primarily in the areas of sonar research programs. While the research program is conducted in open pen and open ocean facilities using marine mammals, the facility is pursuing AAALAC accreditation.

Overseas facilities:

- The Naval Medical Research Unit, Jakarta, Indonesia conducts infectious diseases research. This facility is pursuing AAALAC accreditation.
- The Naval Medical Research Unit, Cairo, Egypt. This facility is pursuing AAALAC accreditation.
- The Naval Medical Research Institute Detachment, Lima, Peru had several recommendations noted in the OIG-DoD report which are being or have been corrected. The facility is pursuing AAALAC accreditation.

**II.3 U.S. Air Force Facilities:**

- Aerophysics Systems Flight Office, Arnold Air Force Base, Tennessee. This facility no longer purchases or houses live animals. AAALAC accreditation is not applicable.

The following facility is involved in biological education for which small numbers of animals are maintained for limited duration. The facilities are governed by the Animal Welfare Act.

- U.S. Air Force Academy, Colorado Springs, Colorado. This facility has not sought accreditation at this time as the current physical facility cannot be brought to AAALAC standards at a reasonable cost. In addition to short-term initiatives such as reduction of the colony size, construction of new laboratory facilities, including a new animal facility built to meet present standards, is expected to begin April 1, 1994. AAALAC accreditation will be sought after this new facility is completed.

## APPENDIX D

Letter from Dr. Martin Stephens



The Humane Society of the United States  
2100 L Street, N.W.  
Washington, D.C. 20037  
(202) 452-1100  
FAX (202) 778-6132

February 7, 1992

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Dr. Harry Salem  
U.S. Army CRDEC  
SMCCR-RST  
Aberdeen Proving Ground, MD 21010

Dear Harry:

Congratulations on organizing what was clearly a successful conference on alternatives. What was particularly heartening from my perspective was all the new faces I had not seen before on the alternatives "circuit." We need that new blood and diversity.

If you are organizing another conference on alternatives, and could use a speaker from an animal protection organization, just let me know. I would be happy to oblige.

Again, congratulations.

Best wishes,

Martin L. Stephens, Ph.D.  
Vice President  
Laboratory Animals

## APPENDIX E

### Professional Background of IACUC Chairpersons

## Appendix E

### Professional Background of IACUC Chairpersons

TITLE	EXPERIENCE
Audiologist	Ph.D., Twenty years experience directing research activities, formal training in research design, statistics and human use of laboratory animals.
Biologist	Ph. D. in Biology, supervised research projects at research laboratory and has experience in veterinary hospital.
Biologist	Ph. D. in Biology, Project Manager in the Experimental Hematology department, 5 years experience on IACUC, 30 years biomedical research experience, over 170 scientific publications, past president of the Association for Gnotobiotics.
Chemist/envi ronmental engineer	Ph. D. Chemistry, MS environmental engineering, 18 years research experience.
Chemist	Ph. D. in analytical chemistry, served on IACUC for four years.
Human Systems Research Scientist	BS, MS in Physics, statistics instructor, member Alabama Academy of Science, authored several scientific publications on acoustics, vision and visual display factors.
Industrial Hygienist	Ph. D., 15 years experience in public health.
Marine Mammal Scientist	Over 21 years experience as a marine mammal scientist, numerous publications and presentations to professional peers in the U.S. and abroad. Holds a BS in Zoology and MS in Biology.
Mechanical Engineer	Previous experience as a principal investigator on studies involving the use of non-human primates. Has over 3 years experience as Chairperson of the IACUC.
Microbiologist	BS in Biology, Ph. D. in Microbiology; experienced in both human and animal research, has 12 publications in peer-reviewed journals.
Microbiologist	Sixteen years experience in biomedical research.
Microbiologist	Nineteen years experience with IACUC, research includes development of artificial human skin as a model.

TITLE	EXPERIENCE
Oral Pathologist	Diplomate, American Board of Oral Pathology, fellow in the Am Acad of Oral Pathology, served as a member of the Editorial Board for the Journal of Oral Surgery, Oral Medicine, and Oral Pathology; over 45 peer-reviewed articles and 75 presentations.
Pathologist	Ph. D., graduate research work and published studies using rats and mice.
Physician	Senior physician, chairperson of the Department of Otolaryngology.
Physician	Received formal research training during research fellowship. Experience with rabbit and swine models as well as tissue culture models.
Physician	Diplomate of the National Board of Medical Examiners and National Board of Pediatrics, fellowship at St Judes Children's Research Hospital.
Physician	Board certified in Internal Medicine.
Physician	Senior military physician with over 20 years experience in medical research.
Physician	MS in statistics, board certified in Internal Medicine, experienced as both a researcher and instructor in advance trauma and life support.
Physician	Preventive medicine and occupational medicine specialist, 2 years experience as IACUC chairman.
Physician	Nationally recognized expert in pediatrics and adolescent medicine, well published with extensive human and animal research.
Physician	Ph. D. in microbiology, board certified in Internal Medicine and Gastroenterology.
Physician	Board certified Pediatrics and Pediatric Endocrinology, completed research fellowship, experienced in research design and protocol review, 24 years experience.
Physician	Ph. D. in biochemistry, 30 years experience as researcher, board eligible in Internal Medicine
Physiologist	Ph. D., over 23 years research experience in non-human primate reproductive endocrine studies, 22 years experience on IACUC.

TITLE	EXPERIENCE
Physiologist	Extensive exercise physiology background, to include experimental design. Thoroughly familiar with applicable Federal regulations on animal use.
Physiologist	Ph. D. in Physiology and Biophysics, extensive experience in animal research and with in vitro assays using tissue culture. Also serves on one of the NIH's IACUCs.
Professor of Anatomy	Ph. D., over 30 years research experience
Psychologist	Ph. D. in research psychology. Over 21 years experience in animal research, special interest in environmental enrichment for non-human primates; associate editor of the Journal of the Experimental Analysis of Behavior ; instructor in Laboratory Animal ethics workshop.
Statistician	MS in mathematics, eight years experience in experimental design. Seven years experience on IACUC.
Veterinarian	Ph. D. Microbiology, Head of Virology Division. Board eligible in Laboratory Animal Medicine.
Veterinarian	Completed Laboratory Animal Medicine Residency program, additional training in comparative pathology and pathology of laboratory animals.
Veterinarian	Veterinary pathologist with over 25 years experience in laboratory animal medicine; also served for 4 years as member of the Animal Resources Review Committee, NIH.
Veterinarian	Board certified in Laboratory Animal Medicine; 15 years experience in infectious disease.
Veterinarian	Board-certified in Laboratory Animal Medicine, experience in designing and constructing animal care and research facilities and ensuring compliance with Federal regulations regarding animal care and use. Ten years experience on IACUCs.
Veterinarian	Senior military veterinarian with extensive experience in all areas of military veterinary practice.
Veterinarian	Board certified in veterinary pathology. 11 years experience in animal research including serving as a member of several IACUCs.
Veterinarian	Board certified in veterinary pathology, 9 years experience in medical research.

## APPENDIX F

### Dissemination of Information on Animal Care and Use

## **Appendix F**

### **Dissemination of Information on Animal Care and Use**

- Posters throughout the facility advising employees and the public on procedures for filing animal care and use complaints emphasize that individuals do not have to use the chain of command but can go directly to the IACUC chairman or the IG.
- Annual briefings to all facility personnel on the Inspector General complaint process
- Notices posted on bulletin boards throughout the facility on how to register a complaint
- Mandatory investigator training courses
- Mandatory monthly seminars
- Researchers and technicians required to have documented appropriate training before performing procedures on animals.
- Research staff and graduate students required to attend a training course on the humane and ethical use of animals prior to engaging in research activities.
- Provide each investigator with operating instructions and manuals.
- Posters announcing availability of anonymous "hot line" for registering concerns/complaints

## APPENDIX G

### Examples of Training and Information Provided to IACUC Members

## **Appendix G**

### **Examples of Training and Information Provided to IACUC Members**

OPRR Institutional Animal Care and Use Guidebook

NIH Publication 85-23, Guide for the Care and Use of Laboratory Animals

PHS Policy on Humane Care and Use of Laboratory Animals

Animal Welfare Act

Local manuals on care and use of research animals

The Journal "Lab Animal"

Newsletter from the National Association for Biomedical Research

Video tapes

AAALAC program description

One-on-one briefings

Quarterly ethics workshop

Ethics in Research training courses

Copy of DoD regulation on use of animals in research

Funded attendance at workshops by Scientists Center for Animal Welfare

Funded attendance at the Public Responsibility in Medicine and Research conference  
"Animal Research Committees: Ethics, Education and Economics," Boston, March 93

Provided course "Animals in Medical Research - Guidelines" 3.5 hour course at  
National Naval Medical Center

Provided continuing education training material to each member monthly

Journal articles and newsletters provided to members and discussed at the committee

Provided membership in the American Association of Laboratory Animal Science

## APPENDIX H

### Chain of Command

Appendix H

CHAIN OF COMMAND - ARMY  
Research

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
US Army Research Institute of Environmental Medicine, Natick, MA	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
US Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
US Army Medical Research Institute of Infectious Diseases, Ft. Detrick, MD	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
US Army Aeromedical Research Laboratory, Ft. Rucker, AL	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
US Army Institute of Surgical Research, Ft. Sam Houston, TX	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	

**CHAIN OF COMMAND - ARMY  
Research (cont)**

<b>FACILITY</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>	<b>LEVEL 5</b>	<b>LEVEL 6</b>
US Army Biomedical Research and Development Laboratory, Ft. Detrick, MD	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
Walter Reed Army Institute of Research, Washington, DC	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
US Army Medical Research Unit 3501, Brazil [Closed Effective Oct 93]	Walter Reed Army Institute of Research	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense
US Army Medical Research Unit, Kenya	Walter Reed Army Institute of Research	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense
Armed Forces Research Institute of Medical Sciences, Bangkok, Thailand	Walter Reed Army Institute of Research	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense
US Army Dental Research Detachment, Great Lakes, MI	Walter Reed Army Institute of Research	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense
Human Research and Engineering, Aberdeen Proving Ground, MD	US Army Research Laboratory	Army Materiel Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	

**CHAIN OF COMMAND - ARMY  
Research (cont)**

<b>FACILITY</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>	<b>LEVEL 5</b>	<b>LEVEL 6</b>
US Army Edgewood Research, Development and Engineering Center, Aberdeen Proving Ground, MD	US Chemical Biological Defense Command	Army Materiel Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
Extramural Contracts, Army Research Office, Research Triangle Park, NC	Army Materiel Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense		
Medical Extramural Contracts, US Army Medical Materiel Development Activity, Ft. Detrick, MD	US Army Medical Research and Development Command	Office of the Surgeon General	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	

**CHAIN OF COMMAND - ARMY  
Education**

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
Walter Reed Army Medical Center, Washington, DC	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
William Beaumont Army Medical Center, El Paso, TX	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
Tripler Army Medical Center, Honolulu, HI	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
Fitzsimons Army Medical Center, Aurora, CO	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
Madigan Army Medical Center, Tacoma, WA	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
Dwight David Eisenhower Army Medical Center, Ft. Gordon, GA	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
Brooke Army Medical Center, Ft. Sam Houston, TX	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	

**CHAIN OF COMMAND - ARMY  
Training**

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
Army Medical Department Center and School, Ft. Sam Houston, TX	Health Services Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	
US 1st Army Special Warfare Training Group, Ft. Bragg, Fayetteville, NC	US Army Special Operations Command	Office of Chief of Staff, US Army	Office of Secretary of the Army	Office of Secretary of Defense	

**CHAIN OF COMMAND - ARMY  
Testing**

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
US Army Dugway Proving Ground, Dugway, UT	Test and Evaluation Command	Army Materiel Command	Office of Chief of Staff, US Army	Office of Secretary of Army	Office of Secretary of Defense

**CHAIN OF COMMAND - NAVY  
Research**

<b>FACILITY</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>	<b>LEVEL 5</b>	<b>LEVEL 6</b>
Naval Aerospace Medical Research Laboratory, Pensacola, FL	Naval Medical Research and Development Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense	
Naval Dental Research Institute, Great Lakes, IL	Naval Medical Research and Development Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense	
Naval Medical Research Institute, Bethesda, MD	Naval Medical Research and Development Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense	
US Naval Medical Research Unit #2, Jakarta, Indonesia	Naval Medical Research and Development Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense	
US Naval Medical Research Unit #3, Cairo, Egypt	Naval Medical Research and Development Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense	
US Naval Medical Research Institute Detachment #3800, Lima, Peru	Naval Medical Research Institute	Naval Medical Research and Development Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense
Naval Medical Research Institute/ Toxicology Division, Wright-Patterson AFB, OH	Naval Medical Research Institute	Naval Medical Research and Development Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense

**CHAIN OF COMMAND - NAVY  
Research (cont)**

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
Naval Command, Control and Ocean Surveillance Center, San Diego, CA	Office of the Chief of Naval Research	Office of Assistant Secretary of the Navy (RD&A)	Office of Secretary of the Navy	Office of Secretary of Defense		
Office of Naval Research Washington, DC	Office of Assistant Secretary of the Navy (RD&A)	Office of Secretary of the Navy	Office of Secretary of Defense			
Extramural Contracts	Naval Medical Research and Development Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense	

**CHAIN OF COMMAND - NAVY  
Education**

<b>FACILITY</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>	<b>LEVEL 5</b>
Naval Medical Center, Department of Surgery, Oakland, CA	Naval Health Sciences, Education and Training Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense
Naval Medical Center, Clinical Investigation Program, San Diego, CA	Naval Health Sciences, Education and Training Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense
Naval Medical Center, Clinical Investigation Program, Portsmouth, VA	Naval Health Sciences, Education and Training Command	Bureau of Medicine and Surgery	Office of Chief of Naval Operations	Office of Secretary of the Navy	Office of Secretary of Defense

**CHAIN OF COMMAND - AIR FORCE  
Research**

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
Armstrong Laboratory, Wright-Patterson AFB, OH	Human Systems Center	Air Force Materiel Command	Office of Chief of Staff, USAF	Office of Secretary of the Air Force	Office of Secretary of Defense
Armstrong Laboratory, Brooks AFB, TX	Human Systems Center	Air Force Materiel Command	Office of Chief of Staff, USAF	Office of Secretary of the Air Force	Office of Secretary of Defense
Aerophysics Systems Flight Office, Arnold AFB, TN	Arnold AFB Commander	Air Force Materiel Command	Office of Chief of Staff, USAF	Office of Secretary of the Air Force	Office of Secretary of Defense
Extramural Contracts	Air Force Office of Scientific Research	Air Force Materiel Command	Office of Chief of Staff, USAF	Office of Secretary of the Air Force	Office of Secretary of Defense

**CHAIN OF COMMAND - AIR FORCE  
Education**

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
Keesler Medical Center, Keesler AFB, MS	Keesler Technical Training Center	Air Education and Training Command	Office of Chief of Staff, USAF	Office of Secretary of the Air Force	Office of Secretary of Defense
Wilford Hall Medical Center, Lackland AFB, TX	Air Education and Training Command	Office of Chief of Staff, USAF	Office of Secretary of the Air Force	Office of Secretary of Defense	
David Grant USAF Medical Center, Travis AFB, CA	60 Airforce Wing, Travis AFB	22nd Air Force, Travis AFB	Air Mobility Command	Office of Chairman, Joint Chiefs of Staff	Office of Secretary of Defense
US Air Force Academy, Colorado Springs, CO	Superintendent USAFA	Office of Chief of Staff, USAF	Office of Secretary of the Air Force	Office of Secretary of Defense	

**CHAIN OF COMMAND - TRI-SERVICE DoD FACILITIES**  
**Research**

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3
Armed Forces Institute of Pathology, Washington, DC	Office of Surgeon General US Army	Office of Assistant Secretary of Defense/Health Affairs	Office of Secretary of Defense
Armed Forces Radiobiology Research Institute, Bethesda, MD	Uniformed Services University of the Health Sciences	Office of Assistant Secretary of Defense/Health Affairs	Office of Secretary of Defense

**CHAIN OF COMMAND - TRI-SERVICE DoD FACILITIES**  
**Education**

FACILITY	LEVEL 1	LEVEL 2	LEVEL 3
Uniformed Services University of the Health Sciences, Bethesda, MD	Office of Assistant Secretary of Defense/Health Affairs	Office of Secretary of Defense	

## APPENDIX I

### Journals With DoD Animal Research Publications

## Appendix I

### Examples of Journals With DoD Animal Research Publications

Acta Tropica  
American Journal of Tropical Medicine Hygiene  
American Journal of Veterinary Research  
American Journal of Physiology  
Behavioral and Neural Biology  
Blood  
Brain Research Bulletin  
Brain Research  
Chemical Biological Interactions  
Clinical Research  
Drug and Chemical Toxicology  
Drug Development Research  
Endocrinology  
Epilepsy Research  
European Journal of Immunology  
Experimental Hematology  
Experimental Parasitology  
Fundamental Applied Toxicology  
Gastroenterology  
Infection and Immunity  
International Journal of Radiation Biology  
Journal of Analytical Toxicology  
Journal of Chromatography  
Journal of Clinical Microbiology  
Journal of Experimental Medicine  
Journal of Immunology  
Journal of Infectious Disease  
Journal of Investigative Surgery  
Journal of Medical Entomology  
Journal of Pharmacology and Experimental Therapeutics  
Journal of Pharmacy and Pharmacology  
Journal of Physiology  
Journal of Submicroscopic Cytology and Pathology  
Journal of the American Mosquito Control Association  
Journal of the American Veterinary Medicine Association  
Journal of the Experimental Analysis of Behavior  
Laboratory Animals  
Laboratory Animal Science  
Lymphokine and Cytokine Research

Medical Veterinary Entomology  
Neuropharmacology  
Pharmacology, Biochemistry and Behavior  
Physiology and Behavior  
Proceedings of the Society of Experimental Biology and Medicine  
Proceedings of the National Academy of Science  
Radiation Research  
Thrombosis Haemostasis  
Toxicologist  
Vaccine