

Connection

Connecting science and responsible animal care.

Animal facility design and renovation: things to consider before breaking ground

AALAC is frequently asked for information on building or renovating animal facilities. A question we, unfortunately, hear from time to time is, “we built a new animal facility that [insert problem here], and now we need to go back and fix it—do you have any information that might help us?”

Building or renovating an animal facility is a daunting task. Aside from meeting all regulations and guidelines for quality animal care and use and employee safety, a facility project also requires you to accommodate the types of research your institution is doing now, *and* plan for what it may be doing years from now.

Compounding these challenges is the scarcity of published information on the subject. In 1991, a comprehensive guide edited by Theodorus Ruys, the *Handbook of Facilities Planning Volume 2 Laboratory Animal Facilities*, was published by Van Nostrand Reinhold. The publisher was later bought out by a larger company that decided to discontinue the publication, making it extremely difficult to locate a copy. (AAALAC is currently investigating the possibility of working with the editor to reprint more copies. We will keep you posted on this project.)

To help frame some general questions that need to be considered before starting any facility

project, we have reprinted some of the planning checklists and key information from the *Handbook* in the sections to follow. We also spoke with users and experts in animal facility design and renovation, and asked them to provide their advice on planning and managing facility projects.

While each of our sources focuses on slightly different aspects of design and renovation, several main themes emerge. The first is to have an absolutely clear vision—and agreement among all end-users—on what the new facility needs to accomplish. Second, build in flexibility whenever possible to accommodate future research needs. Third, seek out and work with people who really know animal facilities. Fourth, pay close attention to trouble areas that are sometimes overlooked, such as floor and ceiling finishes, cagewash areas and workflow issues. Finally, invest in extra oversight systems and management practices that help ensure the project is done right the first time.

Our hope is to provide a general overview of how to approach an animal facility project and avoid common pitfalls. For more in-depth reading, refer to the resources section on page 8 of this issue.

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Facility planning: checklists and troubleshooting

*From the Handbook of Facilities Planning (Handbook),
Volume 2 Laboratory Animal Facilities,
by Theodorus Ruys, Van Nostrand Reinhold, 1991*

Planning phases and common mistakes

According to the *Handbook*, there are four phases in designing or renovating a laboratory animal facility:

1. Planning
2. Programming
3. Design
4. Construction

Phase #1:

The planning phase

The first step in the planning phase is defining the project. This includes identifying needs, determining if the project is feasible, and getting approval for the project from top officers. Next, specific task groups are formed. The *Handbook* recommends three basic task groups.

- The first is a **“user group”** of actual end-users, such as researchers, laboratory animal medicine specialists, and personnel from facility maintenance, management, engineering, and employee health and safety. Their job is to determine needs, and review and evaluate proposed designs from an operational (or needs) perspective. These needs are often determined by completing detailed questionnaires.
- A **“design task group”** serves as the “hub of the design effort and provides central management

throughout the process.” This group usually consists of the facility veterinarian, the technical manager, safety representatives and a budget manager. The *Handbook* states that members of this group should be authorized to make final decisions about the project design. They are responsible for resolving any conflicts among various user needs, and keeping the project on schedule. Any conflicts that cannot be resolved are referred to the oversight committee (described below).

- An **“oversight committee”** serves as the final arbitrator for issues that can’t be resolved by the design task group. This committee can also authorize changes to the budget. The oversight committee is made up of “senior managers with full authority to commit funds and provide organizational direction.” They are responsible for “providing timely final decisions on issues such as competing needs and requests for increases in budget.” They monitor the design development to make sure it is meeting the original goals set for the project.

Finally, the *Handbook* says the project phase is also the time to select an architect/engineering firm (A/E firm).

Phase #2:

The programming phase

During the programming phase, the “architect/engineering group” (A/E group) is added as a fourth task group. It is made up of members of the firm selected during the planning phase. During the programming phase, user needs should be refined, and the goals and objectives for the facility should be clearly communicated to the A/E group. Project constraints, such as budget restrictions, schedules, user requirements, quality requirements (for materials, etc.), and phasing plans (if the facility is to remain occupied during renovation), should be determined.

Common errors that occur during planning and programming

- **Questionnaire errors and interviewer biases.** These result from errors in acquiring good information from the end-users, and collecting opinions instead of facts.
- **Collecting too much or too little information.** Catering to one dominant user or need and overlooking the basics.
- **Failure to establish priorities.** Not knowing the difference between a wish list and a needs list.
- Designing a facility that **does not respond to users’ needs.**

Phase #3:

The design phase

The *Handbook* suggests that the design phase follow a sequential process: conceptual design, design development, review of construction documents, review of “prefinal” construction documents, and review of the final bid documents. During the design phase, the design task group and the A/E group work closely together. The oversight group must be sure that the design is consistent with the original requirements, and that budgets are met.

Phase #4:

The construction phase

The *Handbook* lists six elements that should be part of the construction phase:

- Inspections by the A/E group to “ensure the final product conforms to the design documents.”
- Managing “change orders” which are alterations to the original project resulting from unforeseen developments.
- Reviewing progress reports from the A/E group.
- “Project closeout” which is the process of testing, correcting and approving all parts of the completed work.
- Developing a schedule for occupying of the completed facility.
- Ensuring that warranties are in place and start at the time of occupancy (not when first delivered to the site.)

The *Handbook* notes that it’s important for the design task group to “actively collect all complaints from users” and report them to the A/E group.

Common errors that can occur during the design or construction phases

- **Lack of coordination among building trades.** Questions such as— “Is there adequate head room?” “Are doors wide enough to pass cage racks?” “Will the structure support equipment weight when it’s in place?”— need to be addressed. It is essential to make sure that good communication occurs between all of the building trade groups involved.
- **Problems with interior finishes.** Animal facilities often require special finishes. This is often an overlooked area. (See article referenced on page 8 of this issue, “Animal Room Finishes ...”)
- **Not considering vermin control.**
- **Selecting the wrong or inadequate equipment.** Avoid undersizing or oversizing of equipment such as cage and bottle washers, bedding dispensers, and autoclaves. This ensures cost effectiveness.
- **Not providing fail-safe systems that protect the animals,** such as backup power, fan, exhaust, chiller and filtration systems. Alarms should be in place to warn personnel of system failures (during non-working hours too).
- **Inadequate systems.** Systems must not only be fail-safe, they must also be adequate in size.
- **Inadequate security.** Institutions must consider security to protect facility perimeters, personnel identification systems, determine if there will always be a person in attendance at the facility, and determine if individual rooms will be locked.

Other common trouble areas to be considered include: inadequate storage; no flexibility in animals rooms (they can’t be used for multiple species over the life of the building); noise transmission; poor sizing of waste containers; no future expendability of facility without disrupting current work; and not considering the safety protocols and emergency procedures that can impact the facility design.

Management mistakes

Throughout the entire process, the *Handbook* cautions institutions to avoid the following common management mistakes ...

No management plan

The *Handbook* recommends that management establish a means to solve conflict, make sure members of all assigned task groups are clear on their responsibilities and authority, and develop schedules for the work to be done.

Ill-defined program requirements

Your program should be fully defined before starting the building project. If it's not, you may find you need to make changes in the design while construction is in progress. This can cause lengthy delays, cost overruns and schedule changes.

Not working around problems

As problems arise, work around them immediately. This will maintain the momentum of the project, and the confidence of the task groups. It also helps avoid costly delays in construction.

Letting design take priority over needs

Don't let the design process become the end instead of the means. Pay attention to users' comments—don't ignore them just to keep on schedule and within cost projections. Insufficient user input can result in a new facility that has to be renovated before it can meet user needs.

Poor quality control

Allow sufficient time to review the designs submitted, and make sure they meet the needs of the research program and the requirements of the institution.

Not balancing scheduling and budget priorities

Scheduling and budget priorities should be balanced and adjusted to maintain the functionality of the facility.

Projecting needs through “programming”

Dr. Leary believes that institutions should do “programming” before they start planning a new facility or renovation project. Leary's defines programming as “getting all the critical people in the room and asking them what's ahead.” He recommends looking at items such as recruiting plans for new personnel and faculty, projections for department expansion to determine what research is planned, and determining how many new projects could involve animals and what kinds.

During this process, you may find that some projects will include very special requirements. For example, while planning a facility project at his university, Leary discovered the need to accommodate a researcher working on elephantiasis in humans. This required a mosquito room in which high temperature and humidity would need to be maintained.

Leary also suggests looking at historical data in order to anticipate revenues for research. “Put all this information together so you can create an accurate picture of what you will need—number and types of animals, types of space, work flow, and so on,” Leary says.

But know that even the best projections are not guarantees that the facility will remain viable well into the future. While the average life-span of a new building used to be 20 years, Leary believes the pace of science and new technology has cut that life-span down to five or ten years. He added that the boom in transgenic research is a big contributor to the rapidly-changing needs of animal facilities. “No one anticipated the explosion of transgenics and the resulting need for more rodent housing. Many institutions are now running out of space.” The best an institution can do is to anticipate and plan as well

Advice from the field...

Steve Leary, D.V.M., Director of the Division of Comparative Medicine at Washington University - St. Louis, has played a key role in facility projects at his own institution, and also serves as consultant and speaker on the topic of facility renovation and design. Dr. Leary will be co-presenting an eight-hour workshop at the national meeting of the American Association for Laboratory Animal Science (AALAS) in Cincinnati on Tuesday, October 20. In the sections that follow, Dr. Leary shares what he believes are key points to consider in a facility project.

Also sharing his experience is AAALAC Council on Accreditation member Michael Ballinger, D.V.M. Dr. Ballinger is the Director of Comparative Medicine for Abbott Laboratories. Over the last several years, Abbott has completed several renovation and new building projects. Their collective advice is summarized in the sections that follow.

as it possibly can for future needs, and build in flexibility wherever possible.

Abbott Laboratories made flexibility and expandability a priority. “Interstitial space” in the form a floor reserved for future animal housing was an integral part of the design for one of the company’s new facilities, Ballinger says. Part of this floor contains labs that can be used right now, but the entire floor can be converted to animal housing space in the future if needed.

Organizing for programming

To facilitate the programming process, Leary suggests forming functional groups which include key researchers. At Washington University, these functional groups included animal surgery, large animals, and biohazards. The vice chancellor of research chaired the entire group, with Leary representing the veterinary perspective. After the programming was completed, it was sent to top administration and the Board for approval.

At Abbott Laboratories, Ballinger says they had great success by educating one of their own company engineers on the animal care business. This individual attended many AALAS meetings (American Association for Laboratory Animal Science), and participated in AAALAC site visits in order to become an effective advisor to the company on animal facility issues. This engineer was part of the core planning group along with other company engineers representing different areas. Also on the committee were two animal care representatives, and a representative from the scientific users group.

Choosing an architectural/engineering (A/E) firm

Leary emphasized that for any size project, large or small, it’s important to select a firm that has experience designing animal facilities. After you narrow your search down to a handful of firms, Leary says it’s time to “call your colleagues at the facilities those firms designed, and find out what they did right, wrong, and if they would hire that firm again.”

Dr. Ballinger echoes the importance of choosing a firm with animal facility experience. His company even sent its own engineers out to look at the animal projects done by potential A/E firms.

“Commissioning and qualification” during construction

During the actual construction phase, Leary likes to see what he calls a formal “commissioning and qualification” program in place. This is the process of making sure that everything is being done according to your original plan, and that all equipment, installation and construction meets your specifications. It is done throughout the entire project, so that mistakes can be corrected along the way, and surprises at the end avoided. “This process sometimes requires additional staff and paperwork, but it prevents costly mistakes,” Leary says. He suggests holding weekly construction meetings throughout the project to make certain everything is being checked, and to review any discrepancies between the original plan and the work that’s been done so far.

continued next page...

Troubleshooting

In his experience consulting for and participating in animal facility design and renovation projects, Leary says there are three common trouble areas to look out for, all of which emphasize the importance of hiring an A/E firm with animal facility experience ...

- **Inadequate engineering**, particularly heating, ventilation and air conditioning (HVAC) systems. Leary notes that this is primarily due to the fact that good HVAC engineers are difficult to find.
- **Poor hardware selection**, such as doors and door closures that don’t work well in animal facilities.
- **Improper finishes for ceilings, walls and floors**—which are important issues in animal facilities in terms of safety, functionality and meeting accreditation requirements. (For detailed information on selecting animal room finishes, refer to the June 1998 article in Lab Animal magazine on “Animal Room Finishes: Selecting and Overseeing a Resinous Finish System,” listed in the resources section on page 8.)

Dr. Ballinger suggests that the secret to making a facility project go smoothly is to “have a skilled project manager who represents the ultimate owner, not the contractor.” Abbott’s investment in educating one of its own engineers on animal facility issues helped ensure the success of the company’s multiple building projects.

more on animal facility design and renovation...

Advice from the field continued ...

Construction contracts

Leary feels there are essentially two different ways to approach budgeting and contracts. The first is the “general contractor approach,” in which the construction company provides a total cost and contract for the entire project. Typically, any savings that occur along the way (in time, materials and so on), accrue to the construction company. (Although it is sometimes possible to obtain an agreement in which a percentage of savings goes to the company and a percentage to the institution.) The benefit of this approach is that you know what the project will cost you.

The second approach is the “construction management approach,” in which you also have a contract, but one that allows room for negotiation throughout the course of the project. For example, in one of Leary’s recent facility projects, there was a line item for flooring. The estimate came in under budget, so Leary had the option of realizing the savings, or upgrading the flooring materials. He opted to upgrade, resulting in a higher-quality floor within the original budget. “This approach is more time consuming, but it allows you to balance costs and quality, and perhaps *increase* quality in certain areas along the way,” Leary says.

From the consultant side...

Josh Steven Meyer is Managing Principal for GPR Planners Collaborative Inc. A registered architect, Mr. Meyer has spent the last 15 years consulting on more than 80 animal facility projects encompassing more than 2 million net square feet of space. His clients include Harvard University, University of Pennsylvania, Baylor College, government facilities for agencies including the Environmental Protection Agency, Eli Lilly, Schering-Plough, Hoffmann-La Roche and many others. Mr. Meyer will co-present the two-part workshop on this subject at the national AALAS meeting in Cincinnati on October 20. In the following paragraphs, he offers key points to consider for institutions undertaking an animal facility project ...

Clearly define your goals and objectives

Instead of simply saying you need more space, Meyer says to “have a good, total concept of what you want to accomplish with the new facility.” He says when clients say they need more space, his response is “maybe, maybe not.” More space may not be the answer—there may be better ways to achieve your objectives, such as redesigning existing space or investing in new equipment or systems. Meyer says his first step is always to carefully analyze the existing facility, then compare it with the institution’s goals and objectives. This approach generates solutions that perhaps weren’t thought of before.

Realize the full potential of your facility by building in flexibility

“Don’t use what you are doing now as the basis for projecting how you will operate in the future,” Meyer says. “Too many people accept the status quo. Don’t shy away from rethinking the way you approach design and processing, and look at new ways of doing things.”

Baylor College, one of Meyer’s clients, is a good example of thinking outside the box in terms of

new facility design. They are currently building a 60,000-cage mega mouse house with state-of-the-art, high-density racks. While the tab for the new cage system tallies in the millions, Meyer’s firm projects that it will pay for itself in as little as three years. “The new system will save Baylor 40,000 square feet of space plus staff. They’ve designed a system based on payback—what they will get in return for their investment,” Meyer says.

New designs and technologies for cage systems like Baylor’s are allowing animal facilities to build in more flexibility than ever before, while maintaining high standards for animal well-being. To illustrate this fact, Meyer’s company developed an innovative “Cage and Rack Proforma” system that allows him to plug in current and projected animal census numbers, and compare the equipment costs, staff costs, and space requirements for every cage and rack system currently known. He uses the system to tell clients the capital costs and payback for each system, all on one spreadsheet. Along with

demonstrating different options, “this type of analysis helps show the true magnitude of a facility problem,” Meyer says.

Carefully estimate projections for average daily census

One important way to maximize flexibility is to make sure projections for average daily numbers of different types of species is as on-target as possible. “I know of one facility built to accommodate an average of 100 primates. Once it opened, they never got above 25,” Meyer says. The result was a lot of unused, inflexible space.

Pay attention to the cagewash

Many facilities underestimate the cagewash area. That’s why Meyer says it’s important to talk to the people on the front lines who manage the cagewash system. “Sometimes head veterinarians are removed from the day-to-day workings of how things break down. You have to speak to the individuals that operate each functional area.” (For more details on designing cagewash systems, see the article, “Making Cagewash Facility Design a Priority,” referenced on page 8.)

Determine exactly how you’ll handle materials and waste

Where will feed and bedding be kept? How will people enter the rooms? Where will they put on gowns? How will animals enter and exit? How will waste be removed from the building? Meyer says these are questions that need to be addressed up front, but are often overlooked.

Balance your budget evenly among mechanical systems, equipment and finishes

Meyer says many facilities don’t balance their investments among these key areas. He’s seen, for example, a facility invest a great deal in state-of-the-art equipment, but leave their old ventilation system in place which wouldn’t accommodate the new machinery. Another put all its money into new mechanical systems, but used poor-quality finishes. Meyer suggests taking the total project budget and balancing it out among these three areas.

Make decisions based on life-cycle costs, not initial costs

“We try to explain ‘life-cycle costs’ vs. ‘first costs’ to our clients, and encourage them, whenever it’s possible, to make decisions based on life-cycle costs,” Meyer says. For example, a certain finish may cost more initially, but when you consider that a less expensive option would need to be repainted in several years—perhaps causing major disruptions to work flow—it’s a better long-term investment to go with the more expensive, higher-quality choice.

Invest in a “validating” system that makes sure things are done right the first time

Meyer recommends “validating” as opposed to simply “commissioning” a project. Under the commissioning system, a facility is built from start to finish the way it was originally designed. Validating is similar to the “construction management approach” described earlier by Dr. Leary on page 6. Under a validating

system, the work, materials and design are constantly evaluated every step of the way. Everything used has to be logged, tagged and approved. This requires additional engineers (Meyer recommends hiring a validation consultant), time, and up-front expense, but can pay off in the long run by ensuring a fully-operational facility. “I know one facility that was commissioned, and after it was built, had serious operational problems and couldn’t open for another 18 months,” Meyer added.

Bottom line for success:

employ good planning and programming to meet institutional goals and user needs, build in flexibility when possible to accommodate future needs, work with experienced people, avoid common pitfalls, and use a hands-on approach to managing all aspects of the construction phase to make sure things are done right the first time.●

Resources for facility design and renovation

The *Handbook of Facilities Planning* (listed below) is the most comprehensive resource the AAALAC office has found on animal facility design and renovation. The other resources listed below, while not entirely devoted to animal facilities, may also be helpful supplements ...

- ✓ “Animal Room Finishes: Selecting and Overseeing a Resinous Finish System,” Steven J. Freson, AIA, *Lab Animal*, June 1998, Volume 27 No. 6, www.labanimal.com.
- ✓ “Considerations in the Design and Construction of Facilities for Farm Animal Species,” John T. Hayes, D.V.M., Mark A. Suckow, D.V.M., George E. Jackson, Jr., BS, LATG, and Fred A. Douglas, BS, LATG, *Lab Animal*, June 1998, Volume 27 No. 6, www.labanimal.com.
- ✓ *Guide for the Care and Use of Laboratory Animals*, NRC 1996, National Academy Press. Lists design and construction suggestions in its section on “Physical Plant” (pages 71-79). View the entire text on the Web at <http://www.nap.edu/readingroom/books/labrats/index.html>.
- ✓ *Guidelines for Construction and Equipment of Hospital and Medical Facilities*, The American Institute of Architects (AIA) Committee on Architecture for Health with assistance from the U.S. Department of Health and Human Services, The American Institute of Architects Press, Washington, D.C., 1996-97 edition. \$60.00. Order through the AIA Web site at www.aiabooks.com.
- ✓ *Handbook of Facilities Planning Volume 2 Laboratory Animal Facilities* by Theodorus Ruys, Van Nostrand Reinhold, 1991.
- ✓ “Making Cagewash Facility Design a Priority,” Steven L. Leary, D.V.M., John A. Majors, AIA, P.P., and Jon S. Tomson, AICP, *Lab Animal*, June 1998, Volume 27 No. 6, www.labanimal.com.
- ✓ *Veterinary Practice Building, Standards for AAHA Hospitals*, American Animal Hospital Association, 1988. Call 303/986-2800, or visit their Web site at <http://www.healthypet.com>.
- ✓ *The Animal Welfare Act of 1966* (P.L. 89-544) inclusive of amendments; 1970 (P.L. 91-579); 1976 (P.L. 94-279); 1985 (P.L. 99-198); 1990 (P.L. 101-624); and subsequent amendments. REAC, APHIS, USDA, 6505 Belcrest Rd., Federal Bldg., Hyattsville, Md. 20782. 301/436-8323. Free.

AALAS to offer seminar on facility design and renovation

Two of the key contributors to this issue's feature article, Steve Leary, D.V.M., Director of the Division of Comparative Medicine at Washington University - St. Louis, and Josh Steven Meyers, Managing Principal for GPR Planners, Collaborative, Inc., will conduct two four-hour workshops on animal facility design at this year's national AALAS meeting (American Association for Laboratory Animal Science). The workshop will take place Tuesday, October 20. The first session will serve as an introduction to designing facilities, and include discussions on goals and objectives, "programming," achieving flexibility, corridor systems, and cage and rack systems. The speakers will use case studies from a variety of institutions. (If you have a facility design or renovation project you would like to volunteer as a case study, contact Dr. Steve Leary at steve-l@dcm.wustl.edu or send your information to him at Washington School of Medicine, Campus Box 8061, 600 S. Euclid Avenue, St. Louis, Missouri, 63110.) The second session will cover very advanced functional and technical issues. For information on registering for the national AALAS meeting, visit their Web site at www.aalas.org, or call 901/754-8620.

Tradeline presents...

New facilities strategies for colleges, universities and medical schools

Tradeline will hold its annual conference on "New facilities strategies for colleges, universities, and medical schools," October 19-20 in Washington, D.C. The conference will focus on accommodating the changing business models and teaching concepts of academic facilities management. The tools required to support today's facilities standards and create modern and flexible learning and research environments, along with information on running a competitive facility will be discussed. For more information, contact Tradeline at 925/254-1744, or send e-mail to info@fmdata.com.

Congratulations to these programs for recently earning accreditation!

Genzyme Corporation
Framingham, Mass.

Thomas D. Morris, Inc.
Reisterstown, Md.

**Human Gene Therapy
Research Institute**
Des Moines, Iowa



Meditations on the meaning of “program”

by James F. Taylor, D.V.M.

Just what does the “program” in “animal care and use program” mean? Many often mistake it as simply another way to refer to the veterinary care and animal husbandry provided within a research institution.

After years of fielding this question, I have developed a personal working model of what a program is: program encompasses all of an institution’s resources, and its resolve to support the research missions of scientists and educators, while ensuring animal well-being.

Resources make up the more tangible aspects of an animal care and use program, and I’ll address those first. Among institutions, resources vary in terms of quantity, quality and sophistication. But all successful animal care and use programs encompass certain common elements which follow the section headings in the *Guide for the Care and Use of Laboratory Animals* (the *Guide*).

For starters, an institution’s “physical plant,” which includes animal holding and support spaces, laboratories, animal procedure areas and engineering infrastructure, is one element of a program. These facilities must provide adequate space, separate functions, and operate in a manner that meets the needs of the animals, satisfies the requirements of the protocols, and complies with applicable regulations, policies and standards, such as the *Guide*.

The delivery of veterinary care is another program component. This includes not only the care provided by the veterinarian(s), but also by the animal caregivers and the research technicians who interact with the animals. The level of care

must meet both the needs of the animals and the requirements of the animal users. Aside from direct animal care, users also depend on the veterinarians for guidance on anesthesia and analgesia, and advice on the selection of animal models and appropriate animal procedures.

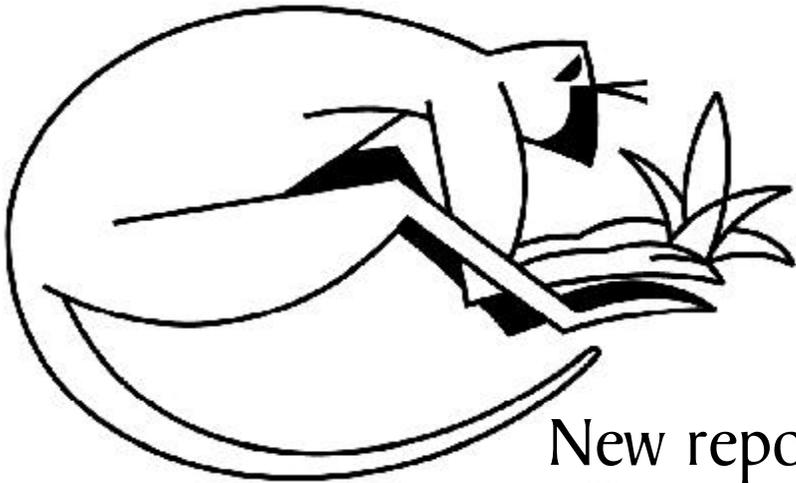
Management of the animal environment is another important aspect of an animal care and use program. While proper environmental management is obviously crucial to animal well being, it also minimizes research variables and can ultimately help promote the quality of investigators’ data. It is easy to overlook the subtle effects that changes in animal husbandry routines (whether it’s a change in the physical facility, veterinary care practices or changes in their environment) can have on the animals’ physiological, immunological or psychological responses to underlying experimental conditions.

Another critical component of an animal care and use program is providing a healthy and safe environment in which staff and researchers can pursue their scientific and educational endeavors. Institutions are responsible for assuring that all staff members are appropriately trained and have sufficient experience in performing the animal activities for which they are responsible. The institution must also provide an occupational health and safety program that assesses the risks of personnel whose work environments may place them at an increased threat of exposure to zoonotic diseases or other biohazardous conditions. Appropriate preventive and

treatment programs must also be made available.

In the U.S., the IACUC (Institutional Animal Care and Use Committee) is charged with reviewing and approving all animal activities and assuring that those activities will be carried out under humane and appropriate conditions. A successful and proactive IACUC is part of the peer review process, and has an obligation to provide guidance to animal users regarding policies, guidelines, and restrictions that reflect institutional norms and standards. Commendable IACUCs are able to successfully serve dual roles—oversight of the institution’s animal activities, and mentoring of new, junior staff members. The pivotal role the IACUC plays in ensuring both animal and human well-being makes it an extremely important part of the larger animal care and use program.

The components of a program described thus far can be readily benchmarked against the principles outlined in the *Guide*. But there are equally important *intangible* aspects that are also necessary for a successful program. These intangibles stem from an institution’s core commitment to the animal care and use program—a resolve to support the research missions of scientists and educators, and at the same time, ensure animal well-being. Institutions that have a firm commitment to their programs create positive and supportive organizational cultures. This type of positive culture creates a climate in which policies and practices are established—and readily adopted by staff—because they are seen as “the right thing to do.” In these ways, the intangible components of a program are just



New report outlines key variables affecting primate well-being

Includes recommendations for developing enrichment plans

In 1985, an amendment to the Animal Welfare Act mandated actions to improve the psychological well-being of nonhuman primates in captivity. Since then, much research has been conducted on fostering primate well-being and enriching the animals' environments.

Several years ago, in an effort to combine the best thinking in this area and develop usable guidelines, the National Research Council's Institute for Laboratory Animal Research (NRC/ILAR) convened a "Committee on Well-Being of Nonhuman Primates." The Committee was charged with four highly-ambitious tasks:

- Evaluate the environmental variables that most affect the well-being of nonhuman primates.
- Evaluate behavioral and psychological measures that can be used as indexes to measure well-being.
- Provide recommendations on developing enrichment/well-being plans.
- Suggest priorities for future research in this area.

In July, the Committee—comprised of professionals with more than 440 years of collective experience in primate research, behavior and veterinary care—released the pre-publication version of their final report, "The Psychological Well-Being of Nonhuman Primates." Key points from the report are listed on page 14 of this issue of *Connection*.

AAALAC's Associate Director, Kathryn Bayne, M.S., Ph.D., D.V.M., served on the Committee. In the sections that follow, Dr. Bayne sheds some light on how this report was developed, and its eventual implications for AAALAC-accredited institutions.

Developing the report

What were some of the biggest challenges the Committee faced in developing the report?

KB: The sponsors of the report—the USDA and the National Center for Research Resources (NCRR), NIH—made it clear that they wanted the publication to be useful to both USDA veterinary inspectors and institutions using primates for exhibit, research or breeding purposes. Writing for this broad an audience was challenging. We had

as important in ensuring its success.

So the next time you see the phrase "animal care and use program," know that it means much more than just husbandry or veterinary care. It is meant to encompass all components—tangible and intangible—that must be considered, managed and nurtured as part of a complete and successful animal care and use program. •

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to make it specific enough for the inspectors to use, yet flexible enough to be of value to research institutions.

Was it difficult to identify the environmental variables that most affect the well-being of nonhuman primates?

KB: Not as difficult as one might think. Committee members came to the table with an understanding of what the biggest areas of potential influence typically are, such as caging, personnel, and lack of stimulation. Many of us had done research in these areas, or had worked extensively with nonhuman primates, so a list of possible variables was readily generated from these professional experiences. The most important factors were social companionship, opportunities to engage in species-typical behavior, housing design, and interactions with personnel.



Hot-button issues

Are there any sections of the report that may be considered controversial by some within the animal care and use community?

KB: One area of the report contradicts the USDA regulations pertaining to space requirements. The report states that ‘When animals are housed socially, the Committee believes spatial requirements of the group need not be calculated by assessing the spatial requirements for one animal to express normal postures and locomotion and multiplying by the number of animals.’ The Committee felt that it is more important to house compatible animals together, than it is to adhere to an exact spatial formula. We also considered the fact that some studies have shown an increase in cage size can increase

the expression of abnormal behavior. The Committee’s position is *not* meant to imply that it is acceptable to overcrowd the animals. The animals must still have sufficient space to express species-typical postures and locomotion as recommended in the *Guide* [*Guide for the Care and Use of Laboratory Animals*]. But the Committee felt that determining adequate space for socially housed primates involves multiple factors.

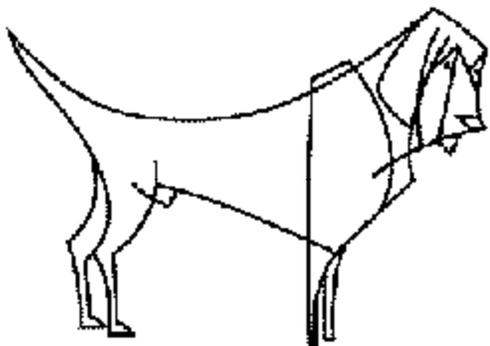
Another hot-button area is likely to be the section on multiple research use. As stated in the report, the Committee believes that ‘appropriate multiple use of primates is in the best interest of conservation goals.’ The report goes on to say that with most species, ‘multiple survival surgery is not recommended; however, multiple survival surgery using nonhuman primates should be considered.’ The Committee felt that considering multiple survival surgeries, such as cannulation or subcutaneous implants, helps conserve animals and maximizes their long-term contribution to research. The Committee underscored the importance of the IACUC’s role in making these decisions, and noted the Animal Welfare Act’s prohibition against conducting multiple *major* survival procedures on an animal, unless the procedures are components of a single approved protocol.

Timely information

Is there a particular section of the report you feel is especially timely, or may be of special interest to laboratory animal professionals?

KB: Yes, the report has two checklists that will help readers assess the value of the enrichment programs they may already have in place. The first chapter lists the key criteria for assessing psychological

continued next page ...



well-being. The second chapter lists the main components that should be included in every program. [See both checklists on page 14.] The report also includes two sample plans for enhancing the environment of nonhuman primates. Readers can use these samples as guidelines for creating or improving their own plans.

Do you see any implications for AAALAC-accredited programs as a result of the report?

KB: AAALAC's Council on Accreditation will review the report for possible inclusion in AAALAC's list of "Reference Resources." If Council adopts the report as a new reference, it will be used as a benchmark during program evaluations. In the meantime, to be consistent with the intent of the 1996 *Guide* and its expanded section on environmental enrichment, Council members are already looking at what types of enrichment programs—for all species—institutions have in place.

[A complete list of AAALAC's "Reference Resources," used by the Council on Accreditation to evaluate programs, can be found on the Web at www.aaalac.org. Also see pages 36-38 of the *Guide for the Care and Use of Laboratory Animals* (NRC 1996) for recommendations on environmental enrichment.]

Are there specific outcomes the Committee hopes will be achieved as a result of the report?

KB: The Committee is hopeful that the future research needs listed in the report will be pursued. We also hope that the report is valuable to the sponsors—the USDA and NCRR—and will be utilized by them. Above all, we hope to see institutions using the information to develop or improve their primate enrichment programs. Throughout the process, the Committee held to one overall goal—to develop

recommendations that will be beneficial to the animals. If those recommendations now filter throughout the animal care and use community and result in positive change, we will have accomplished our objective.

To receive a full copy of the report, "The Psychological Well-Being of Nonhuman Primates," call the National Academy Press at 1-800-624-6242. Ask for the version that became available July 1, 1998. The final publication is scheduled for a



Kathryn A. Bayne, M.S., Ph.D., D.V.M., is Associate Director of AAALAC International.

fall 1998 release date. Updates regarding the report will be posted on AAALAC's Web site at <http://www.aaalac.org>. •

Enrichment resources

Listed below are several U.S. and European resources that contain information on environmental enrichment for laboratory animals...

Environmental Enrichment Information Resources for Laboratory Animals 1965-1995, *Birds, Cats, Dogs, Farm Animals, Ferrets, Rabbits, and Rodents*, Animal Welfare Information Center (AWIC), September 1995. Contact AWIC at 301/504-6212, or visit their Web site at www.nalusda.gov/awic.

Environmental Enrichment Information Resources for Nonhuman Primates: 1987-1992, Animal Welfare Information Center (AWIC), May 1992. Contact AWIC at 301/504-6212, or visit their Web site at <http://www.nalusda.gov/awic>.

European Convention for the Protection of Animals Kept for Farming Purposes, Council of Europe, European Treaty Series/87, June 1995. Copies are available through the AAALAC office.

The Psychological Well-Being of Nonhuman Primates, NRC, prepublication copy, July 1, 1998. Includes a list of more than 300 reference resources in the appendix. To order, call the National Academy Press at 1-800-624-6242, and ask for the version that became available July 1, 1998.

"Refinements in Rabbit Husbandry," *Laboratory Animals* 1993, 27, 301-329. Reprints available through the RSPCA, Research Animals Dpt., Causeway, Horsham, West Sussex, RH12 1HG, UK. Visit the RSPCA Web site at <http://sunsite.anu.edu.au/community/rspca>.

From the NRC/ILAR report,
“The Psychological Well-Being of Nonhuman Primates”
prepublication copy, July 1, 1998

Criteria for assessing the psychological well-being of primates

- The animal’s ability to cope effectively with day-to-day changes in its social and physical environment (with reference to meeting its own needs).
- The animal’s ability to engage in beneficial species-typical activities.
- The absence of maladaptive or pathological behavior that results in self-injury or other undesirable consequences.
- The presence of a balanced temperament (appropriate balance of aggression and passivity) and absence of chronic signs of distress as indexed by the presence of affiliative verses, distress vocalizations, facial expressions, postures, and physiological responses (e.g. labored breathing, excessive cardiac response, and abnormal hormone concentrations).

Essential elements in a psychological well-being program

- Appropriate social companionship.
- Opportunities to engage in behavior related to foraging, exploration, and other activities appropriate to the species, age, sex, and condition of the animals.
- Housing that permits suitable postural and locomotor expression.
- Interactions with personnel that are generally positive and not a source of unnecessary stress.
- Freedom from unnecessary pain and distress.

*For a discussion of normal and abnormal behaviors, AAALAC Associate Director, Dr. Kathryn Bayne, published a 1996 article on “Normal and abnormal behavior of laboratory animals: What do they mean?” *Lab Animal* 25(1):21-24. For a copy of this article, call the AAALAC office at 301/231-5353 or send e-mail to accredit@aaalac.org.



From the executive office ...

Online, digitized and cybercized—do the animals benefit?

by John G. Miller, D.V.M., Executive Director

When I arrived at the office this morning, I was met with the words that in these high-tech times, fill us with dread—"the server's down!" In our case, a major glitch had caused the server that drives our office computer network to crash during the night. We've gotten it back in operational condition, but it appears that two days worth of e-mail messages have disintegrated in cyberspace. The several hours of network down time we faced served as a very vivid reminder of the extent to which we've come to rely on our computers. In AAALAC's case, this reliance extends to almost all intra-office handling of files and correspondence, as well as much of our communication with all of you out there in the trenches.

Without getting too "gee whiz, isn't technology unbelievable," I must admit I'm still occasionally amazed by how far we've come in applying electronic information and data exchange to our profession. I can still remember when we used a typewriter to prepare IACUC minutes and 3-by-5 cards to track animal orders. Today, there are things we do rather perfunctorily that we wouldn't have dreamed of ten years ago. For instance, many of you at accredited programs are now receiving the "AAALAC e-brief," a periodic electronic newsletter. With one click on the "send" icon, over 500 locations in 10 countries receive the latest AAALAC-specific information, at almost no cost for transmission and within seconds or minutes of sending.

For information flow in the opposite direction, our soon-to-be

launched upgraded Web site will eventually allow individuals at accredited programs to confidentially transmit information to us—from Program Descriptions to Annual Reports and everything in between. This information will be directly deposited in the appropriate AAALAC files here in Rockville.

At the laboratory level, we've seen incredible new software systems made specifically for managing all aspects of animal care and use programs—everything from room temperature controls, to care and feeding schedules, to keeping track of the skills and experience of investigators. IACUCs are linked up to special e-mail lists and Web sites that improve their oversight capabilities. And advances in instrumentation and data compilation allow researchers to collect more information than ever before.

These, and hundreds of other examples, demonstrate how technology has unequivocally made the professional lives of laboratory animal scientists better. But has it improved the lives of the laboratory animals we care for and use? The answer—for me at least—is an equally unequivocal yes. A simplistic approach to support this position is to begin with the three R's of Russell and Burch (reduce, refine, replace), and consider how technology has contributed to each. Here are a couple of quick examples of why I believe this is so:

- Refinement—listservs, such as COMPAMED, provide for an information exchange among professionals with varied expertise that has resulted in an increased use of better analgesics in rodents.
 - Replacement—a variety of simulation programs and devices that utilize microprocessor technology have assisted in educating and training laboratory animal professionals, and even replacing animals in some instances.
- Does this mean that we're rapidly approaching a time when technology will eliminate the need to employ laboratory animals at all—a point that some animal rights proponents have claimed we reached some time ago? Unequivocally no. And for all the reasons the scientific community has provided time and time again in response to animal rightists' claims. While great strides have been (and continue to be) made in the application of non-animal alternatives, in many areas of research there will be no substitute for animal studies in the foreseeable future.
- I suspect in the meantime, however, that the lot of laboratory animals, and the people who care for them, will continue to benefit from new technologies—and in ways we haven't even thought of. As professionals, we have an obligation to explore these emerging technologies, and continue to look for new and creative ways we might use these tools to advance the 3Rs, laboratory

continued next page...

“PSE” program launched in Europe

Europe was the site of the inaugural Program Status Evaluation (PSE), a new AAALAC service separate from the accreditation program. Since the service was announced in January, 28 institutions have requested application packages to participate in the PSE program. AAALAC expects to receive additional completed PSE application packages this fall.

The PSE service is ideal for programs that feel they aren't quite ready to participate in AAALAC's accreditation program, but want to see how their program compares to AAALAC standards. The PSE is a completely confidential peer review that helps determine the readiness of your program in terms of applying for AAALAC accreditation. The program components evaluated include animal husbandry, veterinary care, institutional policies, and the facilities where animals are housed and used. A PSE can serve as the

first step toward achieving AAALAC Accreditation.

Although entirely separate from AAALAC's traditional accreditation program, a Program Status Evaluation is similar in procedure. To participate, request an application package from the AAALAC office. The application process includes developing a comprehensive “Program Description” of your institution's entire animal care and use operation. The Program Description will include sections on institutional policies, animal environment, housing and management, veterinary care, and a description of your physical plant. After you submit your application and Program Description, an on-site evaluation is scheduled. Evaluation teams are led by AAALAC's Associate Director, Kathryn A. Bayne, M.S., Ph.D., D.V.M., a Diplomate of the American College of Laboratory Animal Medicine, and former members of AAALAC's

Council on Accreditation—individuals who are expert in the fields of veterinary medicine, laboratory animal science or animal research, and are committed to humane animal care and use in science. The on-site evaluation team conducts a comprehensive peer review and provides specific guidance on how to improve deficient program areas. It includes a facility walk-through, and meetings with animal care and research staff, representatives from oversight committees, and the institutional official.

Recommendations are provided in writing after the visit. The report will identify areas that need improvement in order to meet AAALAC standards, and other modifications to consider in order to further improve your animal care and use program. It will also suggest possible methods for improving any deficiencies. Fees for the PSE service will be negotiated in advance on an individual basis. They will be based on the costs involved in conducting the evaluation visit and administrative expenses. ●

From the executive office continued...

by John G. Miller, D.V.M., Executive Director

animal comfort and well-being, and of course, scientific and medical progress.

For our part, AAALAC is committed to exploiting information technology to the greatest extent possible so that we can continue to offer viable programs and information that advance your institution's scientific goals and laboratory animal welfare. Look for our much more

interactive Web site soon, with new features to be added throughout 1999. Expect a greater reliance on the Internet for communication between our office and yours. And who knows? Maybe we'll be conducting “virtual” site visits ten years from now.

Stay tuned (and online, digitized and cybercized), and keep in touch.

J.G.M.

For more information, or to receive an application package, contact the AAALAC office at 301/231-5353, in Brussels at +32-2-761-6678, or send e-mail to accredit@aaalac.org.

Web sites we like ...

Editor's note: this is the first in a series of recurring columns on Web sites of interest to the animal care and use community. We will try to select Web sites that target different needs—education, news and so on. Suggestions for future “Web sites we like” can be e-mailed to lwieder@aaalac.org.

Education/Tutorial

Tutorial now available on the Public Health Service Policy on Humane Care and Use of Laboratory Animals

The Office for Protection from Research Risks has developed an online tutorial for the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals (Policy). The tutorial is designed for new animal care and use committee members, institutional administrators, investigators, animal care personnel, veterinarians, or others who are interested in learning about the PHS Policy. The PHS Policy provides guidelines for the proper care and treatment of animals used in research, and for the organization and operation of animal care and use committees. The tutorial can be found at <http://www.nih.gov/80/grants/oprr/tutorial/index.htm>.

Funding sources

New Web site offers one-stop shopping for researchers seeking grants

The Howard Hughes Medical Institute (HHMI) and the American Association for the Advancement of Science (AAAS) have launched a new Web site offering “one-stop shopping” for young scientists seeking information on grants and other forms of support for research and training in the biomedical sciences. GrantsNet is located at <http://www.grantsnet.org>. The site currently focuses on graduate and postgraduate training and junior faculty positions, but expansion is planned to encompass undergraduate and precollege science training.

News

HMS Beagle specialized in biomedical news

The HMS Beagle is the “Webzine” of BioMedNet, an online source of wide-ranging information and resources for biological and medical researchers. The HMS Beagle features daily listing of research news, opinion editorials, essays, book reviews and other tidbits of interest. A current, comprehensive, and highly-readable source of biomedical information and news located at <http://biomednet.com/hmsbeagle>.

New “BioMedLink” guides Web users to biological and medical sites

BioMedNet has introduced BioMedLink, touted as the “essential guide to the best biological and medical sites on the Web.” The site is located at <http://biomedlink.com>, and is an evaluated and annotated database of more than 4,000 Web resources for biological and medical researchers. Each entry is individually reviewed and rated.

SCAW meeting to focus on “Institutional Responsibility for Animal Well-being”

The Scientists Center for Animal Welfare (SCAW), the University of Texas Health Science Center at San Antonio and the Office for Protection from Research Risks, NIH, will sponsor a conference on “Institutional Responsibility for Animal Well-Being,” December 7 and 8 in San Antonio, Texas. The conference will provide current information and education about research animal welfare, particularly focusing on the needs of Institutional Animal Care and Use Committees. Some topics include: “An Update on Public Health Service and USDA Policies and Regulations,” “The Issue of Animal Numbers in IACUC Deliberations,” and “Stretching the Scope of the Guide: Field Research and Off-site Collaborative Research.” For more information please contact the Scientists Center for Animal Welfare, 7833 Walker Drive, Suite 340, Greenbelt, Maryland, 20770, phone 301-345-3500, fax 301-345-3503, or e-mail scaw@erols.com.

science in cyberspace

May Council meeting addresses Policy 12, and streamlining the Program Description

by Kathryn A. Bayne, M.S., Ph.D., D.V.M.

The Council on Accreditation met May 29-31 in the AAALAC Executive Office in Rockville, Maryland, to deliberate on reports of site visits conducted during the Winter (January through March) 1998 trimester, and to conduct Council business. Highlights of the business meeting follow.

Q&A Session with USDA / Animal Care's Ron DeHaven addresses Policy #12

USDA/Animal Care's Ron DeHaven spent time with the Council answering questions on several issues including Policy #12, pain categorization, training, annual review of protocols, and environmental enrichment. Information from this meeting will assist the Council in providing better feedback on these issues during the site visit process.

Most of the discussion time was spent clarifying the role of policies in animal care regulations, and specifically on the USDA's goals for Policy #12. In summary, Dr. DeHaven indicated that the Supreme Court has given broad latitude to agencies of the Executive Branch to interpret their own rules. Thus, policies comprising the "Animal Care Policies" booklet are considered "interpretive rules," since they are statements that clarify or interpret the existing Animal Welfare Act regulations. Dr. DeHaven stated that "while these interpretive rules are subject to legal challenge, deference is usually given to an agency's interpretation of its own rules." Policy #12, "Written Narrative for Alternatives to Painful Procedures," stipulates that if the principal investigator uses an electronic literature search as the basis for making the required assurance that a good faith effort in identifying suitable alternatives has been made, then the date of the search, the source(s), key words, and date range will provide the IACUC with the requisite information. The policy does not rule out other methods of conducting a search.

AAALAC program activities set for 49th annual AALAS meeting

AAALAC will once again present a seminar and workshop at the 49th annual meeting of the American Association for Laboratory Animal Science (AALAS) in Cincinnati, Ohio. The seminar, "The AAALAC International Team, A Partnership Approach," is scheduled for Tuesday, October 20. The workshop, "Performance Standards and Other Issues," is scheduled for Wednesday, October 21. Additionally, AAALAC's Executive Director, Dr. John

Miller, will co-present a Special Topics Lecture with AAALAC ad hoc Consultant Richard Fosse on "International harmonization of animal welfare standards and practices--an update." This Special Topic Lecture is scheduled for Wednesday, October 21.

Ad hoc Consultant/Specialist Nominating Committee recommends appointments

The Ad Hoc Consultant/Specialist Nominating Committee submitted their report to the Council with recommendations for appointment and reappointment to the list of ad hocs maintained by AAALAC International. Letters to individuals under consideration were mailed in July, with the term of appointment beginning September 1. Information on becoming an ad hoc Consultant can be found on AAALAC's Web site.

AAALAC's Program Description to be streamlined

Respondents to the 1998 AAALAC International Opinion Survey of Accredited Programs resoundingly requested that repetitive areas in the Program Description be deleted, that the complexity of the Description be reduced, and that the ease of its preparation, via more effective use of software and technology, be enhanced. Efforts are currently underway to prepare a streamlined version of the Description. In the future, institutions applying for accreditation or under consideration for reaccreditation will be able choose to between completing the streamlined version or the existing version of the Program Description.

Seven officers, three new members elected to Council on Accreditation

Seven officers and three new members were elected to AAALAC's Council on Accreditation. The new officers and members were selected by their peers on the 28-member Council, and officially assumed duties in July. Members of the Council are chosen to serve based on their extensive experience in the fields of veterinary medicine, laboratory animal science or animal research, and their commitment to the humane care and use of animals in science. Council members serve four-year terms. Officers serve one-year terms.

The new Council officers:



President:

James F. Taylor, D.V.M., M.S.
Director, Office of Animal Care and Use,
National Institutes of Health



Assistant Section Leader:

Ralph B. Dell, M.D.
Director,
Institute for Laboratory
Animal Research



Vice President:

Thomas M. Butler, D.V.M., M.S.
Chairman, Department of
Laboratory Animal Medicine, Southwest
Foundation for Biomedical Research



Assistant Section Leader:

Douglas W. Stone, D.V.M., M.S.
Associate Director, University
Laboratory Animal Resources,
The Ohio State University



Section Leader:

Hilton J. Klein, V.M.D., M.S.
Senior Director,
Department of Laboratory Animal
Resources, Merck Research Laboratories



Assistant Section Leader:

Robert M. Werner, D.V.M.
Director of Laboratory
Animal Resources,
Florida State University



Section Leader:

Christine M. Parks, D.V.M., Ph.D.
Director of Research Animal Resources,
University of Wisconsin-Madison

New Council members:

David DeLong, D.V.M., M.S.

Veterinary Medical Officer & Chief of the
Veterinary Medical Unit, Veterans Affairs
Medical Center, Minneapolis

Elizabeth A. Gard, D.V.M.

Private Consultant

Stephen T. Kelley, D.V.M., M.S.

Head, Division of Animal Resources, and Senior
Veterinarian, Oregon Regional Primate Research
Center, Oregon Health Sciences University

Connection is published quarterly by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC), a private non-profit organization that promotes the humane treatment of animals in science through voluntary accreditation and assessment programs. More than 600 institutions around the world have earned AAALAC accreditation, demonstrating their commitment to responsible animal care and use, and good science.

Comments and submissions for Connection are welcome and should be directed to the editor.

Articles and information in Connection can be duplicated with attribution.

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John G. Miller, D.V.M.
Executive Director

Lori Wieder
Editor

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Five new Member Organizations join the AAALAC Board

AAALAC's Board of Trustees approved five new organizations for membership on its Board: the Federation of European Laboratory Animal Science Associations (FELASA), the International Council for Laboratory Animal Science (ICLAS), the American Society of Primatologists, the Scientists Center for Animal Welfare and the College on Problems of Drug Dependence, Inc. The five organizations will officially become Member Organizations at AAALAC's annual Board meeting in September, increasing the total number of

Member Organizations (and representatives on the Board of Trustees) to 48. Members play an important role in shaping the policy and programs of AAALAC International, and ensuring that their memberships support the accreditation program. In particular, representatives from FELASA and ICLAS will play key roles in guiding the continued growth of AAALAC's accreditation program in countries outside of the United States. For more information on becoming a Member Organization, visit the AAALAC Web site at www.aaalac.org.

Connection

Connecting science and responsible animal care.

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