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Note: Text has been edited for clarity.

AC and OLAW Perspective on Nonhuman Primate Enrichment and Social Housing

Speakers: Dr. Robert Willems, Assistant Regional Director, Eastern Region, USDA, APHIS, Animal Care; Dr. Axel Wolff, OLAW, Director, Division of Compliance Oversight; and Ms. Kristina Adams, Technical Information Specialist, USDA, NAL, AWIC.

Moderators: Dr. Jerry Collins, OLAW, Division of Policy and Education and Yale University and Ms. Susan Silk, OLAW, Director, Division of Policy and Education.

Recorded June 11, 2010: the seminar can be viewed at
<https://webmeeting.nih.gov/p13739483/>

Slide 1 (Title slide)

Welcome to this special OLAW seminar entitled “AC and OLAW Perspective on Nonhuman Primate Enrichment and Social Housing”. My name is Jerry Collins and I, along with Susan Silk, director of the OLAW Division of Policy and Education, will moderate this session. This seminar is being presented by the NIH, [Office of Laboratory Animal Welfare](#), the USDA, Animal and Plant Health Inspection Service, [Animal Care](#) and the USDA, [National Agricultural Library], [Animal Welfare Information Center](#). It was recorded June 11th 2010. The speakers will be Dr. Robert Willems, Assistant Regional Director, Eastern

Region, USDA, APHIS, Animal Care, Dr. Axel Wolff, OLAW, Director, Division of Compliance Oversight and Ms. Kristina Adams, Technical Information Specialist, USDA, AWIC. If you have any questions for the USDA please contact your regional office. The phone number for the Eastern Regional office is [919-855-7100] [Email: aceast@aphis.usda.gov]. For the Western office, please call 970-494-7478 [Email: acwest@aphis.usda.gov]. Questions for Dr. Wolff can be sent to olawdco@mail.nih.gov or phone contact at 301-594-2061. Ms. Adams may be contacted at awic@ars.usda.gov. That contact information will be available in the transcript of this recording which can be found at the OLAW website.

Our first speaker is Dr. Willems.

Dr. Willems is currently the Assistant Regional Director for Animal Care in the Eastern Regional Office in Raleigh, NC. In this capacity he supervises the five field supervisors in the Eastern Region as well as Animal Care's non-human primate field specialist. Dr. Willems also represents Animal Care in regional and national meetings and conferences held in this area and around the country.

Dr. Willems graduated from the School of Veterinary Medicine at UC Davis, California in 1982. He was in private veterinary practice for six years and practiced in the states of California, Oregon and Washington, where he worked primarily in mixed animal practices. Dr. Willems has been with APHIS since 1987, having worked as Port Veterinarian for Veterinary Services in San Francisco for one year, and then as a field VMO for Animal Care in Oregon for nine years, after which he moved to the Eastern Region in 1997 to become a field supervisor. Dr. Willems was in charge of APHIS' Horse Protection program for two years from 1999 to 2001, and served as

the Regional Animal Care Specialist for the Eastern Region before taking his current position as the Assistant Regional Director.

Bob, would you please begin your presentation?

Slide 2 (The Animal Welfare Act)

The subject of today's presentation is social housing of nonhuman primates in a research setting. Social housing is as a part of the enrichment program for nonhuman primates required by the [Animal Welfare Act Regulations](#). During this talk, I will be presenting the regulatory requirements for social housing of nonhuman primates and covering the allowable exceptions to that requirement.

As with most subjects, it's always good to start at the beginning. Let's look at where the requirement for an enrichment program for nonhuman primates originated. In 1985 Congress amended the Animal Welfare Act with the passage of the Improved Standards for Laboratory Animals Act. This legislation contained a number of significant changes to the AWA including a requirement for the Secretary of Agriculture to promulgate standards in the regulations addressing the "physical environment adequate to promote the psychological well-being of primates." This last phrase is a quote from the 1985 amendment, and at the time there were few in the research community that understood what that meant or what was being required.

It fell upon the USDA to interpret this legislative requirement and translate it into a workable regulation. And that is what happened.

Slide 3 (AWA Regulations)

After receiving much public comment, the USDA published a [final rule](#) in the Federal Register in 1991 adding [section 3.81](#) to the nonhuman primate standards of the regulations. That section requires regulated facilities having nonhuman primates to address environmental enhancement for their nonhuman primates in order to promote their psychological well-being. This section is, in effect, the USDA's interpretation of the legislative requirement in the 1985 amendment.

The regulation requires that research facilities housing nonhuman primates develop a written plan addressing the promotion of psychological well-being in five different areas. The areas required to be addressed are social grouping, environmental enrichment, special considerations, restraint devices, and exemptions. During this presentation, I'll be discussing one of those areas, social grouping.

Slide 4 (AWA Regulations Section 2.81(a) Social Grouping)

On this slide you'll see a quote of the regulation regarding the social housing of nonhuman primates. As you can see, the regulation requires facilities to address the social needs of nonhuman primates, and in such a way that is in accordance with currently accepted professional standards. This regulation is a typical example of a performance standard in that it does not specify how the social grouping is to be accomplished, but instead refers to a set standards accepted by professionals within the community itself. And, as with other sets of professional standards, they may change over time as knowledge of the subject increases and is refined. And as the accepted standards change, so, too, may the requirement. That could mean that what was once considered acceptable may no longer be.

Slide 5 (Social Grouping: Housing as Enrichment)

Grouping nonhuman primates together in a social housing situation is considered a form of enrichment. In general, social housing can be divided into two major types, group housing and pair housing.

Three or more nonhuman primates housed together constitute a group housing situation. Group housing can be either indoors or outdoors. In some group housing situations a hundred or more animals may be housed within the same enclosure. Such large group housing is most often outdoors, in large open corrals that may be an acre or more in area, or in very large cages.

Nonhuman primates can also be housed indoors in large groups or smaller groups. This can be done in large rooms, or runs similar to dog runs where the animals have access to an outdoor and indoor area within the same enclosure, or in indoor cages. Smaller nonhuman primates such as marmosets are often housed in indoor cages in family groups.

Nonhuman primates are group housed in breeding colonies, in holding facilities, family groups, age groups, or other compatible social groups. In many instances, nonhuman primates can also be group housed while on research studies.

Pair housing is a different type of social housing where two nonhuman primates are housed together. Pair housing is generally indoors, though it may be outdoors as well, and is often done in cages or runs. The paired animals must be compatible with each other. Nonhuman primates that are pair-housed are usually on research studies.

Slide 6 (Social Housing is Required)

It is important to note that housing nonhuman primates in social groups is the requirement of the Animal Welfare Regulations. Anything other than social housing is considered an exception.

Slide 7 (Exceptions)

Regulations allow for exceptions to the social housing requirement for nonhuman primates. Any exceptions should be listed in the facility's environmental enrichment plan for their nonhuman primates. Exceptions for individual animals may be given if the animal is vicious or overly aggressive, is debilitated due to age or some other condition, has a contagious disease, or is incompatible with other animals. There may be other reasons as well, and these should be listed in the written plan with an explanation.

Slide 8 (Exemptions to the Enrichment Plan)

Regulations also allow a facility to exempt individual nonhuman primates from the environmental enrichment plan, either from certain parts of the plan, including social housing, or from the entire plan. Such exemptions can be made by the attending veterinarian or the IACUC of a research facility.

The attending veterinarian may exempt an animal for health reasons or in consideration of its well-being. Exemptions by the attending veterinarian must be reviewed every 30 days unless the conditions for which the exemption was made are permanent.

The IACUC may also exempt individual animals from some, or all, of the enrichment plan. The IACUC can do so for scientific reasons as set forth in a research proposal or protocol. These exemptions must be reviewed at appropriate intervals. Since ongoing research studies must be reviewed at

least annually by the IACUC, exemptions granted for nonhuman primates on the study can be reviewed at that time.

Slide 9 (Annual Report)

All IACUC-approved exceptions and exemptions to the social housing requirement in the regulations for nonhuman primates must be reported on the facility's Annual Report to the USDA as exceptions to the standards. It is not necessary to report exceptions that were granted by the attending veterinarian for health or other reasons. Only those approved by the IACUC for scientific reasons must be reported.

Slide 10 (Single Housing of NHPs)

Single housing of nonhuman primates may be allowed for a research study. The need for singly housing a nonhuman primate on a study must be justified by the Principal Investigator in the research protocol, and the justification must be based on scientific necessity arising from the study. The duration of the single housing must also be specified. This must then be reviewed by the IACUC and approved.

Slide 11 (What is Scientific Necessity?)

But what's scientific necessity? Here's one definition: The need to employ or maintain certain conditions, procedures, practices, etc. in such a way that the results of the research study will be deemed to have scientific validity.

The key concept in this definition is scientific validity. If a PI determines that a particular requirement of the Animal Welfare Regulations and standards, such as the requirement for social grouping of nonhuman primates, would interfere with, reduce, or invalidate the scientific validity of his study, the

IACUC, after careful review and consideration, can grant an exception to that requirement.

Thank you Dr. Willems, our next presentation will be given by Dr. Axel Wolff.

Slide 12 (OLAW Mission Statement)

Dr. Axel Wolff serves as the Director of the Division of Compliance Oversight, OLAW. He had previously served as a Senior Assurance Officer at OLAW. Prior to that, Dr. Wolff was the director of the Veterinary Resources Program, NIH's intramural biomedical research support program. He also directed the NIH animal quarantine facility and served as a veterinary officer at the neurology institute. Dr. Wolff's interest in unique research animals has involved him in work with armadillos, chimpanzees, and fruit bats as well as the more common species. He serves on the editorial board of Lab Animal and has published on various topics including primate enrichment and PHS Policy interpretation.

Axel, would you please begin your presentation?

Thank you Dr. Collins. I will provide the OLAW perspective on social housing for nonhuman primates and environmental enrichment. OLAW oversees the programs of animal care and use at institutions that receive PHS funding for vertebrate animal use. Our Office supports educational programs and works through the contractually based Assurance system which relies on local Institutional Animal Care and Use Committees to self identify and correct instances of noncompliance at the institution and to report these to OLAW.

Slide 13 (PHS Policy)

The [PHS Policy](#) is applicable to animal activities supported by the PHS

agencies which include NIH, CDC, and FDA with NIH providing the majority of grants for biomedical research, much of which relies on animal models. The PHS Policy clearly states that Assured institutions are to comply with the Animal Welfare Act as applicable so everything discussed by Dr. Willems applies to PHS grantees using nonhuman primates.

Slide 14 (*Guide for the Care and Use of Laboratory Animals*)

Assured institutions are to base their animal care and use programs on the provisions of the [Guide for the Care and Use of Laboratory Animals](#) [Guide]. The *Guide* may differ from the USDA regulations in some areas but as mentioned, the PHS Policy requires compliance with the Animal Welfare Regulations. In all instances where *Guide* recommendations differ from the applicable legal or policy requirements, the higher standard shall apply.

Slide 15 (U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training)

The PHS Policy contains the [U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training](#) which are to be followed by institutions which are sponsored by U.S. Government agencies to carry out such testing, research or training. The Principles cover a variety of issues such as appropriate transportation of animals, the rationale for using animals, and personnel training. Two principles relevant to this discussion are IV and VII.

Principle IV states that discomfort, distress, and pain must be minimized. This extends to the potential for any distress that may be experienced by a social animal that is prevented from being housed with a compatible conspecific.

Principle VII states that the living conditions of animals should be appropriate for their species and contribute to their health and comfort. Again, for a social species, housing with a partner or group is appropriate and can contribute to the animals' health and comfort.

Slide 16 (*Guide* Language on Social Housing)

Both the 1996 and 2010 *Guides* address social housing more specifically and in detail. Key statements include:

- Animals should be housed with a goal of maximizing species-specific behaviors.
- For social species, this normally requires housing in compatible pairs or groups.
- When appropriate and compatible with the protocol, social animals should be housed in physical contact with conspecifics.
- Appropriate social interactions among conspecifics are essential for normal development in many species.
- It is desirable that social animals be housed in groups.

Slide 17 (Advantages of Social Housing)

Animals housed in social groups often show less behavioral abnormalities and exhibit behavior typical for the species. They are stimulated to move and exercise, are mentally stimulated, are often less impacted by outside stress, and the young learn from peers and older animals and develop normal social interactions.

Slide 18 (Social Housing Exceptions)

Due to a variety of reasons, not all social primates can or should be housed in social groups. Some individuals are aggressive or incompatible with

members of their species and should not be forced into a situation where an animal could be harmed. Sick animals need to be removed from a social situation to prevent disease spread or to avoid aggressive behavior exhibited by a healthy animal toward a compromised one. Some studies or stages of a study may preclude housing with other animals. Established stable social groups containing compatible individuals and an intact dominance hierarchy have a low risk of aggressive behaviors.

Slide 19 (Exemptions)

A primate may be exempted from the environmental enrichment plan by the institutional veterinarian for health reasons but unless the exemption is permanent it must be reviewed every 30 days. The IACUC may exempt a primate from environmental enrichment or social housing but this must be based on valid scientific justification. IACUCs may base such a decision on a pilot study that provides clear scientific evidence that social housing has a direct negative impact on the proposed work. The IACUC is to take current scientific developments under consideration and not base an exemption on a historical precedent of single housing which was never based in science. Investigator preference or an assertion that the study has always been conducted with singly housed animals and must continue in this fashion does not constitute valid scientific justification. Lack of appropriate caging also does not constitute a valid reason for exempting animals from social housing.

The default method for housing primates is in social groups or in pairs. Clear medical or scientific justification is required for any other method of housing.

Slide 20 (Enrichment)

An animal that is singly housed for a valid reason is to receive other forms of

enrichment such as a diverse cage environment; a balanced diet including a variety of foods; communication with other primates by visual, auditory, or olfactory means; foraging opportunity; toys, swings, or other items that can be manipulated and which are stimulating and used by the animal; and safe interactions with human personnel. The period of single housing should only be for the period necessary and animals are to be socially re-housed at times not precluded by the study requirements.

Slide 21 (IACUC Responsibilities)

IACUCs are to oversee the entire animal care and use program, which includes assessing the behavioral management of animals. The committee is to periodically review the written plans for primate enrichment and to evaluate and monitor the outcomes of the behavioral management such as during the semiannual review. The IACUC is responsible for granting exemptions from enrichment or social housing and is to carefully assess the reasons presented by the investigator. The exemption must be documented in the approved protocol, re-reviewed at least annually, and apply only for the period necessary during the study.

Slide 22 (Criteria for Protocol Review (IV.C.1. of Policy, p 13-14))

The PHS Policy outlines the criteria the IACUC is to review in order to approve a protocol. Studies must minimize pain and distress consistent with sound research design. The standards of the *Guide* and the U.S. Government Principles are to be applied to all activities including the proposed housing of social animals.

Slide 23 (Criteria for Protocol Review, continued)

The PHS Policy further states that the IACUC is to review the living conditions for the species and ensure that they are appropriate. In addition,

the IACUC is to ensure that personnel are appropriately qualified and trained, which includes the individuals providing enrichment and overseeing the grouping of primates.

Slide 24 (Applying the Policy to Primate Studies)

The IACUC is to ensure that individuals that set up pairs or groups initially or, after animals are reintroduced after having been singly housed, are well trained in these activities and can recognize signs of potential aggression among animals. Pain and distress must be minimized, including any stress due to capture and restraint. Animals can be trained to adapt to restraint equipment and several institutions have been successful in training primates in group settings to willingly separate from the group for individual attention.

Slide 25 (The Bottom Line)

The take home message is that humane care and use of research primates includes appropriate social grouping and the promotion of psychological well-being. In fact, the Committee for the update of the *Guide* states in the overview “with respect to non-human primates the Committee endorses social housing as the default...” Addressing the social needs of these animals is a legal, ethical, and moral requirement and ultimately contributes to the overall quality of the research.

Slide 26 (OLAW information and logo)

Thank you, Dr. Wolff. Our final speaker is Ms. Kristina Adams. Kristina began working at the National Agricultural Library's Animal Welfare Information Center (AWIC) in 2003. She received a BS in Zoology from Miami University in 1995 and worked as a large mammal keeper at the Baltimore Zoo (now

the Maryland Zoo in Baltimore) for four years. After leaving the zoo, Ms. Adams pursued a graduate degree in Animal and Avian Sciences from the University of Maryland, College Park. She received an MS after completion of her thesis on the relationship between social and spacing behavior in Scimitar-horned Oryx herds maintained at the National Zoo's Conservation Research Center in Fort Royal, Virginia. After graduating from UMD, she worked as an environmental enrichment technician/ behaviorist at the National Institutes of Health, Veterinary Resources Program for two years before moving to her current position with USDA.

Christina, would you please begin your presentation?

Slide 27 (Finding Information on Social Housing and Environmental Enrichment for Nonhuman Primates)

Thank you, Dr. Collins. Finding information on environmental enrichment and social housing of nonhuman primates is not as straightforward as it might seem. Using the correct terminology, understanding the search interface, and searching appropriate databases or websites are critical in order to locate quality, useful information.

Slide 28 (What Should I Search? Terminology Suggestions)

While we are all familiar with the phrase "environmental enrichment," that doesn't mean that every author, indexer, or website designer uses the same phrase when providing information on the same topic. Some other terms that are frequently used include "environmental enhancement," "enriched housing," "enriched environment," "environmental complexity," and "behavioral enrichment." Note that most systems aren't programmed to understand that typing in behavioral with an "ior" also means that the

international spelling of behavioural (iour) should be picked up. When in doubt, include the alternate spellings of a word!

For environmental enrichment, there are other specific terms that you might be looking for as well, such as manipulanda, foraging boards, or puzzle feeders.

One further note on terminology and search engine interfaces. If you are looking for a phrase such as "environmental enrichment," be sure to include it within quotes. Without the quotes, the search utility usually assumes you want records containing both words, but not necessarily together as a phrase.

Slide 29 (What Should I Search? Terminology Suggestions)

Social housing is another concept that seems straightforward yet is referenced in the literature and online in a variety of ways. Terms that may pull up information of interest include pair housing or group housing or social housing, social environment or social groups, pair formation or group formation, or social isolation or social deprivation.

This type of terminology is also referenced in human literature so I often use the Boolean operator AND to combine these terms with an animal species of interest, such as primates or monkeys.

Once again, if you are looking only for the phrase "social housing," make sure you include it within quotes!

Slide 30 (What Should I Search? Terminology Suggestions)

Training animals to cooperate with procedures is another useful tool for minimizing distress. Some terminology suggestions include positive

reinforcement training, operant conditioning, animal training or training animals, or reinforcement (psychology).

Slide 31 (Where Should I Look?)

Now that you are familiar with useful terminology, we are going to talk about where to go find the information. Today's talk focuses on bibliographic databases and website resources, but there are online discussion groups as well as specific books and journals that may be useful. These will be included in a list of selected resources at the end and available on the website associated with this webinar.

Slide 32 (Databases)

These databases are available for searching to anyone at no charge. I will cover basic information about each one.

Slide 33 (no title – picture of Agricola website)

[Agricola](#) is produced by the National Agricultural Library and available for free to anyone with an internet connection. In addition to thousands of citations on agricultural topics, it includes references to critical laboratory animal publications. You can search Agricola's two databases separately or together.

The [National Agricultural Thesaurus](#) is an online tool for browsing agricultural and biological concepts and terminology. The Thesaurus includes a unique set of terms relevant to animal research and alternatives, including environmental enrichment.

Slide 34 (no title – picture of NAL Thesaurus page)

As one example, the phrase environmental enrichment is used by National

Agricultural Library indexers who add information to Agricola. This is the thesaurus entry for environmental enrichment which provides a definition as well as related terms. There are over 600 citations in Agricola that have been specifically indexed with the phrase “environmental enrichment.”

Slide 35 (no title – picture of PubMed website)

[PubMed](#) or Medline is produced by the National Library of Medicine. It includes more than 19 million records from the biomedical science literature and includes many links to full-text articles.

PubMed uses MeSH (Medical Subject Heading) terminology when indexing records. This controlled vocabulary provides a consistent way to retrieve information that may use different terminology for the same concepts. For example, when you search PubMed for information on “heart attack,” the system maps to other related MeSH terms such as “myocardial infarction.” In other words, PubMed finds related and synonymous terms for you and includes them for you, creating a comprehensive search of your topic.

Unfortunately, there is no MeSH term for the phrase “environmental enrichment” or the phrase “social housing.” Enrichment related articles are indexed inconsistently using a variety of MeSH terminology such as “play and playthings” or “environment, controlled.” The MeSH term “social environment” picks up some of the social housing references but other papers are indexed using “housing, animal” instead. For these topics, include the various phrases addressed in the terminology sections previously in order to pick up more specific references and include these phrases in quotes.

Slide 36 (no title – picture of PrimateLit website)

[PrimateLit](#) is a free database supported by a National Institutes of Health

grant. It is a collaborative project of the Wisconsin and Washington National Primate Research Centers. PrimateLit covers the scientific literature published on nonhuman primates since 1940, including all publication types and many subject areas. "Environmental enrichment" and "social housing" are covered!

Slide 37 (no title – picture of PrimateLit website search page)

In the PrimateLit database, you can search using simple terms, or combine words to make a more complex search statement. In this example, I created two sets of similar terms, using OR between words and containing the similar terms in parentheses, and then ANDed the sets of terms together.

My search was for AT LEAST ONE of the terms (group OR social OR pair) AND AT LEAST ONE of the terms (housing OR housed OR caging). PrimateLit pulled up 929 citations with the most recent articles first. You may want to limit your search to particular years or specific primate species, but you can see that this is an extremely useful database when looking for primate information.

PrimateLit now also provides a FindIt option using OpenURL. This means that if the system is able to recognize your organization (usually based on the IP address of your computer), you will be able to link to the full text of any articles available to you through your institution's subscription program.

Slide 38 (no title – picture of the Animal Welfare Institute website)

The Animal Welfare Institute makes available a freely searchable [database on environmental enrichment for primates](#). The database disseminates information on all aspects of environmental enrichment and refinement of housing and handling conditions of nonhuman primates. It comprises

published articles, abstracts, book chapters, books, as well as published photographs, slide sets, videotapes, and selected website information.

Slide 39 (no title – picture of the Animal Welfare Institute website search page)

In addition to the basic query or search box on the front page, users can choose to search for citations that have been indexed with specific terms. For example, this is a list of citations indexed with the keywords social enrichment, group formations, group introduction, or group integration. Citations are listed in order of the authors' last name.

Slide 40 (Other Databases)

As good as these databases are, they are not the only sources of information. Other bibliographic databases to which your institution may subscribe will also provide citations that may or may not be found in Agricola or PubMed. [Scopus](#), [Biosis](#), [CAB Abstracts](#), [Zoological Record](#), [PsycINFO](#), [Embase](#) and [Web of Science](#) all index biological materials with minimal overlap (depending on the topic). Just as AWIC emphasizes with the search for alternatives, broaden your sources when looking for information whether it is alternatives, enrichment, or your science.

Slide 41 (Website Resources)

I'd now like to review some selected website resources of the many that are available for searching.

Slide 42 (no title – picture of the AWIC website)

One place to start looking for carefully selected materials is on the [AWIC website](#). From the main page, you can access materials on enrichment for

nonhuman primates through broad subject areas on research and zoo animals on the left side of the page.

AWIC has also developed an [Environmental Enrichment for Nonhuman Primates Resource Guide](#) that is available from the homepage.

Slide 43 (no title – picture of the AWIC website)

The current document updates an AWIC document first published in 1992 and updated in 1999. It contains an original article on behavioral management.

The bibliographic chapters are broken out broadly by species. There are also chapters on Abnormal Behavior and Training and links to relevant websites.

Although the document was last published in 2006, the web document is updated whenever relevant citations are located and is thus a living document. The last (as of June 10, 2010) update was in May 2010.

Slide 44 (no title – picture of enrichment booklets)

OLAW published a series of six booklets on enrichment for baboons, capuchins, chimpanzees, macaques, marmosets and tamarins, and squirrel monkeys.

For each species, a description of their physical and behavioral characteristics is followed by information on each species's social and physical worlds and identifies appropriate enrichment for each. The booklets are available for download from the [OLAW website](#).

Slide 45 (no title - picture of the UC Davis Center for Animal Alternatives Information)

The [University of California Davis Center for Animal Alternatives Information](#)

provides a page with links to live searches of Agricola and PubMed on environmental enrichment information, both broadly and also targeted to specific species (including primates). There are also links to full text documents.

Slide 46 (no title – picture of two Disney websites)

Staff at Disney's Animal Kingdom have produced two websites based on their experiences designing [enrichment](#) and [training](#) programs. Both websites provide information on the thought process when designing a program, staff training requirements, and they provide examples for different species.

Slides 47 and 48 (Website Resources)

I am now going to talk about some other Web resources as well as newsletters.

Slide 49 (no title – picture of NC3R website)

The NC3Rs stands for the [National Centre for the Replacement, Refinement and Reduction of Animals in Research](#). It is an independent scientific organization established by the United Kingdom government and is the largest funder of 3Rs research in the UK.

Their website contains an information portal covering many topics relevant to biomedical research using animals. Under the nonhuman primates tab, you'll find links to articles about housing, husbandry, and care. There are also videos of enrichment strategies and links to full text papers and reports.

Slide 50 (no title – picture of the Fort Worth Zoo Enrichment Online website)

The Fort Worth Zoo created a database called [Enrichment Online](#) where

users are able to browse for enrichment ideas by species. The enrichment ideas are submitted by animal keepers and provides such useful information as the materials, cost, and time needed to create and maintain a device as well as any safety concerns. The interface also allows users to provide comments on different enrichment strategies.

Slide 51 (no title – picture of the Laboratory Primate Newsletter website)

The [Laboratory Primate Newsletter](#) has been published quarterly since 1962. All issues (both previous and current) are available online. Although LPN publishes all types of information on the housing and care of laboratory primates, articles on social housing, environmental enrichment, and psychological well-being are linked to on a separate page and have been indexed.

Slide 52 (no title – picture of the Shape of Enrichment website)

The [Shape of Enrichment](#) is another quarterly newsletter. This publication focuses on environmental enrichment for animals. It is geared toward zookeepers, animal care technicians, and other people involved in animal care. You must be a subscriber in order to access the articles, but the website provides information on upcoming events (such as enrichment workshops) and a list of videos available for borrowing.

Slide 53 (no title – picture of the Enrichment Record website)

The [Enrichment Record](#) is a newly launched quarterly e-zine containing articles on enrichment for laboratory animals as well as documenting best practices for implementation and assessment. The Enrichment Record requires a sign-up to receive a free subscription and, in addition to the quarterly issues, it provides a discussion forum for subscribers.

Slide 54 (Questions? awic@ars.usda.gov)

As you can see, there are numerous places to go to find information on ways to implement new enrichment programs, introduce primates to social groups, or train animals to cooperate in procedures. Links to the resources discussed here will be provided at the end. If you have any questions, please contact AWIC.

Thank you, Ms. Adams. We will now have our speakers address questions specific to today's topic.

Slide 55 (Questions about primate social housing?)

Dr. Wolff, what should an institute do when one primate of a pair dies and there are no other partners of that species available? Well, the institution is not required to acquire another primate as a partner in this case the remaining animal should be given extra attention such as complex cage furnishings, safe interactions with staff, foraging opportunities, and food treats as allowable.

Dr. Willems, our institution does not have enough pair house caging. Is that adequate as a justification to single house primates? No. The institution in such a situation must implement a reasonable plan and schedule to acquire the appropriate caging or modify existing caging to use for pair or group housing.

Dr. Wolff, our primates have headcaps and it would be impossible to pair them. What do OLAW and USDA expect in this situation? Both agencies have encountered several research programs that have successfully paired primates with headcaps and found no greater risk of damage to the

devices than in singly housed animals. Institutions are encouraged to communicate with other programs with similar research or to consult the literature or their colleagues for information about best practices that would enable them to achieve social housing.

Dr. Willems, what are examples of acceptable scientific justification for single housing? Well some examples are a study with genuine risk of contagion due to direct contact, a feeding study that requires intake of a specific amount of food per animal, a study in which feces or urine needs to be collected. In cases where animals need to be separated for eating or collection of waste, the animals should be placed back together during the time when that activity is not undertaken.

Dr. Wolff, our IACUC granted approval for single housing in a study. We now realize that the approval was based on the investigator's preference. Continuing the work with singly housed animals was justified by the investigator's argument that to change the housing status during the study would introduce a variable into the study. What should the IACUC do now? This IACUC should not really have approved the study initially but at this time the IACUC needs to place the burden of proof back on the investigator to provide actual scientific justification to show that a variable really will be introduced. This can be done in the form of a pilot study using one or more pair housed groups to determine whether a statistically significant change can really be detected.

Dr. Willems, our investigators are studying a contagious disease and housing the primates separately based on the scientific justification that airborne infection could occur but the animals are in adjacent cages in the same room with others all with the same agent. Is the

justification valid? In this situation, the IACUC needs to have the investigator provide clear evidence of how the agent is transmitted and why an adjacent animal is at less risk in the neighboring cage than when in the same one with a partner. The IACUC may not accept unsubstantiated claims as scientific justification.

Dr. Wolff, we were told that primates must be housed singly in quarantine even if they arrived in the same shipment. Is that true?

There is no requirement for single housing primates in quarantine in the CDC importation requirements, but the housing needs to minimize human exposures. Single housing in quarantine allows for easier identification of problems such as diarrhea and better prevention of exposure to a sick animal. An institution needs explain to CDC in detail how human exposures will be prevented and which procedures will be used when an animal becomes ill, whether primates are housed singly or in pairs during quarantine.

Dr. Willems, several of our adult primates have been determined by our behaviorist to be incapable of pair or group housing. What housing status is acceptable for these animals? In all situations, the highest possible degree of socialization should be provided for nonhuman primates. In your example, the behaviorist should determine if these individuals can be placed next to other animals in caging that provides some level of contact or visual interaction. In some cases an older adult has been successfully paired with a juvenile. In this situation and other cases of singly-housed nonhuman primates, the IACUC is responsible for reviewing the housing status of the animal regularly.

Dr. Wolff, at what point in time will OLAW expect an Assured

institution to be in full compliance with the social housing

requirements? OLAW will expect any Assured institution that is not already in full compliance to develop a reasonable plan and schedule to implement actions that will bring the program into full compliance. If not completed in calendar year 2010, this plan and schedule should be submitted to OLAW with the institution's next Annual Report.

Dr. Willems, other than scientific justification, what other reasons

are acceptable for single-housing nonhuman primates? The only other reason recognized by OLAW and the USDA is an exemption by the attending veterinarian. Unless considered a permanent condition, the exemption must be reviewed by the attending veterinarian every 30 days. The attending veterinarian should consult with a program's behaviorist if available to determine the status of animals exempted from social housing for behavioral reasons.

And our final question, **Ms. Adams, what will happen, or would happen**

if one of the URLs is not functioning properly? Well, many times the URLs do break. The AWIC staff checks links monthly and all links will be up to date and currently active on the AWIC website.

All right, well, thank you to the three of you for providing guidance on this very important topic. And also thanks to you, the listener for your interest in it. Remember that if you have questions for our speakers, their contact information will be available in the transcript of this recording which can be found on the OLAW website. Thank you again for your interest. This is the end of this special webinar which was recorded on June 11th 2010.

RESOURCES

NIH, Office of Laboratory Animal Welfare -

<http://grants.nih.gov/grants/olaw/olaw.htm>

USDA, Animal and Plant Health Inspection Service, Animal Care -

http://www.aphis.usda.gov/animal_welfare/

USDA, National Agricultural Library, Animal Welfare Information Center -

http://awic.nal.usda.gov/nal_display/index.php?info_center=3&tax_level=1

Animal Welfare Act Regulations -

http://awic.nal.usda.gov/nal_display/index.php?info_center=3&tax_level=3&tax_subject=182&topic_id=1118&level3_id=6735

PHS Policy - <http://grants.nih.gov/grants/olaw/references/phspol.htm>

Guide for the Care and Use of Laboratory Animals -

http://www.nap.edu/catalog.php?record_id=12910

U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training -

<http://grants.nih.gov/grants/olaw/references/phspol.htm#USGovPrinciples>

Agricola - <http://agricola.nal.usda.gov/>

National Agricultural Thesaurus - <http://agclass.nal.usda.gov/>

PubMed - <http://www.ncbi.nlm.nih.gov/pubmed/>

PrimateLit - <http://primatelit.library.wisc.edu/>

Animal Welfare Institute: Environmental Enrichment for Primates database -

<http://labanimals.awionline.org/SearchResultsSite/enrich.aspx>

Scopus - <http://www.scopus.com/>

Biosis - http://thomsonreuters.com/products_services/science/science_products/a-z/biosis_previews

CAB Abstracts - <http://www.cabi.org/default.aspx?site=170&page=1016&pid=125>

Zoological Record -

http://thomsonreuters.com/products_services/science/science_products/a-z/zoological_record

PsycINFO - <http://www.apa.org/pubs/databases/psycinfo/index.aspx>

Embase - <http://www.embase.com/home>

Web of Science -

http://thomsonreuters.com/products_services/science/science_products/a-z/web_of_science

AWIC: Environmental Enrichment for Nonhuman Primates Resource Guide - <http://www.nal.usda.gov/awic/pubs/Primates2009/primates.shtml>

University of California Davis: Center for Animal Alternatives Information - http://www.vetmed.ucdavis.edu/Animal_Alternatives/enrich.htm

Disney's Animal Kingdom: Animal Enrichment - <http://www.animalenrichment.org/>

Disney's Animal Kingdom: Animal Training - <http://www.animaltraining.org/>

National Centre for the Replacement, Refinement and Reduction of Animals in Research - <http://www.nc3rs.org.uk/>

Fort Worth Zoo: Enrichment Online database - <http://www.enrichmentonline.org/browse/index.asp>

Laboratory Primate Newsletter - <http://www.brown.edu/Research/Primate/>

The Shape of Enrichment - <http://www.enrichment.org/>

The Enrichment Record - <http://www.gr8tt.com/enrichrecord.html>