

Performance standard:

Principal investigators must demonstrate that they actively searched for alternatives to procedures that may cause animal pain or distress, prior to ACUP approval.

Those alternatives are discussed in the ACUP—how they will be used in the study, or if they cannot be used, why this must be.

To answer Q. 12 of the ACUP form, include:

- Date of search
- Time period covered by search
- Database name(s)
- Search strategy used—at minimum, list key words and phrases used
- Briefly discuss each “R” separately. Address what alternatives are used, and if some are not used, why this is so.
 - Replacement:
 - Reduction:
 - Refinement:

Definitions:

- **Alternatives:** an aspect of replacement, reduction and/or refinement applied to minimize animal pain and distress, consistent with research goals.
- **Refinement:** ways to reduce animal pain and/or distress within the study.
- **Reduction:** ways to reduce the number of animals that are used for the study.
- **Replacement:** ways to remove animals from the research to achieve scientific goals.
- **Literature Search:** specific requirement of [USDA/APHIS Policy #12](#). Implied requirement of the U.S. Government Principles, OLAW and The Guide.
 - Can be used in conjunction with expert consultations, workshops, and other sources to demonstrate research beyond the investigator’s laboratory, for additional and comparative information prior to starting work with animals.
- **Key words:** words that are specific to the study. They describe both the animals and aspects of the research that may cause pain or distress.
- **Databases:** electronic publication collections. There are many that cover specific subject areas. It’s unlikely that one database will have all alternatives related to a study.

Guidelines:

- Consider contacting an Oregon State University science librarian and/or the [OSU Libraries site](#) to assist with a search. Many databases are available here.
- Useful alternatives websites include the UC-Davis [Center for Animal Alternatives](#), Johns Hopkins [Altweb](#), and USDA’s [AWIC](#). These sites have useful examples and sample searches, collections of databases, and step-by-step directions on how to perform a search that addresses the 3Rs.
- Choose relevant databases. One database is often considered insufficient.
 - PubMed/MEDLINE—uses Medical Subject Headings (MeSH) to facilitate searches, good for biomedical research. Exists on multiple platforms, so search algorithms can vary.

- AGRICOLA (NAL)—good start for wildlife, zoology, veterinary medicine, agriculture, behavior, animal sciences, and contains a thesaurus to aid in alternative searches. Exists on multiple platforms.
- Other databases can contain unique information. Examples: Fish, Fisheries & Aquatic Biodiversity Worldwide, Biosis Previews, CAB Abstracts, Zoological Records, EMBASE, Web of Science, SciVerse Scopus
- List relevant subject terms and keywords. Consider synonyms and alternate spellings.
 - Species, strain
 - Anatomy or tissue involved
 - Chemical compound names—generic and proper
 - Names of experimental procedures or techniques
 - Alternative search terms should be relevant to the study and can include the following: analgesic, anesthetic, pain, distress, suffer, enrichment, animal model, experimental design, and simulation, among others.
- Use features such as “and”, “or”, and “not” when using word strings. Word truncation and using quotes to search for a particular phrase can be helpful.
- Save the search so it can be used again or refined as necessary.
- Consider registering with the database to receive updates on certain searches—sometimes these can be set up as RSS feeds, and using bibliographic software such as EndNote, Zotero, etc.
- Collect and review appropriate publications to determine which, if any, alternatives will work for the study.
- Answer Q. 12 in the ACUP.

References:

- Nesdill D, Adams KM. Literature search strategies to comply with institutional animal care and use committee review requirements. J Vet Med Educ. 2011; 38(2): 150-156.
- USDA/NAL FAQ: [Why Conduct Literature Searches for Alternatives?](#)