

Searching for Animal Research Methodology: The Potential Impact of Differences Between the PubMed Record and Full-Text Methods Section



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BACKGROUND

- Large animal protocols submitted to Institutional Animal Care and Use Committees (IACUCs) are required to include searches for alternatives, and address the “3Rs”:
- Refinement: use methodology and protocols that reduce pain and distress
- Replacement: substitute animals with non-animal models or lower species
- Reduction: minimize the number of animals
- Locating descriptions of methodology for the refinement concept is challenging since PubMed (and most other databases) do not search full-text.

OBJECTIVES

- Determine how well the title/abstract (T/A) and MeSH terms cover the content of the methods section in in-vivo animal research articles.
- Describe how coverage might impact a search.

METHODS

Process

- PubMed Search**
n = 484
- Rhesus monkey AND commonly abused substances
- Limits: English, last 10 years, MEDLINE, & “has abstract”
- Screen Articles**
n = 96
- 1 reviewer/article
- Articles randomized for screening
- EXCLUDE if: no full methods, faulty PDF, no rhesus, additional animal used, studying other drugs
- Data Collection**
n = 64
- 2 reviewers/article
- 2nd reviewer an animal research ‘expert’
- Analysis**
n = 64
- Statistical consult
- Analyze MeSH

Data Collection Details

A data collection form was created in DistillerSR (Evidence Partners, Ottawa, Canada)

Data was collected on details such as:

- animal model
- animal housing conditions
- ethical statement provided
- procedures conducted in vivo

Procedures

Select or enter the major procedures described in each of the following: (check all that apply)
Do not include anesthesia/analgesia. For MeSH, copy and paste all of the relevant terms for a particular response in the box.

6. In the Title/Abstract.	7. In the Methods.	8. In MeSH.
<input type="checkbox"/> Catheterization	<input checked="" type="checkbox"/> Catheterization	<input type="checkbox"/> Catheterization
<input type="checkbox"/> Inoculation	<input type="checkbox"/> Inoculation	<input type="checkbox"/> Inoculation
<input type="checkbox"/> Lavage	<input type="checkbox"/> Lavage	<input type="checkbox"/> Lavage
<input type="checkbox"/> Restraint, Physical	<input type="checkbox"/> Restraint, Physical	<input type="checkbox"/> Restraint, Physical
<input checked="" type="checkbox"/> Conditioning	<input checked="" type="checkbox"/> Conditioning	<input checked="" type="checkbox"/> Conditioning
<input checked="" type="checkbox"/> Drug administration (not self)	<input checked="" type="checkbox"/> Drug administration (not self)	<input type="checkbox"/> Drug administration (not self)
<input type="checkbox"/> Drug discrimination testing	<input type="checkbox"/> Drug discrimination testing	<input type="checkbox"/> Drug discrimination testing
<input type="checkbox"/> Drug withdrawal	<input type="checkbox"/> Drug withdrawal	<input type="checkbox"/> Drug withdrawal
<input checked="" type="checkbox"/> Self-administration of drugs	<input checked="" type="checkbox"/> Self-administration of drugs	<input checked="" type="checkbox"/> Self-administration of drugs
<input type="checkbox"/> Behavioral testing	<input type="checkbox"/> Behavioral testing	<input type="checkbox"/> Behavioral testing
<input type="checkbox"/> Biopsy	<input type="checkbox"/> Biopsy	<input type="checkbox"/> Biopsy
<input type="checkbox"/> Fluid collection	<input checked="" type="checkbox"/> Fluid collection	<input type="checkbox"/> Fluid collection
<input checked="" type="checkbox"/> Imaging	<input checked="" type="checkbox"/> Imaging	<input checked="" type="checkbox"/> Imaging
<input type="checkbox"/> Neurophysiological procedure	<input type="checkbox"/> Neurophysiological procedure	<input type="checkbox"/> Neurophysiological procedure
<input type="checkbox"/> Nociception assay (pain test)	<input type="checkbox"/> Nociception assay (pain test)	<input type="checkbox"/> Nociception assay (pain test)
<input type="checkbox"/> Physiologic monitoring	<input type="checkbox"/> Physiologic monitoring	<input type="checkbox"/> Physiologic monitoring
<input type="checkbox"/> Euthanasia	<input type="checkbox"/> Euthanasia	<input type="checkbox"/> Euthanasia
<input type="checkbox"/> Other	<input type="checkbox"/> Other	<input type="checkbox"/> Other
<input type="checkbox"/> None	<input type="checkbox"/> None	<input type="checkbox"/> None

A codebook was created to assist with inter-reviewer reliability.

RESULTS

Figure 1. Procedures in the Title/Abstract and MeSH Compared to the Article's Methods

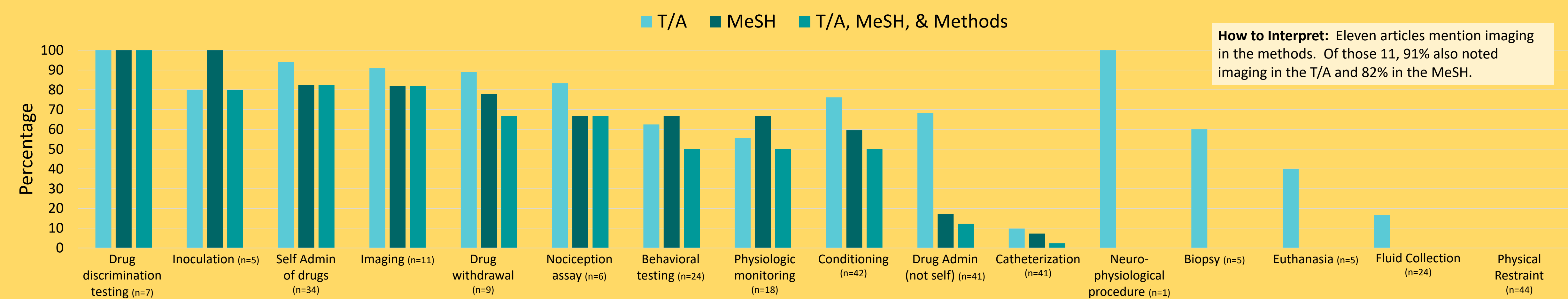


Figure 2. Animal Name Use Across Article Components

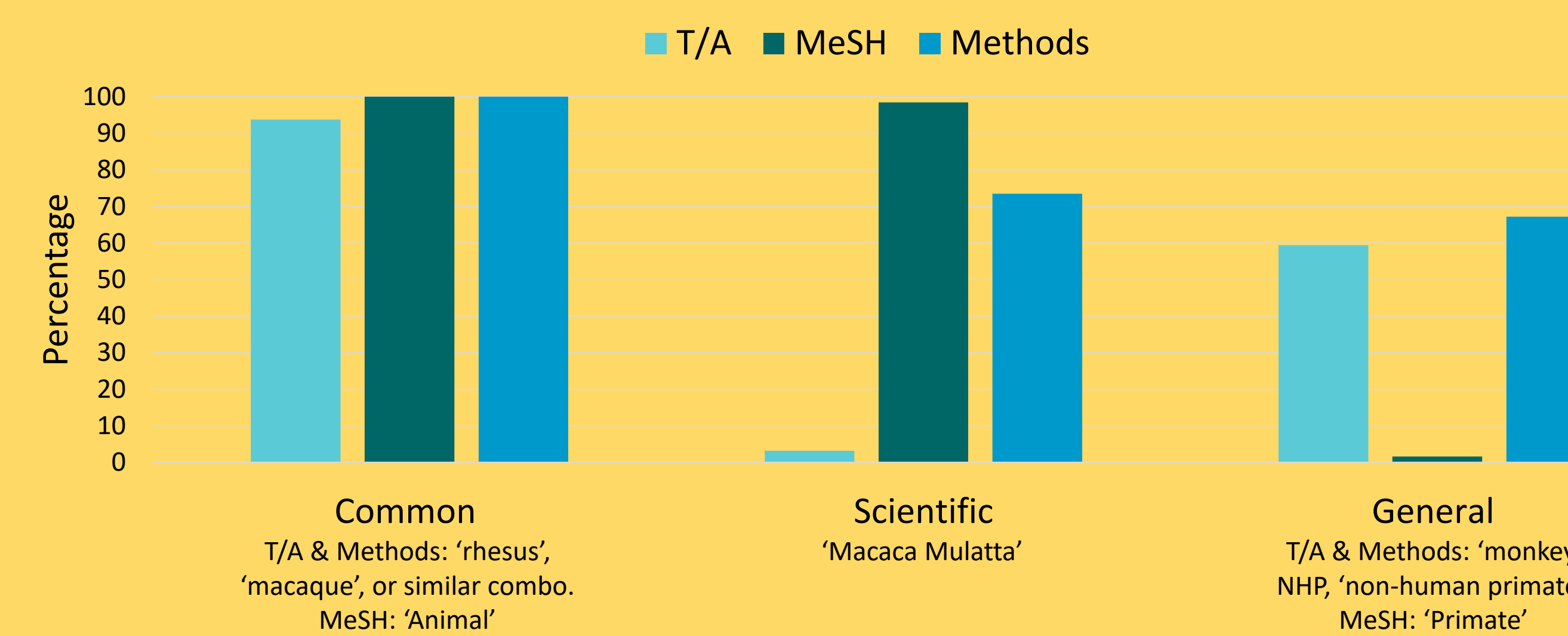
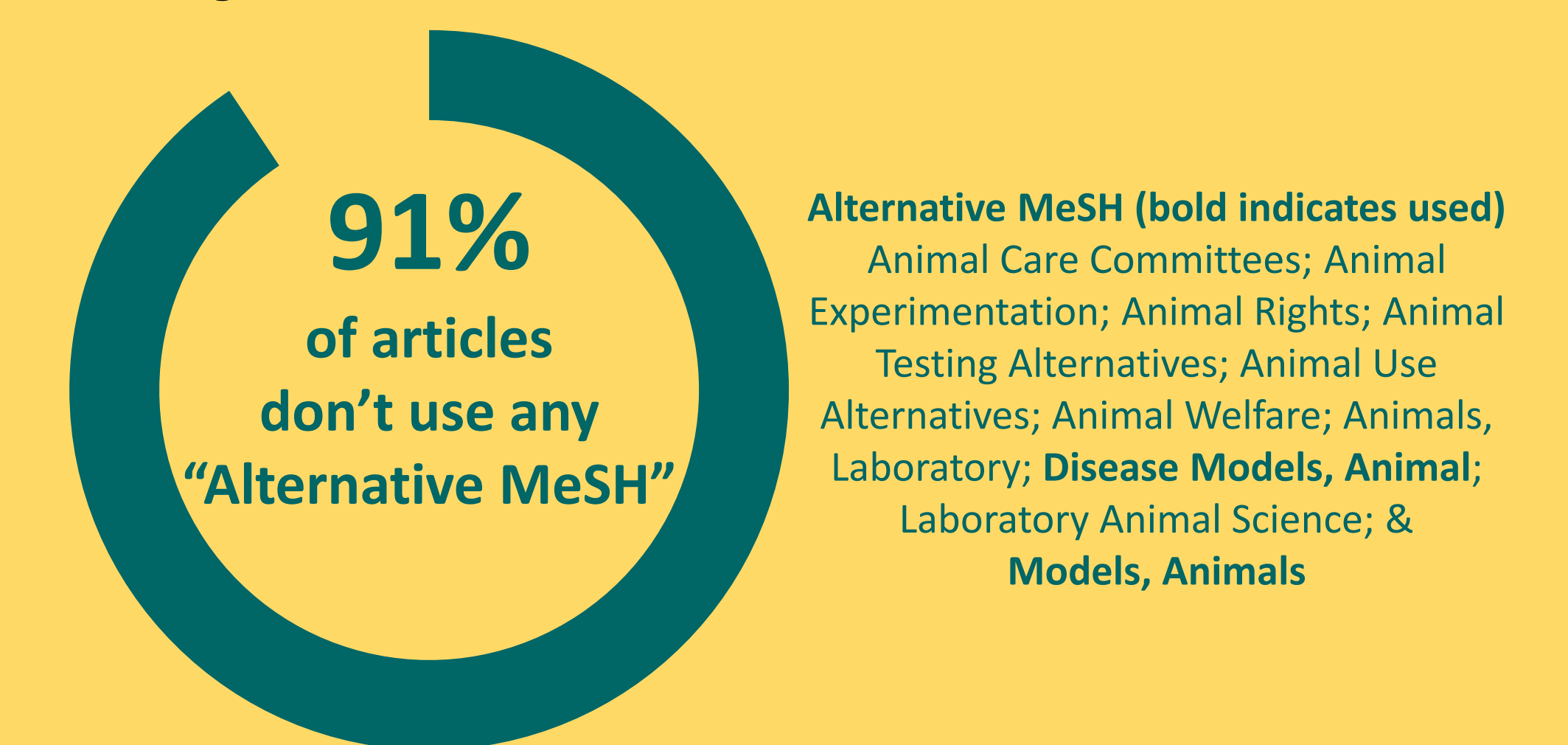


Figure 3. Alternative MeSH



Findings

- Overall, procedures described in the Methods section were described less in T/A (64%), MeSH (45%), and in all 3 components (40%).
- Procedure coverage varied in the T/A and MeSH. Routine procedures like biopsy, euthanasia, fluid collection, and restraint were mentioned less frequently in the T/A and never in MeSH (Fig 1).
- A common animal name was used most frequently, and in the T/A of 94% of articles (Fig 2).
- The scientific name was assigned as a MeSH term in 98% of articles (Fig 2).
- MeSH term ‘Animals’ assigned to 100% of articles (Fig 2).
- MeSH term ‘Humans’ assigned to 3.1% of articles.
- 91% of articles did not use any “Alternative MeSH” (Fig 3).
- The subheading ‘Methods’ was rarely used and ‘Instrumentation’ was never used.
- 78% of article’s methods cited another article for full details of procedures.
- Analgesia/anesthesia was only mentioned in the methods section of the articles, not in the T/A or MeSH.

Potential Impacts & Recommendations for Searching

- Search for and review full-text of articles and protocols reporting similar methods to identify options for refinement and reduction.
- Search by combining the species specific MeSH term and keywords for the common animal name.
 - i.e. (“Macaca Mulatta”[Mesh] OR rhesus[tiab])
- Focus search with "Animals"[MeSH] NOT "Humans"[MeSH] or "Animals"[MeSH:NoExp].
- Search queries using “Alternative MeSH” terms may not retrieve articles describing options for refinement and/or reduction.
- Be cautious when using subheadings with procedures terms as they may severely limit the number of relevant articles retrieved.
- Even if the full-text is searched, important details may be missing; be prepared to consult additional articles that did not appear in the original search results.
- Review full-text of articles to find information about analgesia/anesthesia.

This poster presents preliminary results of a pilot study.