Artificial Intelligence Review Committee (AIRC)

Animal Research - Enhanced Rubric

Version: 2.0 (December 2025)

Use this rubric for: High-risk, novel, or complex animal research using experimental AI tools or AI-controlled interventions.

**Administrative Information**

| **Field** | **Information** |
| --- | --- |
| Protocol Number | [blank line] |
| Principal Investigator | [blank line] |
| Project Title | [blank line] |
| Date of Review | [blank line] |
| AIRC Reviewer(s) | [blank line] |
| AI Tool/Model Name and Version | [blank line] |
| Intended Use | [blank line] |
| Animal Species | [blank line] |
| IACUC Status | ☐ New ☐ Modification ☐ Continuing Review |
| Risk Level | ☐ High ☐ Novel Algorithm ☐ AI-Controlled Intervention |

**Instructions for Reviewers**

* Complete all applicable domains using 1-4 scale
* Use N/A with justification if the item does not apply
* Select "Insufficient Documentation" if unable to score
* Critical Rule: Score of 1 in any domain = "Not Acceptable"

**Domain 1: Data/Method Validity**

Purpose: Ensure AI methods are scientifically rigorous and appropriate.

Checklist Items

1.1 Is the AI methodology appropriate for the research question and animal model?

1.2 Are data sources clearly documented and appropriate?

1.3 Are model performance metrics relevant and validated?

1.4 Is there evidence that the AI approach is justified over alternatives?

1.5 Are data quality, preprocessing, and analysis methods described?

Scoring Criteria

| **Score** | **Description** |
| --- | --- |
| 4 - Exemplary | AI methodology optimally matched with detailed rationale, complete data provenance with quality metrics, performance exceeds field standards with external validation, clear evidence of AI superiority, comprehensive methods documentation |
| 3 - Proficient | AI approach appropriate and justified, data sources documented, performance metrics acceptable, scientific rationale provided, methods adequately described |
| 2 - Basic | AI method applicable but with a limited rationale, data sources identified but incomplete, limited validation, weak justification versus alternatives, and a basic description of methods description |
| 1 - Deficient | AI approach unsuitable for research question, poor data quality or undocumented sources, missing performance metrics, no scientific justification, insufficient methods |

Reviewer Assessment

| **Item** | **Rating** | **Comments** |
| --- | --- | --- |
| Domain 1 Score (1-4) | [blank] | [blank area for detailed comments] |
| ☐ N/A - Justification: |  |  |
| ☐ Insufficient Documentation |  |  |

**Domain 2: Justification for AI Use / Appropriateness of Model**

Purpose: Ensure AI use is necessary, appropriate, and adds value.

Checklist Items

2.1 Is there clear justification for why AI is needed?

2.2 Is the AI model appropriate for the animal species and context?

2.3 Are limitations of the AI approach acknowledged?

2.4 Is the level of complexity appropriate?

2.5 Are alternative (non-AI) approaches considered and ruled out?

Scoring Criteria

| **Score** | **Description** |
| --- | --- |
| 4 - Exemplary | Compelling evidence-based rationale for AI necessity, model optimally suited to species and context, limitations comprehensively discussed with mitigation, appropriate complexity with justification, thorough comparison demonstrating AI advantage |
| 3 - Proficient | AI necessity explained, model appropriate for species and context, key limitations acknowledged, complexity appropriate, alternative approaches considered |
| 2 - Basic | Limited AI necessity explanation, model marginally appropriate, limited limitations discussion, complexity concerns, minimal alternative consideration |
| 1 - Deficient | AI use not justified, model inappropriate for species/context, no limitations discussion, inappropriate complexity, no consideration of alternatives |

Reviewer Assessment

| **Item** | **Rating** | **Comments** |
| --- | --- | --- |
| Domain 2 Score (1-4) | [blank] | [blank area for detailed comments] |
| ☐ N/A - Justification: |  |  |
| ☐ Insufficient Documentation |  |  |

**Domain 3: Animal Welfare & the 3Rs**

Purpose: Ensure animal welfare is protected and 3Rs are appropriately applied.

Checklist Items

3.1 Does AI use support Replacement (using non-animal alternatives)?

3.2 Does AI use support Reduction (minimizing animal numbers)?

3.3 Does AI use support Refinement (minimizing pain/distress)?

3.4 Are animal handling, housing, and care procedures appropriate?

3.5 Is there appropriate veterinary oversight and welfare monitoring?

Scoring Criteria

| **Score** | **Description** |
| --- | --- |
| 4 - Exemplary | AI demonstrably advances replacement strategies, achieving significant reductions in animal numbers while maintaining validity, clear refinement benefits, minimizing distress, enhancing welfare monitoring through AI capabilities, and implementing a comprehensive veterinary oversight plan. |
| 3 - Proficient | AI contributes to one or more 3Rs principles, reasonable animal numbers justification, documented refinement benefits, standard welfare procedures in place, and appropriate veterinary oversight. |
| 2 - Basic | Limited 3Rs impact, animal numbers justified, but no clear reduction, minimal refinement benefits, basic welfare procedures, standard veterinary oversight |
| 1 - Deficient | No 3Rs consideration despite opportunities, excessive animal numbers, no refinement benefits or increased distress risk, inadequate welfare procedures, insufficient veterinary oversight |

Reviewer Assessment

| **Item** | **Rating** | **Comments** |
| --- | --- | --- |
| Domain 3 Score (1-4) | [blank] | [blank area for detailed comments] |
| ☐ N/A - Justification: |  |  |
| ☐ Insufficient Documentation |  |  |

**Domain 4: Minimization of Harm from AI-Driven Interventions or Analytics**

Purpose: Ensure AI-driven procedures or decisions do not cause unnecessary harm.

Checklist Items

4.1 Are risks from AI-driven interventions identified and minimized?

4.2 If AI controls or influences procedures, are safety mechanisms in place?

4.3 Is there appropriate human oversight of AI-driven decisions?

4.4 Are potential AI errors or malfunctions considered with contingencies?

4.5 Is there monitoring for unexpected harm or adverse outcomes?

Scoring Criteria

| **Score** | **Description** |
| --- | --- |
| 4 - Exemplary | All AI-related risks are thoroughly identified and mitigated through multi-layered safety mechanisms for AI-controlled procedures, strong human oversight with clear intervention protocols, comprehensive error analysis with detailed contingencies, and active monitoring with defined response procedures. |
| 3 - Proficient | Major AI risks identified, safety mechanisms in place for critical procedures, human oversight defined, error scenarios considered with basic contingencies, and a monitoring plan documented |
| 2 - Basic | Some AI risks identified, limited safety mechanisms, vague human oversight, minimal error consideration, and basic monitoring are mentioned |
| 1 - Deficient | AI risks not identified; no safety mechanisms; no human oversight; no error contingencies; no monitoring plan. |

Reviewer Assessment

| **Item** | **Rating** | **Comments** |
| --- | --- | --- |
| Domain 4 Score (1-4) | [blank] | [blank area for detailed comments] |
| ☐ N/A - Justification: |  |  |
| ☐ Insufficient Documentation |  |  |

**Domain 5: Risk Assessment & Transparency**

Purpose: Ensure AI use is transparent, reproducible, and appropriately documented.

Checklist Items

5.1 Is the AI algorithm, version, and rationale clearly documented?

5.2 Are model performance metrics and validation results reported?

5.3 Is there a plan for version control and algorithm updates?

5.4 Are methods sufficiently transparent to support reproducibility?

5.5 Is there appropriate data security and management?

Scoring Criteria

| **Score** | **Description** |
| --- | --- |
| 4 - Exemplary | Algorithm fully specified with version control, performance metrics thoroughly reported with validation evidence, formal change management procedures, complete methods enabling replication, and enterprise-grade data security |
| 3 - Proficient | Algorithm and version documented with rationale, performance metrics reported, version tracking in place, methods adequately described for reproducibility, and appropriate data security. |
| 2 - Basic | Algorithm identified with limited detail, basic performance metrics, minimal version control, methods description incomplete, basic data security |
| 1 - Deficient | Algorithm unclear, missing performance metrics, no version control, methods inadequate for reproduction, inadequate data security. |

Reviewer Assessment

| **Item** | **Rating** | **Comments** |
| --- | --- | --- |
| Domain 5 Score (1-4) | [blank] | [blank area for detailed comments] |
| ☐ N/A - Justification: |  |  |
| ☐ Insufficient Documentation |  |  |

**Final Score Calculation and Recommendation**

Score Summary

| **Domain** | **Score (1-4)** |
| --- | --- |
| Domain 1: Data/Method Validity | [blank] |
| Domain 2: Justification for AI Use | [blank] |
| Domain 3: Animal Welfare & 3Rs | [blank] |
| Domain 4: Minimization of Harm | [blank] |
| Domain 5: Risk Assessment & Transparency | [blank] |
| Total Score (Range: 5-20) | [blank] |

**Critical Deficiency Rule**

| **Check if applicable** |  |
| --- | --- |
| ☐ One or more domains scored 1 | *(If checked, Final Recommendation MUST be "NOT ACCEPTABLE")* |

**Final Recommendation**

Select One:

☐ ACCEPTABLE - Forward to IACUC with approval recommendation

☐ MODIFICATIONS REQUIRED - Return to submitter with feedback below

☐ NOT ACCEPTABLE - Reject; major revision required

Required Modifications (if applicable):

1. [blank line]
2. [blank line]
3. [blank line]

**Overall Summary**

Strengths:

[Large blank area]

Concerns:

[Large blank area]

Additional Comments:

[Large blank area]

Signatures

| **Role** | **Signature** | **Date** |
| --- | --- | --- |
| Reviewer | [blank line] | [blank line] |
| AIRC Chair/Designee | [blank line] | [blank line] |