# The ARRIVE Guidelines Checklist

**Animal Research: Reporting In Vivo Experiments**

Carol Kilkenny¹, William J Browne², Innes C Cuthill³, Michael Emerson⁴ and Douglas G Altman⁵

¹The National Centre for the Replacement, Refinement and Reduction of Animals in Research, London, UK, ²School of Veterinary Science, University of Bristol, Bristol, UK, ³School of Biological Sciences, University of Bristol, Bristol, UK, ⁴National Heart and Lung Institute, Imperial College London, UK, ⁵Centre for Statistics in Medicine, University of Oxford, Oxford, UK.

| ITEM | RECOMMENDATION | Section/Paragraph |
|------|----------------|-------------------|
| Title | 1 Provide as accurate and concise a description of the content of the article as possible. | Title |
| Abstract | 2 Provide an accurate summary of the background, research objectives, including details of the species or strain of animal used, key methods, principal findings and conclusions of the study. | Abstract |
| INTRODUCTION | | |
| Background | 3 a. Include sufficient scientific background (including relevant references to previous work) to understand the motivation and context for the study, and explain the experimental approach and rationale.  
   b. Explain how and why the animal species and model being used can address the scientific objectives and, where appropriate, the study’s relevance to human biology. | Paragraphs 1-3, Paragraphs 2-3 |
| Objectives | 4 Clearly describe the primary and any secondary objectives of the study, or specific hypotheses being tested. | Paragraph 4 |
| METHODS | | |
| Ethical statement | 5 Indicate the nature of the ethical review permissions, relevant licences (e.g. Animal [Scientific Procedures] Act 1986), and national or institutional guidelines for the care and use of animals, that cover the research. | Paragraph 1 |
| Study design | 6 For each experiment, give brief details of the study design including:  
   a. The number of experimental and control groups.  
   b. Any steps taken to minimise the effects of subjective bias when allocating animals to treatment (e.g. randomisation procedure) and when assessing results (e.g. if done, describe who was blinded and when).  
   c. The experimental unit (e.g. a single animal, group or cage of animals).  
   A time-line diagram or flow chart can be useful to illustrate how complex study designs were carried out. | Paragraphs 2-3, Paragraphs 2-3, Paragraphs 2-3 |
| Experimental procedures | 7 For each experiment and each experimental group, including controls, provide precise details of all procedures carried out. For example:  
   a. How (e.g. drug formulation and dose, site and route of administration, anaesthesia and analgesia used [including monitoring], surgical procedure, method of euthanasia). Provide details of any specialist equipment used, including supplier(s).  
   b. When (e.g. time of day).  
   c. Where (e.g. home cage, laboratory, water maze).  
   d. Why (e.g. rationale for choice of specific anaesthetic, route of administration, drug dose used). | Paragraphs 2-3, N/A, N/A, Paragraphs 2-3 |
| Experimental animals | 8 a. Provide details of the animals used, including species, strain, sex, developmental stage (e.g. mean or median age plus age range) and weight (e.g. mean or median weight plus weight range).  
   b. Provide further relevant information such as the source of animals, international strain nomenclature, genetic modification status (e.g. knock-out or transgenic), genotype, health/immune status, drug or test naïve, previous procedures, etc. | Paragraph 2, Paragraph 2 |

The ARRIVE guidelines. Originally published in *PLoS Biology*, June 2010¹
| Section                          | Paragraphs | Notes |
|---------------------------------|------------|-------|
| Housing and husbandry          | Paragraph 1|       |
|                                 | Paragraph 1|       |
|                                 | Paragraph 1|       |
| Sample size                     | Paragraph 2-3|       |
|                                 | Paragraph 2-3|       |
|                                 | N/A        |       |
| Allocating animals to           | Paragraphs 2-3|       |
| experimental groups             | N/A        |       |
| Experimental outcomes           | Paragraphs 2-3|       |
|                                 | Paragraph 2-3|       |
|                                 | N/A        |       |
| Statistical methods             | Paragraph 11|       |
|                                 | Paragraph 11|       |
|                                 | Paragraph 11|       |
| RESULTS                         | Methods Paragraphs 2-3|       |
|                                 | Figures 2, 5|       |
| Baseline data                   | Methods Paragraphs 2-3|       |
| Numbers analysed                | Methods Paragraphs 2-3|       |
| Outcomes and estimation         |          |       |
| Adverse events                  | N/A       |       |
| DISCUSSION                      | Throughout|       |
|                                 | Paragraphs 1-3|       |
|                                 | N/A        |       |
| Interpretation/scientific       |          |       |
|                                 |            |       |
| Generalisability/translation    |          |       |
|                                 |            |       |
| Funding                         | Included separately|       |

References:
1. Kilkenny C, Browne WJ, Cuthill IC, Emerson M, Altman DG (2010) Improving Bioscience Research Reporting: The ARRIVE Guidelines for Reporting Animal Research. PLoS Biol 8(6): e1000412. doi:10.1371/journal.pbio.1000412
2. Schulz KF, Altman DG, Moher D, the CONSORT Group (2010) CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials. BMJ 340:c332.