

Inclusion of Policies on Ethical Standards in Animal Experiments in Biomedical Science Journals

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Most published biomedical research involving animal models is evaluated carefully to ensure that appropriate ethical standards are met. In the current study, 500 journals randomly selected from MedLine were assessed for whether they presented animal research. Of the 138 journals that did, the instructions to authors of 85 (61.6%) included a requirement for author assurance of adherence to ethical standards during experiments involving animals. In comparison to a wider range of biologic journals, biomedical science journals were more likely to have some sort of ethical policy concerning the reporting and presentation of animal experiments.

Animals play an important part in biomedical research, and much discussion concerns the ethical considerations of using animals in research.^{4,26} Most published biomedical research involving animal models now is regulated at local or national levels to ensure that appropriate ethical standards are met. However, the reported results of experimental research may obscure or lack details of the associated ethical considerations. Several journals³ now require a description of animal care and handling within experimental protocols, but the degree of detail required differs greatly among journals.^{1,5,29} Although including ethical information may be important for scientific purposes,^{23,30} some authors regard mandating this inclusion as yet another element of bureaucracy involved with the process of presenting results.¹⁵ This attitude suggests that authors hold diverse views about whether ethical information should be included in their manuscripts, and what level of detail is required. If a submitted manuscript lacks any details of the ethical processes involved in the research, should the editor and referees determine whether the work conforms to appropriate standards? Furthermore, if a published paper is later demonstrated to have fallen short of accepted ethical standards, should any of the responsibility for the publication of that work fall on the editor or referees?²⁴

Mandating that authors confirm that experiments involving animals conform to a defined set of ethical guidelines is the minimal requirement a journal can make to ensure some ethical consideration of the experiments described. Assuming this minimal benchmark acknowledges that authors are aware of the ethical dimensions of their work and informs readers that these are being considered. In addition, ensuring that ethical guidelines are met might protect editors and referees from the repercussions of publishing unsound studies. However, many journals do not mandate even this minimal level of information. A recent study²⁹ encompassing a wide range of biologic journals showed that only 40.7% of those publishing work involving animals had a predefined ethical requirement. The cited study²⁹

was deliberately broad in its coverage (using titles listed on Web of Science and the Directory of Open Access Journals²²), and different disciplines may mandate different types of ethical consideration. Another study²⁷ considering a range of titles harvested from PubMed showed that 53% of titles had some sort of ethical policy.

These previous studies^{27,29} covered a wide selection of biologic disciplines, encompassing broad differences regarding the invasiveness of the procedures to which animals might have been treated. For example, one previous study²⁹ considered many field biology journals, in which reported research typically (but certainly not always⁷) involves minimally invasive procedures on studied animals. Work within the biomedical sciences frequently involves some of the most invasive procedures permitted during experiments on animals. Therefore journals seen as core to biomedical research should be more likely to require some level of ethical policy regarding animal experimentation. Assuming that the resource MedLine is a fair representation of those journals that can be seen as core to the biomedical sciences, I assessed the extent to which ethics in animal experiments were considered by these journals. In particular, rather than focusing on whether a particular journal based its ethical stance on specific criteria laid down by either national or international entities or by the ethical review bodies of the institution at which the research was conducted, the current study simply considered whether a journal stated any form of ethical benchmark defined by the publisher as being appropriate for that specific journal. In addition, I explored whether how long a journal had been published was correlated with whether it had a stated policy regarding ethical animal experimentation, in light of the previous finding that older journals were more likely to have a policy.²⁹

Materials and Methods

A list of 5455 periodical titles covered by MedLine was extracted from PubMed on 02 June 2010. Five hundred of these titles were selected randomly and assessed for whether contents were available online. Journals available online and currently in publication (that is, content was available for 2009 or 2010) were surveyed for whether they published animal

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experiments; for this criterion, the contents of the final regular issue (not including special supplements) with a 2008 publication date (not necessarily the last of that volume, if the volume spanned several years) were examined. Any article within the issue that reported primary work that involved experimental manipulation of a nonhuman metazoan at any multicellular stage of its life cycle was considered to have published animal experiments; reviews were not considered as presenting primary work. Online instructions for authors of journals that published animal studies then were evaluated to determine whether they required author assurance of adherence to ethical standards during experiments involving animals. According to website instructions accessed on 02 through 06 June 2010, 138 journals met these criteria. The year in which the journal began publication was extracted from PubMed also. Data were analyzed using R 2.11.1.³⁰

Results

Of the 138 in-print journals that published primary research involving experiments on animals, the online instructions to authors of 85 (61.6%) explicitly required author assurance of adherence to ethical standards during animal experiments; the remaining 53 (38.4%) did not. These results reflect journals in which the instructions to authors contained an explicit requirement for some sort of confirmation of ethical considerations. Journals without an explicit policy may have scrutinized manuscripts carefully before publication, but they gave no written indication of this process.

The length of time that a journal had been published (based on the start date listed in PubMed) was not correlated to whether the journal had a written policy on presenting animal experiments (binary logistic regression: constant $b = 7.216 \pm 18.014$, Wald $Z = 0.160$, $P = 0.689$; date: $b = -0.003 \pm 0.009$, Wald $Z = 0.140$, $P = 0.708$; Hosmer–Lemeshow test on model for lack-of-fit: $\chi^2_7 = 2.141$, $P = 0.952$).

Discussion

Just less than 40% of the core biomedical science journals sampled in the current study lack a requirement for confirmation of ethical treatment of animals during research. In comparison to other studies encompassing a wider range of biologic journals,^{27,29} this result suggests that journals dealing with the biomedical side of the life sciences are more likely to have an ethical policy. In the current assessment, any overt statement of ethical policy was considered as valid. Many types of ethical policy exist, and different journals mandate different forms.^{1,10,27,28} Those surveyed had policies ranging from a simple acknowledgment that ethics had been considered to a detailed description of ethical principles followed during the experimental design and review processes. The information reported varies widely among journals,^{1,21} and the current study made no attempt to assess quality.

The current study found no relationship between how long a journal had been published and whether it stated a policy regarding reporting ethics in animal experimentation. This finding contradicts previous results from biologic journals reflecting a wider range of disciplines,²⁹ in which longer-established journals were more likely to have ethical policies. The lack of difference between older and newer journals suggests that the decision to state an ethical policy is not simply an eventual historical artifact reflecting only well-established titles.

Among the sampled core biomedical journals publishing work involving animals, more than 60% have some form of

stated ethical benchmark to which authors assure their adherence. Demonstrating that ethical considerations have been made is an important step in demonstrating scientific integrity, and reporting them appropriately is good scientific practice.³¹ Many forms of publishing guidelines have been proposed (see references 2, 3, 6, 13, 14, and 17 for examples), and journals without a stated policy on animal experiments likely easily could consider adding a sentence into their instructions for authors asking for confirmation that the work conducted fits appropriate guidelines. Certainly different disciplines will require different ethical considerations, but having a common underlying framework for what should be considered may be a step to ensuring that ethical considerations are made correctly. A working group established by the United Kingdom's National Centre for Replacement, Refinement, and Reduction in Animals (NC3Rs) recently published the ARRIVE (Animal Research, Reporting In Vivo Experiments) guidelines simultaneously in a number of high-profile biomedical science journals,¹⁶⁻²⁰ the ARRIVE guidelines recommend a framework for reporting animal experiments in journals. In parallel with ARRIVE, several other organizations are working to improve the quality of reported animal experiments (summarized in reference 23), and enhancements of the ARRIVE guidelines have been suggested.^{11,12} These efforts make guidance on policies regarding ethical animal experimentation is freely available to publishers (many of whom have already agreed in principle to follow variations on the ARRIVE guidelines^{8,9,23,25}), potentially avoiding some of the potential problems that may be caused by currently ambiguous or minimal advice.²⁴

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