

Manuscript development and the publication process

Daniel O. Morris, DVM, MPH, DACVD
Professor and Chief of Dermatology & Allergy
Editor in Chief, *Veterinary Dermatology*

Dept. of Clinical Sciences and Advanced Medicine, School of Veterinary Medicine,
University of Pennsylvania, Philadelphia, PA

In the beginning... Before the glossy pages of a scientific journal can proudly display the fruits of your hard labor and intellectual awesomeness (and most importantly... your name at the lead of the author list!) the most difficult of all things must first occur. You must develop a research hypothesis and conceptualize the study from soup to nuts. If you do not get these critical first steps of the investigative process right, no amount of sparkly prose or adherence to the tenets of technical writing will suffice to get you published. There can be no greater disappointment than learning that peer review of your work has identified a fatal flaw in your research methodology. REJECT! (Cue sounds of crashing and burning... fade to black).

Lesson #1: Conduct an exhaustive literature search to assure that you are now a card-carrying content expert on your topic of interest. Seek the counsel of mentors, potential collaborators, and recognized experts in the field of investigation to which you aspire. In the case of prospective research and clinical trials, obtain statistical consultation PRIOR to starting your study so that it may be powered appropriately. Also, the ACVD offers scientific review of proposed resident research projects. Take advantage of this! For studies involving client-owned animals, proof of informed consent (from pet owners) will be required for publication in most journals. If you are at an academic institution, IACUC approval will also be required. Many corporate practice groups also have medical/research ethics review committees, and proof of review will help expedite publication of your project.

Mission accomplished... time to publish. What a thrill! Your *p* values are all <0.05. Success! Now, convince me that this work is worthy of my attention. *Sell it.* Precision, clarity, efficiency, structure; these will be your goals in writing your masterpiece.

Step 1: Organize the authorship team. Ideally, authorship and the order of author names within the publication will have been decided at the time of study conceptualization. This can be a tricky issue – especially in academic settings. The *International Committee of Medical Journal Editors* has defined an author as “Someone who has made ‘substantive intellectual contributions’ to study conception and design or data acquisition, analysis, and interpretation and who takes responsibility and accountability for at least part of the work”. While there are no steadfast “global” guidelines for authorship order, the first author will generally be the person primarily responsible for the conduct of the study and writing the manuscript. In veterinary clinical medicine, the second author is sometimes the mentor to the first author. In basic sciences and academic circles, the mentor (or “primary investigator”) is usually the last author. The rest of the team is typically listed in the order of effort contributed to the study.

Step 2: Select a journal. There are several factors to consider. Who is your target audience? If you want to reach the general practitioner, consider *JAVMA* or *JAAHA* (or the *Equine Vet J* for an equine study that should be read by all primary care equine practitioners). Keep in mind that the majority of people who will see your work are the journal's subscribers. Others interested in your topic will likely find it through a search engine. If your work is primarily of interest to a specialty audience, choose a specialty journal. My general rule: strive for the greatest audience impact. I am personally less concerned about a journal's impact factor (a rating system mainly of interest to basic scientists and academics); other researchers will find my work if they are interested in doing so. Secondly, consider the journal's purview. If in doubt about whether your study is consistent with a journal's mission, contact the editor.

A few comments on “Open Access” publishing, “predatory” journals and “paper mills”:

The world of scientific publishing is moving steadily toward an Open Access (OA) future. OA means that anyone can access your publication without a paywall blocking their access. For example, *Veterinary Dermatology* is still a subscription journal, but Wiley -- which publishes *Vet Dermatol* -- now has OA agreements with many individual universities, consortiums, state university systems (eg., Univ. of California system), and in some cases, entire conferences (eg., the Big 10 schools). In Europe, Wiley has agreements with some entire countries (eg., Germany). A list of OA agreements held by Wiley can be viewed at: <https://authorservices.wiley.com/author-resources/Journal-Authors/open-access/affiliation-policies-payments/institutional-funder-payments.html> If you are an author with an affiliation to an institution (or country) that has an OA agreement with the publisher of your target journal, you will be able to publish OA without paying a fee. Some journals are OA for all articles published, but require a hefty fee to be paid by the authors if they aren't covered by an OA agreement.

Predatory journals are generally those which charge authors large publication fees, but do *not* conduct themselves by the industry standards expected of “valid” journals (such as peer review, ethical oversight and quality editing services). The best way to avoid predatory journals is to publish only in journals that are indexed in *Medline*. The list of acceptable journals provided by the ACVD for the resident publication requirement includes *only* Medline-indexed options.

Paper mills are entities that sell authorship on “fake” research papers which often resemble valid scientific research. Most -- but not all -- articles produced by paper mills will end up in predatory journals. Many university faculty receive several unsolicited emails each week from dubious sources, inviting them to author articles for paper mills or for predatory journals.

Step 3: Familiarize yourself with the journal's formatting requirements.

These are available from the journal's web site in the “instructions for authors” section. Nothing annoys grumpy editors (like myself) more than receiving a submission that either (a). appears to have been formatted for another journal, or (b). follows no consistent structure at all. Failure to adhere to formatting requirements is a common reason for manuscripts to be returned to the authors prior to review. If the journal you have selected uses a blinded review process, take great care not to reveal your identity. If you are submitting to a journal that is published in a language

other than your native language, ask a colleague in your field who is a native speaker of that language to review/edit your manuscript prior to submission.

Lesson #2: Formatting, formatting, formatting. Do it once; do it right.

Step 4: Outline the structure of your manuscript. Most journals (but not all!) follow a similar format of: ‘Abstract’, ‘Introduction’, ‘Materials & Methods’, ‘Discussion’, ‘References’, ‘Figure Legends’.

Title: Strive for ‘succinct yet informative’. Brevity is a plus.

Abstract: Many journals now require structured abstracts, and all have specific word limits. Precision is never more important than in the abstract. Many readers will only peruse this portion of an article! It *must* capture the totality of your manuscript in a succinct manner, including a brief justification for the study, the research hypothesis, enough methodology to entice the reader to seek more detail, and the “take home” conclusion(s) that address the hypothesis. There is no “Discussion” section in an abstract.

Introduction: This section provides the justification for your study. It should address the gaps in general knowledge about your chosen topic which led you to develop the study concept. Provide only enough background information for the reader to understand the need for your study. A research study manuscript is *NOT a review article!* If a fact or concept peripherally related to your topic doesn’t directly pertain to your study, it has no business showing up in your intro. Again, consider the target audience of the journal and tailor the information appropriately. End the introduction section with a clear statement of your hypothesis and specific aims.

Lesson #3: Research manuscripts are not review articles. The purpose of the Introduction section is to provide a justification for the study and to state your hypothesis.

Materials & Methods: This section may have several sub-headings and some sub-headings may have multiple levels. Therefore, check the “instructions for authors” (or a current issue of the journal) to see how you should designate these (eg., ALL CAPS, **bold type**, *italics*, underlined, etc.). In general, it is best to minimize the number of sub-headings to those that improve clarity and provide a road map for the reader. The materials and methods should provide enough detail to allow other investigators to repeat your study. *However*, lengthy descriptions of laboratory assays should be referenced whenever possible. For example: “Pulsed field gel electrophoresis was performed as previously described,^{ref} with the following modifications...blah blah blah”.

For studies that are performed on client-owned animals, a statement that the research adhered to institutional and/or local regulatory guidelines and that informed consent was obtained by signature of the owner *must* be provided. For the purposes of blinded review, take care to not reveal institutional identifiers until the paper has entered the copy-editing stage.

Lesson #4: Construct your Materials/Methods section such that another investigator could repeat your study to the letter, or provide the primary references that detail these processes.

Results: Results should be reported in the order in which the materials & methods were described, for studies that have multiple parts. Take care when using the term “significant”. This should be reserved for use only in the context of statistical significance. There is also the concept of “clinical or biological relevance”. Not everything that is statistically significant is clinically relevant!

The results section should generally sound very mechanical. This is not the place to interpret or discuss the relevance (or impact) of the results; just the facts. Pay special attention to formatting as this can get tricky when a lot of numbers and parentheses are involved, eg: ($p < 0.05$; [95% C.I.: 4.2, 9.6]). Look through a current issue of the journal to find examples.

Make use of tables and figures to report extensive or complex data. Summarize, but do not repeat, these data in writing. Reference the table or figure at the end of a sentence, in parentheses.

Lesson #5: Only the facts for the Results section! No interpretation; no discussion.

Discussion: Please repeat after me... “A research manuscript is not a review article!” This is not the place to teach your audience about all of the nuances surrounding the disease process in question. Many readers will only inspect the first paragraph of the Discussion. Therefore, the first paragraph should address whether you have successfully answered your research hypothesis and completed your specific aims. It should also summarize the experimental evidence that supports those statements. The second section of the Discussion is where you should provide a succinct review of the collective evidence from the literature that would support your study results as being valid. A third section should discuss any published works that are inconsistent with yours, and suggest potential reasons for the disparity. Finally, you should provide a statement of the limitations of your research and suggest how these could be mitigated in future studies. A concluding paragraph should wrap it all up by reinforcing the primary take-home point(s) of the paper and their implications for the advancement of the field. The final sentence often suggests how future research could move this field of inquiry further forward.

*Lesson #6: The Discussion is about **your** study and how it impacts the world. It is not about the general disease process involved in your investigation. This isn't a review article!*

References:

You are responsible for the integrity of your references. Take care to review the original source (rather than perpetuating citation errors in secondary sources). Use peer-reviewed literature whenever possible. Minimize use of book chapters and “opinion” articles. Be sure that your references are properly formatted before submitting the manuscript for review. It is fine to use a reference management system, but realize that you may have to reformat *all* of your references just prior to submission (if the software can't utilize the exact format required by the journal).

Lesson #7: Check all references carefully to assure that you are not mis-representing them. Do NOT depend on secondary references to correctly cite the original publication.

Figures: A common reason for manuscripts to get sent back to authors (prior to review) is failure to adhere to requirements for figures (clinical photos, photomicrographs, graphs, artwork, etc.). Carefully review the Journal's "instructions for authors" regarding minimum resolution for images, how to designate internal markers on photomicrographs, etc. *Veterinary Dermatology* currently has a full-time Image Editor to assist with these, but many journals do not.

Legends: Be sure that all figure and table legends and titles can stand alone without the need for the reader to refer to the text for an explanation.

Step 5: Submit your manuscript. Consult the Journal's home page for instructions. Contact the Journal Office if problems arise during the submission process. Most journals have categories of submissions to choose from and many require a cover letter. If you are a resident submitting a paper for your College's credentialing process, note this in your cover letter, along with your deadline date.

Step 6: Peer review: Peer review (preferably blinded) is considered by most members of the scientific community to be an essential part of the publishing process. Reviewers should be content experts who are capable of assessing whether the work reported is novel and contributes new knowledge to the field. Reviewers are tasked with identifying flaws in study concepts, design or analyses which might adversely affect the validity of the results (and therefore, the conclusions you have drawn from them). A good reviewer will also improve your manuscript by pointing out any rough edges that can be smoothed for the reader. They may catch omissions of important references.

Reviewers: who are they? Most reviewers are volunteers who spend a great deal of personal time and effort reading and re-reading your manuscript. They do this out of a sense of responsibility to their profession and are often "paying back" (returning the favor to the journal for publishing their prior work) or "paying it forward" (practicing good citizenship). Reviewers should be viewed not as the enemy, but as a welcome resource to improve your publication.

Editors: who are they? The Editors are your advocates in the publishing process. They are tasked with balancing the needs of authors with those of readers (and in essence, "safeguarding" the scientific literature and reputation of their journals). Editors work hard to make manuscripts "better", which often means reducing their content for the sake of brevity, accuracy, and clarity for the reader. Try to not be offended if an Editor asks you to reduce content.

The initial review decision: Most journals will have several categories of "decisions", such as "accept without revision" (which is very rare!!), "minor revision", "major revision – no commitment", or "reject". The ultimate decision is made by the editors, who will carefully consider the recommendation made by the reviewers. It is unlikely that an editor would overrule a unanimous rejection decision from all reviewers, but split decisions by reviewers are not uncommon. In the case of a split decision, it is the editor's responsibility to weigh the evidence and make recommendations to the authors on how the manuscript can be redeemed (or not).

Step 7: Responding to your initial peer review comments.

It is quite likely that you will receive some type of “revision” decision. Whether it is “major” or “minor” is highly subjective, so don’t despair! It is rare for any author to open the decision letter and feel elated. There will almost always be comments that feel like an attack on your hard work, but don’t overlook the fact that you’ve been invited to revise (and improve!) your manuscript.

My prescription for how to survive the shock of reading your initial review:

1. Read the comments in their entirety and fume a bit. Complain to a friend, your mentor, your resident mate. Call your mother. But if possible, try to see the positive side: experts have determined that your manuscript can be revised and published!
2. Walk away. Do something fun and don’t dwell on it for a while. Sleep on it; it’s amazing how much clarity you may have achieved by morning. There is a strong body of evidence in the psychiatric literature that “sleeping on a problem” allows the sub-conscious to solve problems while you slumber.
3. Read the comments again a couple of days later. You will be surprised at how benign they often seem the second time through. You *will* suddenly realize: “I can do this!”
4. Respond to the editor with your intent to submit a revision. If you think this will take longer than the time frame specified in the decision letter, ask the editor for a potential extension.
5. Begin to formulate a response plan.

Lesson #8: Never start to formulate your response to reviewer comments immediately after reading them. Sleep on it!

Writing your response:

- The Journal will provide you with explicit instructions on how to submit a response. Follow these to the letter!
- Begin by thanking the reviewers for their time and expertise. If you feel their comments have improved your manuscript, be sure to say it!
- You will need to provide a point-by-point response/rebuttal to each and every comment made by the Editor and each Reviewer.
- Reviewer comments are suggestions; not mandates. However, if you disagree with a point, offer an explanation as to why a change was not made and back it up *with evidence* when available. Above all, be tactful!
- Don’t resist reasonable suggestions for revision.
- Don’t make extensive revisions if a small change will satisfy the request.
- If two Reviewers provide conflicting suggestions and you are unsure of how to proceed, contact the Editor for advice. If the Editor advises against a change, note that in your response, *politely*.
- Within your manuscript, you will highlight the substantive changes made. Most journals do not want this to be provided in tracked changes as authors may not eliminate identity markers within tracked changes. For example, the *Veterinary Dermatology* journal asks you to highlight changes in **bold blue** font.
- Carefully proof read your revised documents.
- Have a skeptical friend review your comments for “tone”.

- Carefully adhere to the journal's "Instructions for Authors" regarding protocol for re-submitting.

Lesson #9: There are three golden rules to be observed when you respond to the reviewers:

1. *Respond politely*
2. *Respond completely*
3. *Respond with evidence*

Step 8: The remaining life-span of your manuscript project:

While many manuscripts will be accepted after an initial revision, some will require additional revision(s) to satisfy Reviewer and/or Editor concerns. Once accepted, the manuscript will move forward through a two to three-stage editing process, including "copy editing" (where a professional editor corrects language according to the journal's style guide), technical editing (where a scientific editor may have additional comments/questions/instructions) and "production editing" (where the Publisher may request clarifications within a galley proof). It is important that you respond immediately to these requests, since your article is now on track to be published.

Step 9: Basking in the glory

A note on copyright: Upon acceptance of your manuscript, most journals will require that you sign over copyright to the Publisher or the Society that owns the Journal. As quoted from the reference provided below, "Copyright gives the holder the legal right to manage the use, reproduction, and distribution of an article; others must request permission and ensure the work is attributed to the copyright holder. 'Fair use' of an article, such as sending a PDF to a colleague and including the article in personal teaching materials, is acceptable without permission."¹

This means that you should never post the PDF of your manuscript to a sharing web site – such as Research Gate – without first contacting the publisher to confirm their policy. Posting to a publically accessed web site is akin to re-publishing, and is not allowed by most journals.

Reference: ¹Writing for Publication in Veterinary Medicine: A Practical Guide for Researchers and Clinicians. By: Mary Christopher & Karen Young. Available open access from the Publisher's web site via your favorite search engine.