

GUIDES TO UNDERTAKING RESEARCH

6.4 Producing a Manuscript First Draft

Once the research project is developing in a satisfactory way and the data and data analyses are accumulating, attention needs to move to the manuscript that will describe the work. Here, we go through the steps of writing a piece intended for publication in a reputable journal, and some time tested strategies that will make sure that that manuscript will look good. Note that there are other Guide articles that address in more depth the features of the different manuscript sections.

Starting on the blank page

Before the first text keys are tapped, the findings of the data analysis should be carefully examined, and thought given as to how the proposed paper fits with other published work in the area. Will the paper be framed as a rebuttal of someone else's study? As the further development of another study? Supporting the current consensus or not? Adding more data to further inform a controversial topic? Proposing something entirely new? This will shape how the start and ending of the manuscript will be written (i.e., will frame the manuscript) and will influence how the data analysis will be presented. Note the data has to serve the paper and not the other way round – so some data and analysis may, in the end, be left out.

At this point a good approach to start filling that blank page is to note down, perhaps as bullet points, the data outcomes, the main arguments and points of fact relevant to the work, then the conclusions that the data seem to support. It can be a useful thinking aid to clarify the state of the work (that is, to see what is still missing) and decide what data and arguments are essential to include and which less important.

Journal choice and information on format

It saves time later if the formatting of the manuscript is right from an early stage, so it is good to choose a target journal, then consult and adhere to their "Instructions for Authors". Manuscript sections can then be written out using that journal format, adding content from the sketched out dot

points (above) as appropriate. Thus, a MS Word or LaTeX document begins to take shape with a Front page (title, names, affiliations), Introduction or Background, Patient details and Methods/Methodologies/Materials (as appropriate to the work), Results, Discussion, References and Figure/Table Legends. The document should from the beginning look like a proper and neatly crafted manuscript all ready to be fleshed out. The authors will then see a real paper emerging in front of them, giving the enterprise some feeling of momentum gained.

Assembling and ordering cartoon data

In parallel with the above writing work, key data (and anticipated data) should be assembled to plan the figures. If the data or data analyses are graphs, table and images these can be assembled in cartoon form as composite figures, perhaps on a whiteboard to start with.

While cartoons are no good for journal submission they allow experimenting with the order and structure of data figures/tables. It is useful to play with different versions of the cartoons as the order of the figures will define the *narrative* of the manuscript.

At this early stage with many different possibilities in play for the narrative. The manuscript may be simple, for example with a straightforward research problem (perhaps shown by illustration) a fairly uncomplicated study structure (maybe a flow chart), dataset details, a series of analysis outcomes

and a concluding diagram. This is an easy structure and simple to write up. Some manuscripts have much greater complexity than this, for example perhaps first laying the groundwork with basic descriptive data, followed by a reveal of controversial data, then follow up information that leads to the conclusions.

Methodical with Methods

Writing the Methods section early on is always useful as it involves a lot of formulaic sections (e.g., details of ethics approval, statistical approaches) that are easy to compose, but take a bit of time. Note there must be enough method detail presented to make the paper technically credible.

Conclusions

Once the paper structure is decided, then the conclusions that form the basis of the paper can be written out. These must be in the form of short, direct text with a minimum of hedging, fudging or caveats. This can be as outrageous as you like at least until it has to be seen by a co-author.

For the manuscript Conclusions, everything rests on how well they data buttresses them. At this stage it should be very evident if there are any significant data or further information needed to support the conclusions. Note that if there are more data needed, there is a risk that when it arrives it may not be supportive, which may mean that the manuscript will need radical changes. However, if all seems fine then manuscript text development should proceed apace.

Writing up Results and Figure Legends

After the general outline has been envisaged, then a rough version of the Results section can be written based on the figures drafted above. A logical sequence of Results section subheadings, fleshed out with concise descriptive text is needed. It first describes the plain but scene-setting data, (and data that confirms the work of others) then moves on to the more interesting parts.

Good figure/table/diagram legends should be written at this point. Legends usually need to be stand-alone, i.e., they can be understood well enough without referring to the manuscript text. To

see how to do this, and clarify what level of detail is needed in the legends it is best to examine similar papers in the journal of interest.

Introducing everything

The scope of the study should now be evident, so work on the Introduction can start; it may take time as literature consultation often throws up unexpected challenges. This section starts with general statements about the field or clinical problems, noting particular and peculiar features and gradually expanding into a solid but very short review of the field that highlights key knowledge and areas of ignorance. It will also display a firm grasp of the subject and make clear the knowledge gap the manuscript will fill, then lead the reader logically to the work presented in the manuscript.

The Introduction should mention the research approach employed and why it was chosen. Some Introductions briefly note (at the end) the main conclusions of the manuscript, however journals vary as to whether they prefer this or not.

Discussion among friends

After the Results, Figures and Legends are done the next part to tackle is the Discussion section which ideally should be developed slowly with many revisions as the logical development of the proceeds. In practice, for a small paper with obvious conclusions this may not take long.

The Discussion should begin by briefly noting the most important or striking Results, followed by a section that carefully considers how those study results do (or do not) support the project aims and hypotheses. This should merge into general exposition of the major literature on the subject, making clear where the study fits with this. The Discussion should also clarify the limitations of the study, and what future work it might lead to. Lastly the Discussion should close with a statement of conclusions of the study. This should not simply restate the Results yet again, but bring out the key messages that emerge from the Discussion.

The next steps: Abstract and referencing

The work completed up to this point should enable the construction of the Abstract. This requires a

whole set of writing skills in itself as there is nothing quite like it in style, but its structure and content has to accurately reflect the substance of the manuscript Introduction, Methods, Results and Discussion sections, hence it is best left until these sections are drafted. The Abstract begins with a terse description of the problem and state of the field and ends with the main conclusions and what they mean. In between, there is the narrative sequence of arguments and information. All of this in under 300 words, sometimes less.

There should now also be some attention paid to the proper referencing of the literature that supports key points raised in the text. This requires some fairly obsessive literature consultation. A neat way to evade immediate tangles with reference manager software during writing is to note citations in the text as simple PubMed ID (PMID) numbers. These can easily and rapidly be replaced with the proper format in later drafts.

End of the first draft

The development of the manuscript to this point probably involved collaboration between authors,

but if not then it must begin here. A choice of document sharing strategy must be made – will the text be circulated as MS Word and PowerPoint documents, or online shared documents such as Google Docs or Overleaf.com? If Word and PowerPoint are used version control is crucial to avoid time-consuming blunders made like editing old or out of date drafts. Thus, it is best to be clear which file is the ‘master’ or definitive version, with only one person editing it so confusion is avoided. However, Google Docs or Overleaf.com can allow simultaneous editing which can get round this problem.

Onwards

With completion of a first draft much has been achieved but much remains to be done. This will take time and it is important not to underestimate this. This is scientific writing, and while it needs to be succinct and pointed it should also read well to maximise the chance the reviewers and editors will accept it for publication.

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Version 2.2 (Nov 2020)

Thanks to Professor Thomas Hugh and Dr Richard Piper for reviewing and critiquing this article.

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