

Seven easy steps to getting started in scientific writing...

G. Bordage, MD, PhD
Department of Medical Education
University of Illinois at Chicago

Once you have analyzed all the results from your study, then comes the often daunting task of getting started with the writing. Here are seven “easy” steps that should get you well on the road to writing your manuscript as well as make you feel good about the task that lay ahead. The steps are:

- 1- In one sentence, what is your **main message**?
- 2- So what? **Importance** What are you saying that we don't already know? How important is your message?
- 3- Who cares? **Audience** To whom do you wish to communicate your message? Your audience(s).
- 4- What are the **main issues** you want to write about? To answer this question you will use the **structured abstract** format as a working document with bullet point answers.
- 5- What's the **title**, a provisional title?
- 6- Who are the **authors** ?
- 7- Which **journal** ? Format?

Prepare short answers to the 7 questions and put in a PowerPoint® presentation. No need for elaborate answers; this is just a starting point.

Writing is a constant process of surveying all you could write about and making discriminating decisions about your purpose, your audience, and your forum.

1- What is your main message?

Imagine that someone comes up to you and asks you: What's the main conclusion, the bottom line from your study? In one sentence, what would you answer? What's your main message? The answer to this question will become the centerpiece of your paper.

2- What are you saying that we don't already know? How important is your message?

Journal editors, and the eventual readers, see this as the “So-what?” question. What does your study and results add of substance to the literature? What are you saying that we don't already know? This question addresses issues of importance and relevance. What are you contributing to the field that is worth paying attention to?

3- To whom do you wish to communicate your message?

Given your research topic and specific study, to whom do you wish to tell your results, your conclusions? This is the “Who-cares?” question. You can think of audiences in terms of three

broad categories of people: teachers (the practical outcomes), administrators (the organizational outcomes), and researchers (the theoretical and methodological outcomes). (Note that the audiences may also be related to the previous question on relevance and importance.) You may be interested in communicating your results to all three audiences, but scientific journals may only focus more precisely on certain audiences; for example, while *Medical Teacher* is oriented towards practical outcomes and advice for teachers, *Advances in Health Professions Education* is more oriented towards theoretical and methodological outcomes. Of the multiple audiences, first state the one that you would pick first, and then your second choice. In reality you may find a journal that caters to both or you may eventually split the manuscript in two, one for each journal (audience). So, please answer this question by stating your (a) main audience and (b) an alternative.

4- What are the main issues, key points? ...using a working structured abstract format.

The ultimate purpose of an abstract is to present to the readers a summary of your study and findings. Usually this is done once you have written the whole manuscript and the pieces are all laid out. Another way of looking at this is to use one particular type of abstract, called the structured abstract, as an initial advance organizer to help you as you begin to write your paper. It has the advantage of forcing you right from the beginning to lay out the main issues and key topics that you will be writing about. It is in essence a paper in miniature, and thus its usefulness as an organizer. The classic "structured abstract" contains nine sections, each addressing a main question in the reader's mind, that is:

- 1- Background (What's already known? Why did we do this study?)
- 2- Objectives (What did we intend to do? What are the goals, research questions?)
- 3- Design (How did we answer the research questions?)
- 4- Subjects (Who participated?)
- 5- Setting (Where did it take place?)
- 6- Intervention (In the case of an experiment, what did we manipulate?)
- 7- Outcomes (What did we observe, measure?)
- 8- Results (What did we find?)
- 9- Conclusions (What do the results mean? So what?)

Write your working abstract spontaneously, as you see the information in your mind at this time. Remember this is an advance organizer and a working document. You will have the chance to refine it as you go along. Don't worry about details for the moment, just focus on the main issues or key topics that you want to address in each section. Write in a bullet form, not in complete sentences, and limit the number of bullets in each section, focusing only on the main issues. It's like making an initial list of key points. This working abstract, especially in its structured format, forces you to state the central messages, what is important in the work you want to report. It also helps you get a sense of the big picture and all the components that will eventually go into your paper. Thus when you are deep into writing the details of any one particular section of your paper, this initial structured abstract is always there to remind you of where that particular section fits and how it relates to other parts of the paper. It's a big-print roadmap.

The structured abstract itself has many advantages. It is a uniform way of reporting information to the readers. It covers all the components of the study and guarantees that more complete

information is presented. The usual length of a structured abstract is 250 words; some electronic forms allow up to 400 or 450 words (you will need to check the maximum length allowed by the journal you will be submitting your manuscript). For the moment don't worry about length, just make an initial list of key points. The details and writing will come later. Also, remember that this is a work in progress. You will have ample opportunities as you go along to add or subtract. The purpose for the moment is to get you started and to have a clearer sense of the big picture of the manuscript you are going to write.

5- A working title.

On the basis of this brief information in your working structured abstract, if you were going to give a title to your prospective paper, what would it be? The same way that a working abstract helps you organize things, a working title will help you focus on your central messages. At times, your title will help guide the structure of your paper, but at times the content of your paper will force you to reconsider your title.

Huth (the former editor of the *Annals of Internal Medicine* and a scholar of scientific writing in medicine) describes two types of titles, the *indicative* title, that is, what the paper is about, and the *informative* title, that is, the message. Combining both aspects, indicative and informative, makes a title even more complete. For example, consider the following title: "A Factor Analysis of an Oral Examination in Pediatrics." This title is indicative. It tells the readers what was done but not what the results showed, what factors were important. To add an informative aspect to this title, the author could say: "A Factor Analysis of an Oral Examination in Pediatrics: Importance of Problem Solving, Communication, and Satisfaction." The latter part of the title now conveys the message, the factors. Remember, the title will become your shortest possible abstract! The decision to read an article often rests on the appeal of the title, thus its crucial importance.

To help you prepare a title, begin by making two lists of keywords, one indicative, the other informative. Then play with the keywords until you have a clincher! For now, the purpose is simply to get you started and to have a provisional title to hang your study on as you write the paper. It too will evolve, grow on you with time.

6- Who are the authors?

The last piece of information you need to think about at this stage is authorship. Authorship presents two challenges. Who is an author? And, who is the first author? Huth and other editors are becoming very specific about criteria for authorship because of the ever growing inflation in the number of authors included on papers. The following criteria should be applied:

"Each author should have participated sufficiently in the work to take public responsibility for the content. Authorship credit should be based only on substantial contributions to:

- (1) conception and design, or analysis and interpretation of data; and to
- (2) drafting the article or revising it critically for important intellectual content; and on
- (3) final approval of the version to be published.

Conditions (1), (2), and (3) must all be met."

Huth defines responsibility for the content as the ability to defend publicly the intellectual content of

the paper, that is, to justify the conclusions of the paper, including defending the evidence and counter evidence weighed in reaching them. Certain other conditions, in and of themselves, do not justify authorship, namely:

- 1- acquisition of funds,
- 2- collection of data,
- 3- general supervision (administrative leadership), and
- 4- proofreading or editing the drafts for style and presentation, not ideas.

The opposite phenomenon to gift authorship is also important to notice, namely “absent” authorship where contributors eligible for authorship are left out, either because of personal or political reasons.

Second, who is the first author? The first author assumes the leadership and the main responsibility for the paper. There is no universal interpretation or rule for the order of the authors, except that the first is the main author and the main person responsible for the study and paper overall. As for overall order, a good strategy is to list by order of involvement or in alphabetical order if no other method works. Remember that you have two other options to acknowledge people’s contribution to the study. You can list them in the *Acknowledgements* section or in the *Collaborators* section (e.g., in a multi-center study).

There are three main reasons for determining authorship at this early point, if not sooner. The first is to make sure that every author satisfies the criteria for authorship. Second, the first author becomes the leader for the writing task ahead, assigning specific tasks to each of the remaining authors. Finally, by postponing the decision about authorship, not only will individual responsibilities be blurred, but also bad feelings may arise if more than one author believes (feels) they should be the first author. Better settle the matter early and clearly based on sound criteria and civil discussions. Remember that journals will require that each author individually sign a statement indicating that they satisfy the criteria for authorship.

7- Which **journal** ? Format? What’s the best match for your “topic, message” and your “audience.” Sample journals in your library or on-line for similar topics and note the journals or for journals with your audience to assess your chances. Also decide on the best format: Original research, Short reports, Reviews, Letters to the editor... Select your one preferred journal plus one alternative. Gather examples of similar articles and get a copy of the Instructions to authors.

An example

Here is an example of the seven “easy” steps, written in bullet form.

- 1- *Main message*: - to fulfill their job, directors of educational programs call upon a variety of
 - skills, that can be learned, and
 - attributes, that are mostly personal characteristics
- 2- *Importance*: - little is known about this topic
 - the list of skills and attributes can be used to hire new directors, evaluate existing ones, or plan educational programs for them

- 3- Audience: - departmental heads, deans, employers
- program directors themselves

4- Working structured abstract:

(1) Background: - educational program directors have multiple and diverse duties, "wear many hats"

- they must constantly adjust to current and future demand
- little published on skills and attributes
- various conceptual frameworks to categorize skills and attributes

(2) Objective: - obtain a list of desirable skills and attributes of prospective educational program directors (defined generically)
- as perceived by superiors or employers

(3) Design: - international mail survey
- one-page, open-ended questionnaire

(4) Subjects: - potential employers of program directors
- non-random sampling; n=623 solicited
- from the various health professions
- deans, department heads, chief executive officers
- schools, hospitals, professional organizations

(5) Setting: - survey from DME at UIC

(6) Outcomes: - skills of directors of educational programs
- personal attributes

(7) Intervention: N?A

(8) Results: - 139 subjects of 623 solicited; 22.3% response rate; proportional to professions solicited and regions sampled worldwide
- number and nature of the responses quite similar across health professions
- data combined across professions
- nine leading skills: oral communication (53%), interpersonal skills (40%),

competent

practitioner (31%), educational goal-definition skills (29%), instructional design skills (29%), decision-making skills (29%), team worker (28%), written

communication

(23%), and fiscal manager (23%)

- three leading personal attributes: visionary (34%), open-minded (27%), and trustworthy (21%)

- five rubrics: health professional, educator, leader & manager, researcher,

personal

attributes

- (9) Conclusion:
- importance of leadership compared to managerial responsibilities
 - need to train future educational program directors
 - lists can be used by employers or administrators to build checklist items for hiring or reviewing program directors or to plan and evaluate training programs

5- *Provisional title:* An international Survey of Skills and Attributes of Educational Program Directors: Importance of Leadership Qualities

6-*Authors:* G. Bordage, R. Foley, & S. Goldyn

The first two authors initiated and conducted the study. S. Goldyn started as a research assistant on the project. She quickly became involved in the design of the study by suggesting important theoretical points and in the interpretation of the results as well as the writing. Her role went beyond simply processing data and satisfied all three criteria for authorship.

Note the bullet points. At a glance, you already have a glimpse into the paper as a whole, a sense of the big picture. Not the details, simply the key points. These will serve as buoys to guide the detailed writing to come. You can go through the six steps in just an hour or so, a great investment for things to come and a great sense of accomplishment towards something worthwhile and useful.

7- To give you a sense of the finished product, here's the reference to the published paper: Med Educ 2000;34:206-210.

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Georges Bordage, MD, PhD
Department of Medical Education, University of Illinois at Chicago

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- 2- So what? **Importance** What are you saying that we don't already know? How important is your message?
- 3- Who cares? To whom do you wish to communicate your message?
Your **audience(s)**. *Who cares?*

- 4- What are the **main issues** you want to write about?

Structured abstract format:

- 1- **Background** What's already known? Why did we do this study?
- 2- **Objectives** What did we intend to do? What are the goals, research questions?
- 3- **Design** How did we answer the research questions?
- 4- **Subjects** Who participated?
- 5- **Setting** Where did it take place?
- 6- **Intervention** For experiments, what did we manipulate?
- 7- **Outcomes** What did we observe, measure?
- 8- **Results** What did we find?
- 9- **Conclusions** What do the results mean? *So what?*

- 5- What's the provisional **title**? **Indicative** (what the paper is about)
Informative (the message)

- 6- Who are the **authors** ? Substantial contributions to:

- (1) Conception and design, or analysis and interpretation of data; **and**
- (2) Drafting the article or revising it critically for important intellectual content; **and**
- (3) Final approval of the version to be published.

- 7- Which **journal** ? Best match for your topic and your audience.
One preferred journal plus one alternative; instructions to authors.

Format? Original research, Short reports, Reviews, Really Good Stuff, Letters to editor...