

## Chapter 10

# Writing for Success

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*“...scientific understanding is inseparable from the written and spoken word. There are no boundaries, no walls, between the doing of science and the communication of it; communicating is the doing of science.”*

Scott L. Montgomery, in *The Chicago Guide to Communicating Science*, 2003.

### INTRODUCTION

Whatever careers physicians and scientists undertake, writing is an important—often critical—part of their professional work. In this chapter, I shall define *good writing*, point out some failings in bad writing, and outline approaches that an individual can take to improve the ability to write well. This topic is highly important for biomedical professionals because poor writing skills lead to weak documents. This is especially important for *persuasive writing*, that is, of documents intended to sell ideas, projects, or even oneself. Most professional documents fall into this category. Bad writing can lead to professional failure, for example, causing rejection or delay of applications for training or grant support and academic or business promotions (Table 10.1).

Poorly written abstracts and research papers can blunt the impact of great data. The ability to write well—clearly even if not elegantly—provides a competitive edge for an individual, a work group, an institution, or a company. To be clear at the outset: no one is born a great writer, but writing well is a learnable skill. The process I went through to reach a tolerable level of writing ability involved mentoring, criticism by colleagues, and personal study. It was worth the effort.

Many medical and scientific articles and grant applications are poorly written, but this is not a new problem. In 1900, nearly 120 years ago, the editor of the *Journal of the American Medical Association* complained:

*The majority of articles submitted for publication could be cut down by one-half, and not a thought be eliminated... The repetition of well-known facts, padding..., and words, words, words, too often constitute the papers... [appearing] in*

**TABLE 10.1** The Costs of Poor Medical and Scientific Writing

Bad writing leads to the following:

- Rejection or delayed acceptance of research papers and abstracts
- Unfavorable reviews of grant and project applications
- Possible failure of a drug's or device's development, registration, or commercialization
- Failure to be accepted for training or professional position
- Confusion about messages
- Time wasted on rewriting

All of the above are tied to loss or wastage of money

**FIGURE 10.1** Major factors affecting the writing of a document.

*medical journals. And if the editor presumes to... [reduce the text], the majority of authors consider it an insult [2].*

Excessive length—too many words—continues to bedevil medical and scientific writing. But there are many other important failings, including poor textual organization, lack of focus, overuse and underdefinition of jargon, overly complex sentences, pretentiousness, lack of clarity, misuse of words, vast overuse of the passive voice, overuse of “that” phrases, unclear references, and unintentionally dumb-sounding or funny phrases. Fig. 10.1 illustrates the factors that need to be considered in writing a manuscript.

What follows are illustrative samples of such problems in writing and approaches to avoiding them. As you read, consider my four key rules for preparing a persuasive document:

1. Tell me a story.
2. Be brief.
3. Be clear.
4. Make me care.

Everything from here on is intended to help the writer achieve those four goals.

## EXAMPLES OF GOOD AND BAD WRITING

Here is an example of dismal scientific writing:

*The results of the present study suggest that in addition to the manifestation of aberrant homeostatic patterns of neuro-humoral activity following the cessation of noxious stimulation, the neurotic may be further characterized by atypical autonomic responses to an increase in the level of appetitional drive.*

Why is this bad writing? First, it uses too many words and too much obscure jargon; the sentence is too long for easy comprehension; and it uses “fancy” or pretentious words needlessly. Good writing is concise, crisp, clear, and flows logically.

Here is an example of very good writing in a less formal context:

*The laboratory director who seeks a program of quality control sometimes feels like Goldilocks at the bears’ home: Some suggested programs are Too Big, others are clearly Too Small. This handbook outlines procedures and suggests combinations that can be Just Right for each individual laboratory.*

The writer breaks sentences cleanly and with purpose; uses analogy and humor to convey meaning; and is clear, direct, and forceful. While humor is often not a part of biomedical persuasive documents, the other elements make any writing stronger.

Sometimes logical inconsistencies creep into sentences:

*All data, except for the 6 hour blood draws, will be collected from patients at the study endpoint.*

Obviously, we do not “draw” or “collect” data from patients. “Data” are not “blood draws.” And the phrase “blood draws” is awkward hospital jargon.

Better:

*All blood samples, except for the 6 hr specimens, will be collected at study endpoint.*

Inadvertent humor does not help the reader stay focused on a document’s messages:

*The pneumonia was treated with penicillin, then changed to erythromycin.*

One has to chuckle as the writer suggests that “pneumonia” can be “changed to erythromycin.” Less funny, but communicating more accurately,

*The pneumonia was treated first with penicillin, then erythromycin.*

A common failing in biomedical writing is abuse of the horrific “that” phrase, frequently preceded by “It:”

*It has long been known among international experts, through an extensive literature and vast experience that hyperglycemia in diabetes mellitus leads to numerous complications involving many organs.*

In this made-up example, 15 words stating the obvious precede the intended communication, separated by “that.” The key ideas of the sentence are better communicated as follows:

*Hyperglycemia in diabetes leads to many complications.*

“That” phrases generally convey little additional meaning, but always add words and complexity, sometimes adding pomposity. One strategy for controlling one’s use of “that” phrases is to use the computer to search one’s document for the word, “that,” then to look at each instance to determine if there is a better and more concise option. A search for “it” can be similarly rewarding.

The following example illustrates the wooden dullness of the passive voice:

*Numerous data were derived from these studies and X, Y, and Z were shown.*

The active voice has more clarity and force and often uses fewer words:

*Our data showed x, y, and z.*

The passive voice is often ambiguous:

*My first patient interview will always be remembered.*

By whom? Me? The patient? The ward nurses? The hospital legal department? Passive voice can be clear but cumbersome:

*My first patient interview will always be remembered by me.*

Active voice is clearer, cleaner, and more forceful:

*I shall always remember my first patient interview.*

For reasons unknown to me, most scientists and physicians think that scientific documents must be written primarily in the passive voice, perhaps to avoid the personal “I” or “we.” However, all experts on persuasive writing agree that the benefits of using the active voice far outweigh any disadvantages. There is nothing wrong and much right in such writing as “After reviewing the literature, we designed an experiment as follows... We recruited X patients and Y control individuals... At the conclusion of the study, we analyzed the data in accord with the statistical plan.... We interpret our findings in light of other reports....” I am not against all use of the passive voice; sometimes it is the best way to go. However, use it judiciously and mixed with active voice.

*Ambiguity* is a common problem in medical and scientific writing. Here is a rather silly example, but which makes the point: “Labs were checked weekly.” Does “labs” refer to laboratory tests, a place where experiments are done, or Labrador retrievers? Did the dogs have checkered coats? Putting one’s written product aside for a while, then reading it as if you had never seen it before, can reveal ambiguous statements; colleagues reading the work will also point out ambiguities.

Yet another common problem in medical writing is *monotony*. It can result from repetition of words, for example, beginning many sentences with “it,” or

“these,” or “this;” overuse of clichés such as “stands to reason,” “few and far between,” or “in the long run;” or a lengthy run of very short sentences. There are other causes of monotony in writing. Fresh rereadings of one’s own work can reveal some.

## **APPROACHES TO IMPROVING WRITING SKILLS**

The reader may be thinking, “I was not an English major; how can I deal with all this?” Here are some working strategies.

To write well, it helps to *read* good writing; it need not be only scientific writing, either. Wide reading in thoughtful journals such as *The Atlantic* or *The New York Times Review of Books* will give ample exposure to skillful explanatory or persuasive writing. When reading in the medical or scientific literature, look for writing that is unusually clear, direct, and forceful. Analyze those good examples and emulate them. Because writing is so critical to professional success, become a student of good writing. There are numerous books on scientific writing, which vary in quality and specifics, but any of them will provide similar, useful approaches to self-improvement in writing.

Another crucial approach is to seek out good writers in one’s own environment and talk to them about writing techniques. If one of them is willing to be a mentor for your writing, take advantage of this generosity. You may find that good writers love to talk about and teach writing. As a corollary to this, it is extremely valuable to have colleagues who will provide critical reviews of one’s documents. When asking for such reviews, one should be specific in requesting frank criticism of not just the data, but the quality of the communication. (it is better to hear the bad news from a friend than an uninterested and potentially hostile reviewer!) A reviewer who gives a document back marked, “Looks good,” has not helped the writer. In my personal experience, having multiple critical reviewers is best because one reader will see a problem others have missed.

Finally, to become a good writer, it helps to practice. I urge the beginning medical or scientific writer to practice writing well in every communication, be it a paper letter, email, or other electronic missive. Writing skill is analogous to muscle: use it to gain strength.

Let us turn to the first steps in preparation of a document; these ideas should have been conveyed during junior high and high school courses but, apparently, often are not.

## **PLANNED STRUCTURE AND LENGTH**

It is absolutely necessary to do some planning before setting pen to paper or fingers to keys. First, who are you writing for? What is your message? What is the desired timing of delivering the information? What constraints are there on sharing this information (e.g., regulations or confidentiality agreements)?

Where is the information to be shared (e.g., before an audience or in a journal)? If it is to be published, what journal—print or online—is the best fit? Each of these factors will affect the structure and length of the document. It is essential to read and understand any guidelines and requirements of a granting agency, scientific organization, or journal to be sure your document will fit their criteria.

Starting to write without an outline, at least in your mind, leads to meandering, confusing prose, and lost messages. Remember: you will be telling a story, with a beginning, a middle, and an end. Thinking and planning the approach helps the writer achieve logical flow and internal consistency, as well as clarity. A written outline is a helpful starting point.

Tables 10.2 and 10.3 provide length guidelines' manuscripts for various purposes.

## FINGERS TO KEYS

I have found it helpful to have all the supporting material at hand before putting down the first word. This might include reprints of articles to be

**TABLE 10.2** Suggested Length Guidelines for Small- to Medium-Sized Clinical Trials or Moderate Research Reports

A report on a small- to medium-sized clinical trial or moderate experiment should usually not be longer in each section than:

- Introduction—1–2 printed pages
- Methods—2–5 printed pages, depending on complexity of the study; this is after all the crux of the report
- Results—1–5 printed pages, depending on complexity
- Discussion—1–4 printed pages
- Minimize the use of figures and tables; usually, 2–3 figures and 2–3 tables will do the trick
- Seldom use more than 25–30 reference citations, except in review articles.

**TABLE 10.3** Tips for Reports From Large Teams

Reports on “Big Team” Science

- The 20-author study will always be long relative to smaller studies with fewer authors
- But word count and length still matter, especially to editors who must control journal page count!
- Length matters to readers who have limited time to examine new articles
- The same principles apply to all parts of all reports: brevity, clarity, flow, and correctness of grammar are essential

quoted and cited and charts, tables, and graphs of the data to be presented. A cup of fresh coffee is not a bad idea, either! Different writers do things differently, so you will need to find your own best approach. In my case, I set aside a block of time and write entire papers from start to finish, leaving blanks where I am unable to provide information or analyses, to be filled in later. Others will write the methods section first, then the data section, then the introduction, and so forth. For me, writing straight through helps assure that my paper tells a coherent story. Having an outline prepared will help keep the writer on course. Generally, it is advisable to write straight through a section rather than stopping and backtracking to correct typos or refine sentences. Get the whole section or the whole paper set down, then come back through to touch up the draft. When the skeleton of the document is complete, that is the time to work on filling in any missing information, meanwhile looking for “that” phrases, passive voice, awkward or overlong sentences, and any unintentional humor or offense. Make sure that “this thing” and “that thing” references are clear.

## **GET SOME DISTANCE**

Once a clean draft paper has been completed, and blanks filled in, it is good practice to set the document aside. I recommend printing the document and literally putting the draft in a drawer or on a shelf—one way or another, put it out of sight and out of mind (as much as possible!). Depending on time sensitivity, it may not be possible to set the document aside for very long, but even a lunch break or overnight will help. Even better is to let a few days or a week go by before rereading the document. The beginning writer is often stunned to see mistakes, inconsistencies, typos, overlong sentences, and other structural and linguistic problems almost pop off the screen or page on such a delayed reading. This is also a good time to ask whether each section has been pruned down to the minimum length needed for communication. Once all the newly found issues are fixed, it is time to obtain independent, frank critiques from colleagues, local or distant.

## **WHAT TO DO WITH RETURNED CRITICAL COMMENTS?**

Having several reviews in hand can be confusing because they might not all identify the same errors or problems, may interpret the information differently, or may misunderstand things. In any case, it is wise to read carefully and take each review seriously because you do not want readers of the finished product to react similarly. My practice has been to put the document up on screen, with the reviews at hand, and go through the document from top to bottom, making changes in response to all the reviews simultaneously in each section. Once that is done, you probably have a much-improved document that is ready for submission.

## GENERAL THOUGHTS

Recall the 1900 complaint about “words, words, words,” and strive to make communications concise. When helping colleagues edit their writing, sometimes I have been able to reduce the length of a document by two-thirds, without losing a single idea from the original. How could this miracle happen? Simple: the writer made each point three times in the original. Try to find such redundancies in your own work. Critical reviewers will often point out duplications between and within sections. Keeping documents short makes them easier to read and often much clearer and more persuasive. Some documents must be long, but nonetheless they should be only as long as needed to communicate the key points.

Because most professional documents are intended to sell something—a hypothesis, a planned project, experimental results, or oneself—and because the readers of one’s documents may be under time pressure, the first sentence of an abstract or grant proposal or research paper should be a “grabber.” That is, the first sentence should make the reader want to keep reading. Furthermore, the first paragraph should draw the reader into the second, and so on. Dull, poorly constructed, ambiguous, or incomprehensible first sentences or paragraphs can sink the goals of the document. Here is a made-up example of a “grabber” first sentence: “Most patients having lung cancer are dead within 5 years of diagnosis, regardless of treatment. Here, we present clinical trial findings with a new approach that has dramatically extended median disease-free survival of patients having small-cell carcinoma of the lung.” Similarly attractive first sentences can be crafted even for less important material than in the example.

Do not forget the key points in writing a strong persuasive document:

1. Tell me a story.
2. Be brief.
3. Be clear.
4. Make me care.

In conclusion, individuals and groups in medicine and science cannot afford to tolerate bad writing. Good writing provides a competitive edge for the individual, the work group, and the organization. The well-written project proposal, grant application, abstract, or research report will stand out from the vast mediocrity around it and have a greater chance of success. Take heart: writing well is a learnable skill. Study writing as carefully as you would study a new research method. Almost certainly, there are good writers around you: find them and learn from them. Throughout your career, commit to helping each other to improve the quality of your writing.

For additional information on how to write specific types of manuscripts, please [Chapter 9](#) (for journal articles) and [Chapter 11](#) (for medical book chapters).



## RESOURCES

Here I list some recent books on medical and scientific writing, plus some stalwarts from earlier times that have served me well in learning to write. Any of them would be valuable if read and referred to over years. My all-time favorites are items 4 and 5.

1. *The Complete Guide to Medical Writing*. Mark C. Stuart. Pharmaceutical Press, 2007 (491 pp). This book has an excellent chapter on writing that reflects and expands on many ideas presented in the present chapter. However, much of the book is about larger issues in preparing, submitting, and publishing various kinds of medical or scientific documents.
2. *Medical Writing: A Guide for Clinicians*, 2nd ed. Robert B. Taylor, Springer (New York), 2011. The author is a widely published academic family practitioner. I find the text very accessible, almost chatty, but he knows whereof he speaks. Even an experienced specialist writer would find useful information here.
3. *AMA Manual of Style: A Guide for Authors and Editors*, 10th ed. Multiple authors. This classic has been updated regularly over the years and is a valuable resource for writers seeking publication in peer-reviewed journals. It should be on every medical writer's bookshelf (or hard drive). Available at Amazon or through the American Medical Association.
4. *The Elements of Style*, 4th ed. William Strunk and E.B. White. Pearson Publishers, 1999 (105 pp). This slender book, updated for the current century, has been for many the first and best writing guide of their lives. Some dislike the later version—I had the original and found great value in it, but admittedly, it was dated in places—but there is so much good in its 105 pages that the current edition remains the best bargain ever in learning how to write clear, concise, communicative English. BUY IT!
5. Unfortunately, the most useful, practical book on medical writing I have is now out of print, but if you can track down a copy, I highly recommend it. It was published in a cheesy paperback form that fell apart quickly. Because the book was so valuable to me, I took its remains to a bookbinder for binding into hardback form. The book is *Scientific Writing*. Lester S. King and Charles G. Roland. American Medical Association, 1968 (133 pp). The chapters are short, the examples compelling, and the solutions straightforward.
6. Another out-of-print gem is *Why Not Say It Clearly?* Lester S. King. Little, Brown, and Co., Boston, 1978 (186 pp). Read in conjunction with citation 5, above, for a broader understanding of good and bad scientific writing. Track one down and treasure it.

## REFERENCES

- [1] Montgomery SL. In: *The Chicago guide to communicating science*. 2003.  
 [2] Editorial (anonymous). *JAMA* 1900;35:626.