

# JUST WHO ARE WE AND WHAT ARE WE DOING, ANYWAY? NEEDED RESEARCH IN MEDICAL WRITING

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“If you think clarity is expensive,  
consider the cost of ambiguity.”

## ABSTRACT

*For medical writing to mature as a profession, I propose that we conduct the research that will document our productivity and value added, keep our skills current and relevant, determine the core knowledge and skills needed to enter and thrive in the profession, identify the cognitive and personality characteristics associated with an affinity for our line of work, and establish the history of medical writing and editing from antiquity to the present. This research can begin with simply identifying our work tasks and determining how much time we spend in each. It can include reviewing the literature on any of several topics; collecting data from institutional archives and databases; surveying coworkers, clients, or administrators for their knowledge and opinions of medical writing; and conducting experiments to determine which form of instruction or which version of a text is most effective in promoting comprehension, recall, ease of referencing, or usability. In this article, I offer some thoughts on the value of such research and provide an overview of the issues in how to conduct it.*

Consider the following:

- Administrators often believe that if they cannot measure a process or a product, they cannot manage it. When the “it” is medical writing and editing services, our profession has a problem. That is, if we cannot measure our productivity and prove our value added, we may be administratively invisible and thought to be unnecessary.
- To maintain and advance our professional standing, we must be constantly improving our knowledge and skills and be seeking new professional and employment applications for them. We need to apply the theories and research findings that will allow us to do state-of-the-art, evidenced-based writing, editing, project management, document and instructional design, and so on.
- Currently, turnover in our profession is common and often relatively rapid, in part because of the questionable belief that the necessary knowledge and skills can be acquired outside of the profession and that such knowledge and skills are not extensive or highly specialized. Identifying the specific knowledge base and skills necessary to do well in the field should improve how we recruit and train writers, as well as raise professional expectations and retention rates.
- Another factor in rapid professional turnover may be mismatches between the nature of the job and the preferences and strengths of the individual. For example, many of us work from home and deal with data far more than with people or things; we often work alone and in our heads for long periods, whereas others may have more social contact. Thus, identifying the personality and cognitive traits of those people who have an affinity for various medical writing positions may also improve recruitment, retention, and training.
- Finally, although medical writing has a history several thousand years old, we are nevertheless a relatively young profession. If we are to establish medical writing as a distinct career and to develop AMWA’s organizational culture, we need to make this history coherent and distinct enough to provide a basis for professional identity.

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The thread common to addressing all of the above issues is *research*. I have been asked to review some of the needs, issues, and methods associated with this research to encourage AMWA members to begin conducting it. So, I present here some thoughts I have collected over more than 30 years in the profession, a period that includes obtaining a master’s degree in communications, serving as Manager of Medical Editing Services at the Cleveland Clinic (where I worked for most of the

1990s), and working now as a communications consultant. Although my comments tend to focus on preparing scientific publications, many of the concepts apply to other forms of writing: regulatory, instructional, marketing, and so on. However, many of these forms of medical communication doubtless have their own challenges and research needs and may need to be addressed separately. (See page 133 to learn about 2 new research awards available through AMWA.)

## AREAS AND TOPICS OF RESEARCH

### Measuring Productivity

Measuring productivity means measuring the quality and quantity of the work we do. It can mean measuring inputs—how many manuscript pages are submitted for editing, how many authors request writing support, and so on—or outputs—the number of slide sets created, the number of people trained in writing classes. It can also mean recording the characteristics of what we work with. For example, for 5 years my associate and I kept detailed records of the manuscripts submitted to us for editing.<sup>1</sup> Among other things, these data provided us with ranges for the characteristics of different manuscript types. The median length of manuscripts reporting original research (cover page through conclusions) was 12 double-spaced pages; half contained from 10 to 16 pages. Thus, articles containing fewer than about 10 pages raised our suspicions about underreporting or reluctant writers, and those containing more than about 16 pages were immediately candidates for shortening.

Measuring productivity can also involve keeping track of time spent in specific activities per day, per week, or per month. Such records can give us some idea of where our efforts are requested, where they are going, and where more resources are needed. As part of the above 5-year data-collection study, we also kept track of our editing time with stopwatches, so we had exceptionally accurate data on how

long it took to edit, to our standards, each type of document.<sup>2</sup> The median stopwatch time for editing an original article was 5 hours, with half requiring between 3.5 and 7.5 hours. Overall, we edited at a rate of about 4 pages per stopwatch hour and were able to provide reasonable estimates of total editing time based on this rate.

Most AMWA members can collect similar data about what they do on the job. If data from members holding similar jobs can be combined, we may be able to suggest ranges for various products and activities. The AMWA salary survey is an excellent example of such research, as is the recent article by Stephanie Phillips on authorship practices in the health care industry.<sup>3</sup> Average lengths, durations, pages, and so on, are probably not as useful as the range of variation in these averages.

The most serious problem we face in measuring productivity (and value added; see later) is that we are information workers, and information is notoriously difficult to measure and to value in dollars. How do we put a

value on insight? On clarity? On critical thinking? On creative problem solving? The answer is that we do not necessarily need to evaluate our *writing*, we can evaluate *those who read our writing*. In fact, market research tells us that people buy only 2 things: solutions to problems and good feelings. So, to value information, we may have to ask clients how much they will pay to have us solve their communication problems or to feel good about the quality of their publications. (I'm convinced that many authors still have their manuscripts edited only to be sure that they aren't embarrassed by punctuation errors and misspellings. Thus, we also have another critical task: to communicate to clients what, exactly, we can do for them.)

As a grants officer, I once helped an audiologist apply for money to develop homemade noisemakers that parents could use to test their newborns for hearing problems, a technology that could prevent life-long deafness in thousands of infants. After 3 years and a dozen grant applications, he was still



unfunded. During this same period, however, I summarized in less than an hour the health-related research being conducted at the university. That summary was directly responsible for 2 alumni making a \$2 million gift to the university. Which use of my time was more productive?

### Measuring Value Added

Adding value usually means reducing costs (such as time, money, or effort) or increasing benefits (adding information, accuracy, insight, or clarity). Value, however, like information, is in the eye of the assessor. Thus, to study the value added of a writer, you may need to study the time that the writer saves the principal investigator or the effort that the writer saves readers. As an example, if it takes 30 minutes to make an explanation coherent in a journal article read by, say, 20,000 dentists, the editor can potentially save 10,000 hours of reader time, assuming that readers would take the time to decipher the explanation. The fact that most readers will not take the time to study a poorly written paragraph raises the question of how much it might be worth to make sure they can understand it in the first place.

Another factor complicating the measurement of value added is the “causal pie.” Given a finished document, how do we determine who added what value? A strong author and a weak editor is not the same as a weak author and a strong editor, but how do we distinguish between their contributions? An often-heard justification for writing services is that “better written grants

are more likely to be funded.” Such a claim ignores the influences of the quality of the original idea, its appropriateness for the funding agency, the quality and number of competing grants, circumstances within the funding agency, and so on. Likewise, poor writing may be grounds to reject a manuscript, but good writing without a good idea will not get one published.

The most effective way we established our value-added at Cleveland Clinic was to collect the positive comments we received on our editing. It helped that several department chairs used our services routinely, a fact we told our administrator several times a year. Not much, but it was all we had.

It may also be useful to try to determine the costs of communication that is misdirected, unread, misunderstood, or never attempted.

Sometimes, circumstances provide useful information of value added. When the pharmaceutical division of Revlon was sold, the new owners disbanded the medical writing group—and had to contract out their regulatory writing for years afterward when their new drug applications, prepared by scientists, not medical writers, continued to be rejected.

One aspect of value-added is the ability to establish and maintain reputations: yours and your organization's. Ed Huth, MD, then the Editor of the *Annals of Internal Medicine*, praised the editing department of the Mayo Clinic—during grand rounds at the Cleveland Clinic. He said “There is something comforting about receiving a manuscript from the Mayo Clinic. You

know it will be tightly edited, formatted correctly, and the tables and figures carefully thought through.” The implications of this comment were lost on the Cleveland Clinic's administration (sigh . . .), but it illustrates the value added of a publications group.

### Evidenced-Based Writing and Editing

Written communication has an evidence base: theories and research findings that can help us prepare more effective texts more efficiently. (The classic readings listed at the end of the article are illustrative). We should identify and learn to apply the most useful theories of composition, cognitive processing and learning, persuasion, publication design, visual perception, instructional design, Web design, memory, and so on. We should also know what the research can tell us about textual factors that enhance or inhibit how well readers understand a text (comprehension), how long they remember the text (recall), how long it takes them to find given information in the text (referencing time), and how well they can apply the information in the text (usability). (These 4 endpoints are often used in research into written communication.)

Although we can conduct our own research in these areas, we also need to evaluate what has already been learned and to disseminate the most useful findings. We need to move from “I recommend this change because I think it makes the text read better,” to “I recommend this change because the research indicates it will improve comprehension.”

### Work-Related Knowledge and Skills

It is essential that we itemize the bodies of knowledge and skills of our profession. Only when we have this information can we evaluate professional competence, improve hiring practices, develop self-assessments, and direct the AMWA workshop program appropriately.

Not all medical writers are necessarily well trained in the profession.



**Table 1.** The Four Areas of Attentional Focus Described in Attention Control Training<sup>3\*</sup>

	Internal Focus	External Focus
<b>Broad Focus</b>	Attention is focused inward, on a range of possible thoughts. <b>Writers</b> need to integrate information from several sources and cannot afford to be distracted by external stimuli or be limited by a narrow perspective.	Attention is focused outward, on the environment. <b>Teachers</b> must be aware of how an entire class of students is responding and cannot be distracted by 1 student or by deep reflection when teaching.
<b>Narrow Focus</b>	Attention is concentrated inward on a single line of thought, to the exclusion of others. <b>Statisticians</b> need to focus on a line of reasoning free from internal and external distractions.	Attention is concentrated outward on a single aspect of the environment. <b>Proofreaders</b> must focus on the text, without distraction, and without “reading in” meaning by thinking about the text.

\* Most people have skills in all quadrants but do better in some than in others.

Many of the skills associated with our profession are still acquired through on-the-job training, which can be highly specialized, nonsystematic, and inconsistent. Professional development depends on knowing what one does and does not know and on knowing where and how to acquire missing knowledge and needed skills, and we need to make this information widely available to current and prospective members, as well as to employers.

A related area of research is to identify how people enter the profession, what career track they follow within the profession, and where they go when they leave the profession. Although we know that many pharmaceutical writers enter the profession as scientists, working first in drug development before transferring to regulatory writing, that is about all we know. Medical writers come from a variety of backgrounds and enter various aspects of the profession in numerous ways. The career path can also be fairly short, with only a few steps between entry-level and management jobs, which may require people to leave the profession for more challenges or higher incomes. Knowing the potential opportunities may be useful if we plan to continue in or leave the profession.

#### Talents and Aptitudes for the Profession

Medical writing, like any profession, attracts some people and not others. It would be useful to identify any psychological or cognitive traits that are more common among successful writers and successful editors. For example, one theory with some explanatory power is Attention Control Training.<sup>4</sup> The theory suggests that attention can be focused internally or externally and on a broad or narrow spectrum (Table 1). It may be important to match one’s attention control strengths with job requirements. For example, proofreading requires a narrow, external focus of attention; teaching benefits from a broad external focus; writing typically draws on a broad internal focus; and calculating requires a narrow internal focus.

Several dozen psychological dimensions could be studied, and studied with an even larger number of psychometric instruments. One need not be a psychologist to determine which of these dimensions and instruments could be of use to us.

#### Defining Our History

Medical writing has a long and fascinating history (Table 2).<sup>5</sup> Yet only in the

past 100 years has it become a profession, distinct from the practice of medicine and apart from writing in the Humanities but combining elements of both. We need to appreciate the contributions of people such as Harold Swanberg, Maude Mellish, Morris Fishbein, Richard Hewitt, and Lillian Sablack who have figured prominently in our professional history. Having our own history allows people who join our profession to have a sense of joining a time-honored tradition, not simply a new job. The history is there, we just have to uncover it.

#### THE RESEARCH PROCESS

Irrespective of which aspect of medical writing you choose to study, you will probably encounter the issues described here.

#### The Research Question

The research question is critical because it will determine who or what you study, your research methods, the scope of your investigation, and what you can do with the results. The research question needs to be meaningful, focused, accurate, and answerable.

One way to generate research ideas is through introspection. Look back at your job performance over the past year and ask yourself whether you generated enough value to cover your salary and then some. If you did, how do you know? If you do not know, what data could you collect to find out? What can you do to work more efficiently or effectively, and how would you know if you were successful?

Your research question may concern studying parts of documents (eg, introductions, figures), complete documents, individual writers and editors, writing groups, or entire organizations. Some of these “units of observation” may be easier to study than others, and each has its own challenges.

When developing a research question, remember the admonition of

**Table 2.** Ages and Key Events in the History of Medical Writing and Scientific Publishing<sup>4</sup>

Antiquity	
	Thoth (Egypt's ibis-headed god), mythical inventor of writing and the patron god of physicians.
	Apollo, Greek god of rhetoric and the arts, gives the gift of healing to his favorite son, Asclepius.
The Age of the Great Medical Texts	
BCE 1700	<i>Papyrus Smith</i> describes diseases by presentation, treatment, and prognosis.
900	<i>Ayurveda</i> is written, describing this ancient system of health care in India.
850	The Mesha Stele, a stone tablet inscribed in the Moabite language, is the first text known to use punctuation.
460	Hippocrates writes 70 books on medicine.
300	<i>Nei Ching</i> (Yellow Emperor's Book of Medicine) is written in China, reflecting several centuries of medical practice.
The Age of the Great Physician Writers	
AD 20	Celsus writes <i>De Re Medica</i> (8-volume encyclopedia of medicine).
170	Galen writes 500 books on medicine.
885	Al-Razi, the leading Islamic physician, writes <i>Kitab Al-Mansuri</i> , a 10-volume treatise on Greek medicine.
1300	Taddeo Alderotti writes <i>Consilia</i> (medical case book), which contains the first modern case histories.
1363	The most complete and scholarly book on surgery to date, the <i>Inventarium sive Chirurgi Magna</i> , is written by Guy de Chauliac, physician to Pope Clement VI.
1542	Vesalius writes <i>De Humani Corporis Fabrica</i> (On the Fabric of the Human Body) which contains more than 600 woodcut illustrations of human dissection.
1609	The Italian <i>Accademia dei Lincei</i> publishes the proceedings of its meetings as <i>Gesta Lynceorum</i> , the first publication of any scientific society.
The Age of Formalized Medical Writing	
1665	First scientific journals are published: the French <i>Journal des savans</i> and the English <i>Proceedings of the Royal Society</i> .
1669	Christiaan Huygens creates perhaps the earliest known graph, a plot of the expected number of survivors from a hypothetical pool of 100 persons, as a function of age.
1812	<i>The New England Journal of Medicine</i> , the oldest continuously published medical journal, begins as <i>The New England Journal of Medicine and Surgery and the Collateral Branches of Science</i> .
1859	Pasteur adds the Methods section to the scientific article, essentially creating the IMRAD format.
1911	German artist Max Brödel creates the first academic department of medical illustration, at the John Hopkins School of Medicine.
1940	Mississippi Valley Medical Editors Association is founded, later to become the American Medical Writers Association (AMWA) in 1948.
1979	<i>Uniform Requirements for Manuscripts Submitted to Biomedical Journals</i> is introduced by the International Committee of Medical Journal Editors (the Vancouver Group).
1997	The Consolidated Standards for Reporting Trials Statement (The CONSORT Statement) for reporting randomized controlled trials; beginning of the reporting standards movement.

IMRAD = introduction, methods, results, and discussion.



statistician John Tukey: it is better to have an approximate answer to an important question than an exact answer to a trivial one. In other words, study what needs to be studied, not just what can be studied easily.<sup>6</sup>

### Measurements

Science depends on measurement. To do good research, you need to define and measure inputs and outputs, characteristics, and explanatory and response variables.

Consider 2 types of measurements: objective and subjective. **Objective measurements** are those in which anyone following the prescribed rules will assign the same values to what is being measured. Examples include the number of articles accepted for publication, the amount of time required to summarize a document, and the number of typographic errors in a cover letter. Especially useful are **unobtrusive measurements** that do not require you to intrude into the environment of the relationships being assessed. I once evaluated the utility of a university newsletter by counting the number of issues that appeared in recycle bins shortly after they were distributed. Immediately discarded issues were thus an unobtrusive measure of how valuable the newsletter was (was not) to readers.

**Subjective measurements** are judgments or opinions. Examples include reviewers' assessments of the quality of a proposal, opinions of the effective-

ness of titles, and personnel evaluations. A useful approach to subjective measurement is the **connotative definition** that captures the intangible qualities of what is being defined. For example, the quality of a report written by a trainee could be indicated by whether or not it is good enough to submit to the CEO (higher quality), your division chair (intermediate quality), or your lab manager (lower quality). Different judges will still have different opinions about quality, but at least with a connotative definition they are answering the same general question.

An interesting issue with subjective measurements relates to whether your "unit of observation" is a text or a reader. For example, if you want to determine the frequency of, say, passive sentences in abstracts, you probably want to have a few trained judges evaluate a large sample of abstracts. On the other hand, if you want to determine the quality of a slide set, you probably want to have a large number of judges.

Research can be conducted without measurements, but the results have to be interpreted carefully. **Qualitative research**, which has its origins in anthropology, as participant-observer research, involves making detailed observations of people or events in their natural settings. The ability to ask and follow-up on open-ended questions is often necessary to characterize hard-to-measure concepts or to discover subtle interactions in a complex situation. Qualitative research findings may not generalize to other settings, but they often give rise to new hypotheses or research questions that can be studied with quantitative methods.

### Identifying a Sample

Your research question will determine who or what you study. Chances are you will have to study a sample of something, and choosing an appropriate sample can be difficult. Ideally, your sample will be large and representative of the population to which you will generalize the results. The size of

the sample can be determined statistically (with a power calculation), or by circumstance (eg, the number of clinical study reports completed in a unit of time or the number of writers in a particular writing group). Choosing a representative sample can be more problematic. What would a representative sample of medical writers look like? Not all authors, editors, or writers are equally skilled, so it can be difficult to get a sample representative enough to make generalizations. For example, a conclusion that edited manuscripts are evaluated more highly than others may be true for one editorial group but not for another.

Be sure your sample is appropriate for the question you are trying to answer. Experts in science are not necessarily experts in scientific communication, even if they have published dozens of articles. Studying the frequency with which, say, subtitles are used in the titles of scientific articles to determine whether current practice justifies their use is to study the behavior of amateurs. Focus groups with experts in scientific communication or an experiment measuring the effectiveness of such titles may be better approaches to answering this question.

### Research Designs and Activities

Your research question may also determine your research design. The most common designs are described below.

**Literature reviews.** Some questions can be answered, or at least approached, by reviewing the literature on the topic, and all research benefits from background information. Literature reviews are ideal for identifying theories and research findings that can be applied to writing and for discovering key events in the history of medical writing. Such reviews can yield unexpected benefits, such as discovering other organizations interested in the same topics or learning that your topic is actually indexed under a different set of key terms.



### Archival and database research.

Many offices and companies maintain archives of one sort or another that may answer some questions of interest. Files of regulatory submittals, published journals, evaluation reports, and so on should not be overlooked as sources of data. My colleagues and I once reviewed a sample of invoices from the print shop to estimate how much the Cleveland Clinic was spending on patient education materials, for example. (The amount was less than the Clinic was spending on business cards, a fact we used to argue that both the quality and quantity of these materials should be improved.)

**Survey research.** Surveys can be an inexpensive, fast, and convenient way to gather a great deal of information on what people know, think, or think they know that is not so. Consider e-mail and Web-based surveys, as well as paper-and-pencil ones. Questions should be pretested to ensure that respondents understand them similarly and that the response options are complete and appropriate. Surveys over time can identify trends. In a survey at the Clinic, we learned that most authors would accept a 1-week turnaround time for editing, but not much more. Remember to get approval for the survey before administering it.

**Interviews and focus groups.** One of the most useful techniques for assessing the quality and acceptability of written communication is to conduct interviews and focus groups with readers. Skill is a factor in conducting these activities, but it is a skill worth developing. The outcomes of interviews (which is qualitative research) can include unexpected insights into how documents or people are perceived, as well as ideas for new procedures, changes in workflow, and additional research.

**Experimental research.** Formal comparisons and hypothesis testing can be accomplished with classical experimental designs. Good designs allow

### Classic Readings Reporting Research into Written Communication

- Anderson PV. *Technical Writing*. San Diego: Harcourt, Brace, Janovich, Inc., 1987.
- Anderson P, Brockmann R, Miller C (eds). *New Essays in Scientific Communication: Research, Theory, and Practice*. New York: Baywood Publishing Company, Inc., 1983.
- Benson P. Writing visually: design considerations in technical publications. *Tech Comm*. 1985;4:35-9.
- Britton BK, Woodward A, Binkley M (eds). *Learning from Textbooks: Theory and Practice*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers, 1993.
- Charrow PR, Charrow VR. Making legal language understandable: a psycholinguistic study of jury instructions. *Columbia Law Rev* 1979;79:1306-733.
- Duffy T, Waller R. *Designing Usable Texts*. San Diego: Academic Press, 1985.
- Felker D (ed). *Document Design: A Review of the Relevant Research*. Washington, D.C.: American Institutes for Research, Document Design Center, 1980.
- Felker, D, Pickering F, Charrow VR, Holland VM, Redish JC. *Guidelines for Document Designers*. Washington, DC: American Institutes for Research, Document Design Center, 1981.
- Redish J. *How to Write Regulations (and Other Legal Documents) in Clear English*. Washington, D.C.: American Institutes for Research, Document Design Center, 1981.
- Schraver KA. *Dynamics in Document Design*. New York: John Wiley & Sons, Inc., 1997.
- Schraver KA. Teaching writers to anticipate readers' needs. *Written Comm*. 1992;2: 179-208.
- Souther, J. What management wants in the technical report. *J Engineer Ed*. 1962;52: 498-503.

you to reduce or control for errors, confounding, and bias as you examine the effect of 1 or more differences between, say, 2 versions of a consent form. You can test for differences between groups who respond to the 2 versions or within 1 group tested at 2 times, say, before and after editing.

### CONCLUSIONS

As professionals, most of us deal with some aspect of life science or biomedical research. As members of a profession, however, we will have to involve ourselves in social science research: much communication research is still "soft science." So, despite W. H. Auden's commandment, "Thou shalt not sit with statisticians nor commit a social science,"<sup>7</sup> we may have to do just that if we are to justify our employment and advance our profession. As difficult and as frustrating as this research can be, the personal benefits of conducting it can be substantial, and the professional benefits, profound.

### References

1. Lang T. Assessing the productivity and value of a hospital-based medical editing service. *AMWA J*. 1997;12(1):6-14.
2. Lang T. Physical and processing characteristics of manuscripts submitted for author's editing. *CBE Views*. 1996;19(5):111-115.
3. Phillips S. Authorship and writing practices in the health-care industry. *AMWA J*. 2009;24(1):4-8.
4. Nideffer RM, Sharpe RC. *Attention Control Training: How to Get Control of your Mind Through Total Concentration*. New York: Simon and Schuster, 1978.
5. Lang T. *How to Write, Publish, and Present in the Health Sciences: A Guide for Clinicians and Laboratory Workers*. Philadelphia: American College of Physicians, 2009.
6. Tukey JW. The future of data analysis. *Ann Math Statis*. 1962;33(1):1-67.
7. Auden WH. Under which lyre: a reactionary tract for the times [poem]. *Harper's Magazine*. June, 1947.