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Working Together Theme Issue

Types of Errors Used in Medical Editing Tests

Science Series: Overview of Human Fertilization and Egg Activation

Regulatory Insights: How to Effectively Lead Your Team as the Medical Writer

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- Enhance theoretical knowledge as well as applied skills of medical communicators in the health sciences, government, and industry
- Address the membership's professional development needs by publishing the research results of educators and trainers of communications skills and by disseminating information about relevant technologies and their applications
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FROM THE EDITOR

LORI ALEXANDER, MTPW, ELS

Think about your professional life. How often have you worked alone? Completely alone. Freelances, you may be alone in your home office, but you're not really alone—you work with clients, vendors, physicians, and other freelances. Working well with other people is crucial in our field. To work well with others, we need to understand the people we work with and then find ways to communicate with them effectively. This principle is analogous to knowing your audience and addressing its needs—a tenet handed down from Aristotle and emphasized in every writing course known to man and woman. Communicating effectively is the first step toward working together efficiently, the theme of this issue.

When I entered the profession as a medical editor at then-Lahey Clinic, I worked in an office of older, experienced editors. I accepted all the advice and instructions these women gave me as "editing commandments," never questioning, always following. So, 12 to 15 years later, when I became a manager, I wondered where some of my new hires got their gumption. Two days on the job, and they were questioning established processes. Why didn't they have that same level of respect for rules that I had early in my career?

During this period of my wondering "what has happened to young people?" (and feeling like I had turned into my mother), I attended the Society for Technical Communication annual meeting and went to a session on communication in the workplace. Dan Jones and Gail Lippincott, of the University of Central Florida, discussed this topic within the context of multiple generations in the workforce and how differences in generations' attributes affect communication and workplace relationships. Dan and Gail had me on "welcome." Since then, I have been fascinated by the phenomenon of Traditionalists working with Millennials working with Baby Boomers working with Generation Xers. I learned why my behavior differed from those of many younger writers and editors in their early career. Different things make us tick.

The Top Ten provides an overview of the four generations in the workplace, and you can learn about the social events that shaped the values of each generation and the professional implications of generational differences (page 143). Although generational differences can help to explain quite a bit, we must take care to avoid stereotyping. Just as disease risk and prognosis are determined for groups of people and not individuals, generational characteristics are defined for all people born within a specific time span and should not be applied across the board. However, the insight gained can help us better understand our coworkers and colleagues.

The articles in this issue address working together in a variety of settings. Our Freelance Forum panelists discuss how to bridge the generation gap with clients, and because our panelists are on the "older" side of the gap, we asked some "younger" freelances to weigh in on the topic as well (page 123). Generation gaps are also the topic of Eleanor Vincent's Page Break (page 144).

Because working together effectively takes more than understanding generational differences, the issue includes articles on leadership and teamwork, other essential components. In Regulatory Insights, Julie Beyrer describes how medical writers can meet the challenges of being a leader (page 118). In Practical Matters, Nicola Bond addresses ways to successfully carry out team building activities (page 129), and in Around the Career Block, Jennifer King presents a unique method that some employers are using to develop closer working relationships (page 132). The virtual workplace of the 21st century also calls for new ways to collaborate, and Jeanne McAdara-Berkowitz explains new technology that allows us to work together regardless of actual proximity (page 139). In addition, you'll find the theme of working together highlighted in CME Rising, which focuses on how team-based health care affects the development of continuing medical education (page 126), and in Melnick on Writing, which discusses the essential relationship of the physician and pharmacist (page 135).

Just as our workforce spans four generations for the first time, it is also becoming more diverse in terms of race, culture, and fundamental values. This diversity manifests itself across a wide spectrum, from being truly embraced to prompting harmless curiosity to instigating outright animosity. Working together effectively requires mutual respect and a focus on our professional tasks. Each of us brings different ideas and perspectives to the table, and there is a place for everyone in the proverbial sandbox. Rather than cast aspersions on differences, we must cultivate common ground. During this contentious election year, I'd like to shout that last sentence from the rooftop, but alas, I can only encourage the members of our distinct and distinguished organization to not throw sand at each other and instead, work together to build sand castles.

TYPES OF ERRORS USED IN MEDICAL EDITING TESTS

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ABSTRACT

For medical communication to mature, more research that investigates the core knowledge and skills required to enter and succeed in the profession is needed. In this article, I report the types of errors found in 13 editing tests administered to prospective medical editors. These data will help prospective medical communicators prepare to take an editing test and help hiring managers evaluate how well their own test assesses their applicants. A contingency table analysis identified how evenly the errors were distributed across six broad categories, and a weighted index identified the errors that were most frequent and most dispersed within the sample. The weighted index includes 21 errors that were dispersed in at least 50% of the sample. The results indicate that grammatical/mechanical and style errors had a higher than expected frequency, suggesting that the sample's hiring managers were more concerned with candidates' understanding of these error types than errors classified in other categories. The most predominant error was "Unnecessary or missing capitalization," and its occurrence was primarily related to the capitalization conventions outlined in the AMA Manual of Style. *Finally, six style errors ranked in this study's list of predominant errors. This result suggests that style-intensive editing tests may be a convention that differentiates medical editing from other technical editing.*

Editing in the health sciences encompasses skills and practices that differ from those in other types of technical editing. The manuscript types represent a variety of forms and styles, and the targeted audiences—practitioners, researchers, and patients, as well as national and international readerships—are diverse. In a 2009 issue of the *AMWA Journal*, Lang called for more research within several areas of medical communication, including studies that investigate the core knowledge and skills required to enter and succeed in the profession.[1] A popular topic among many technical editors is usage error, specifically their most bothersome ones, or the ones they associate with personal preference rather than grammatical correctness. With the exception of a recent study,[2] anecdotal discussions among editors remain the best source of information on error.

In this article, I report the types, frequencies, and dispersions of errors found in 13 editing tests administered to prospective medical editors. Editing tests evaluate an applicant's ability to spot obvious typographic errors as well as to fix rather than to introduce new errors.[3] The editing test remains a unique workplace document because it purposely contains errors and therefore serves as a first step in identifying how medical communicators prioritize specific errors. Results respond to Lang's call for research on the professionalization of medical communication by providing a list of errors that were derived from an actual workplace document. These data will help prospective medical communicators prepare to take an editing test and help hiring managers evaluate how well their own test assesses their applicants.

The results from relevant error studies have primarily reported how distracting specific errors are to practitioners instead of examining the actual errors found in workplace writing.[4-7] Several empirical studies have identified the most frequent errors in college writing,[8, 9] but these results do not necessarily reflect how practitioners, in general, or medical communicators, in particular, prioritize errors. Hairston's study was the first to determine how business practitioners responded to specific usage errors.[7] These practitioners, who represented 63 occupations, reported being overwhelmingly bothered by errors classified as status markers; eg, "When Mitchell moved, he brung his secretary with him."[7] The next tier of bothersome errors was grouped by mechanical mistakes—sentence fragments, fused sentences, and faulty parallelism. Two follow-up studies yielded results similar to those of Hairston's original study[4, 5]; fused sentences, faulty parallel structure, sentence fragments, and danglers ranked as some of the most distracting errors. Although these studies generated important findings, the usefulness of the data is somewhat limited by methodologic design. In all of these studies, data were solicited via a questionnaire, which included errors that the researchers believed could be the most bothersome to practitioners. These results may not accurately reflect the errors that practitioners pay attention to. Similarly, data collected from questionnaires depend on self-reporting, which can motivate participants to respond in ways they think are appropriate to the research.[10]

Error taxonomies of college writing compensated for these methodologic limitations by assessing the errors in actual student samples, but the results cannot necessarily be generalized to professional communication practices. Connors and Lunsford's study produced a list of more than 50 formal and mechanical errors that college students made in their writing.[8] Misspellings outnumbered all other errors by 300% and were removed from the formal study for independent analysis. The researchers ranked the remaining errors by frequency, selecting the top 20

for further inquiry. The list began with "missing comma after an introductory element" (occurring 11.5% of the time) and ended with the "its/it's error" (occurring 1.0% of the time).

Twenty years later, Lunsford and Lunsford extended the original study.[9] The results reflected how a broader range of academic text types and the expansion of technology changed the error patterns in college student writing. Due to an increase in argumentative essays, the new list included errors related to using sources, quotations, and attributions. Technology also played a role in the rank of specific errors. "Misspelling" now ranked fifth, and "wrong word" emerged as the top error. The researchers attributed these shifts to electronic spellcheckers. Technology helped students remedy misspellings, but a reliance on the automated spelling suggestions likely caused an increase in wrong words.

Both of these studies present comprehensive error taxonomies, but they do not specifically relate to professional communication in which context might yield a different list of prominent errors. Lunsford and Lunsford's results represent the errors commonly seen among developing academic writers. Expert professional writers will likely make different errors in their writing, and organizations' use of style manuals might also create different contexts for errors related to capitalization and number format as well as introduce new error types related to tone, word choice, or consistency. For example, in a recent study of the errors found in 41 editing tests from multiple industries (two of which were related to the health sciences), I found a high frequency of spelling and capitalization errors; however, many instances of these errors were related to the spelling of proper nouns, such as company or product names as well as the capitalization standards outlined in style manuals.[2] The study also showed a high frequency of eight different style errors, such as language consistency, unnecessary passive construction, and faulty parallelism, but half of the errors disappeared from the prominent errors list when the dispersion was calculated (ie, how many tests a particular error appeared in). I reported that although style errors appeared frequently in specific tests, the error types were not representative of the sample. These findings suggest that examining various technical editing disciplines (eg, medical, engineering, computer science, education) results in qualitatively and quantitatively different error distributions.

Medical editing has much in common with other technical editing, but it also exhibits distinct features that reflect how its communicators work with subject-matter experts and convey technical information. The writing common to medical communication spans a variety of document types, such as journal articles, regulatory documents, grant proposals, educational resources, and marketing materials. These texts often include original research, which involves a synthesis of statistical data and a discussion of human subjects. These ideas must be presented with clarity, concision, ethicalness, and sensitivity, and the writing must adhere to discipline-specific nomenclature and stylistic conventions. Specialized style manuals like the 1,000+ page *AMA Manual of Style*[11] help medical communicators create consistency, and the *AMWA Journal* has published original research on relevant ethical topics such as working with statistics,[12] the language patterns used to humanize patients,[13] and the use of passive voice.[14] However, no study has examined these issues in total and in an actual workplace document such as an editing test, which can distinguish a good editor from a great one. The present study was designed to explore the types of errors associated with medical communication and to determine how these errors align with or differ from those in other types of technical editing.

METHODS

Because of the privatization of editing tests, the study's sample proved difficult to collect. I obtained 13 editing tests through personal requests to 13 different medical communication companies. I signed a nondisclosure agreement with most companies to further protect the integrity of the tests. Participating companies represented a variety of subfields within the health sciences, including health care management, pharmaceutical research, and medical and scientific communication editing services. Every error in the tests was classified according to the latest edition of the designated style manual; 10 tests required the *AMA Manual of Style*, two required the *Publication Manual of the American Psychological Association*, and one required the *Chicago Manual of Style*.

Raters

Four raters were involved in the classification process. All had formal education and professional experience in technical and (or) medical editing. Two raters independently classified the errors in nine of the 13 editing tests by using the assessment keys provided by the company's hiring managers. Using the assessment keys ensured that errors were classified from the organization's perspective. Whenever possible, errors were classified by the error/error patterns name listed in the Connors and Lunsford and the Lunsford and Lunsford studies; however, multiple new errors related to style were identified in this sample. Every error was then classified into one of six broad error categories: grammar and mechanics, punctuation, spelling, style, content, and design.

A third rater with more than a decade of medical editing experience helped classify the four tests that did not have assessment keys. This rater completed each test as if she were an applicant for the targeted position. The original two raters then classified the errors from these four tests just as they had the rest of the sample. Percent

agreement between these raters identified an 81.0% consensus level, an acceptable level of agreement.[10, 15] A fourth rater made the final decision in instances when the two raters disagreed on how an error should be classified.

Measures

I used two measures to explore the sample. The contingency table analysis identified how evenly the errors were distributed across six broad categories: grammar and mechanics, punctuation, spelling, style, content, and design. Determining this distribution can help prospective applicants prepare for an editing test and can show hiring managers how the content of their test compares with that of other organizations. To my knowledge, no other study has grouped errors into broad categories to measure their distribution across the sample; therefore, the null hypothesis assumed that if the errors were evenly distributed, then each category would contain 144 errors. This number was determined by dividing the total number of errors (864) by the number of categories (6).

To gain a better understanding of the distribution of errors in the data sample, I also present the results of what I will subsequently refer to as an error's "weighted index." The weighted index factored the frequency and the dispersion of each error into a single numerical value. Although a lone frequency list provides useful information on the frequency (or popularity) of errors, it cannot account for errors that cluster in a small number of the sample (ie, weakly dispersed errors) compared with errors that appear consistently throughout the sample (ie, highly dispersed errors). This study's weighted index thus provides a means for considering both how frequent and how dispersed an error is within the 13-test sample. This index weights each error's frequency and dispersion 50/50 because I could not identify an existing model that would have suggested a different weighting. I welcome suggestions on alternative weightings.

RESULTS

Eight-hundred and sixty-four errors and 60 error types were identified within the sample. Each test contained an average of 66.46 errors (median=69.5, SD=37.48) and an average of 23.38 error types (median=26.0, SD=9.90).

Contingency Table Analysis of Errors by Category

The contingency table analysis determined if the errors were evenly distributed across the six broad categories (Table 1).

Style errors and grammatical/mechanical errors had a higher than expected frequency. Content errors were not significantly distributed because the individual frequencies for the category were too close to the expected frequency of 144. Therefore, this error type was distributed among the sample as would be expected if each type was predicted to have equal representation. Punctuation, spelling, and design errors had a lower than expected frequency.

Weighted Index (Frequency and Dispersion) of Errors by Type

The weighted index factored how frequent and how dispersed each error was within the sample. The sample's top 21 errors were identified, which were dispersed in at least seven of the 13 tests studied (Table 2). Thirty-nine additional errors were identified in the sample (Appendix A, online exclusive). More than 60% of the top 21 errors related to grammar and mechanics or style. The five grammatical and mechanical errors included the most prevailing error in the sample: "unnecessary or missing capitalization," which was the second most frequent error but dispersed through 92% of the sample. The four additional grammatical and mechanical errors all appeared infrequently but were dispersed throughout 69% or more of the sample, accounting for their strong rankings in the top half of Table 2: "missing or wrong article" and "unnecessary shift in verb tense" (both ranked as the fourth most prominent error), "misplaced/dangling modifier" (ranked fifth), and "incorrect singular/plural application" (ranked eighth).

Six style errors ranked in this study's list of predominant errors: "redundant, expendable, or incomparable language" (ranked second); "vague or missing language" (ranked third); "faulty parallel structure" (ranked 10th); "inconsistent terminology" (ranked 12th); "informal or discriminatory language" (ranked 17th); and "unnecessary passive construction" (ranked 18th). Five of these errors appeared infrequently (ie, less than 50% of the tests) but were strongly dispersed in the sample.

Table 1. Errors Organized by Broad Error Category, Frequency, Significance Level of their Contingency Table Analysis, and Confidence Intervals

Category	Frequency[a]	$P_{binomial}$[b]	95% CI
Style	281	.000	.294–.358
Grammar and mechanics	234	.000	.241–.302
Content	136	.494	.134–.183
Punctuation	115	.008	.111–.158
Spelling	57	.000	.050–.085
Design	41	.000	.034–.064

[a] *Every error in the sample (864 total errors) was classified into one of six broad error types.*

[b] *The null hypothesis assumed that if the errors were evenly distributed, each category would contain 144 errors. This number was determined by dividing the total number of errors (864) by the number of categories (6).*

Table 2. The Most Predominant Errors, Ranked by Their Weighted Index

Rank	Error	Broad Error Category[a]	Frequency Index[b]	Dispersion Index[c]	Weighted Index[d]
1	Unnecessary or missing capitalization	Grammar	.063	.923	.493
2	Redundant, expendable, or incomparable language	Style	.049	.846	.447
3	Vague or missing language	Content	.035	.846	.440
4	Missing or wrong article	Grammar	.028	.769	.398
4	Unnecessary shift in verb tense	Grammar	.028	.769	.398
5	Misplaced/dangling modifier	Grammar	.016	.769	.393
6	Misspelling	Spelling	.066	.692	.379
7	Incorrect number format	Style	.051	.692	.372
8	Incorrect singular/plural application	Grammar	.035	.692	.364
9	Hyphen, en-, or em-dash error	Punctuation	.034	.692	.363
10	Faulty parallel structure	Style	.025	.692	.359
11	Missing comma with a nonrestrictive element	Punctuation	.020	.692	.356
12	Inconsistent terminology	Style	.017	.692	.355
13	Wrong word	Content	.036	.615	.326
14	Lack of subject-verb agreement	Grammar	.028	.615	.321
15	Equation error (eg, incorrect calculation or symbol)	Content	.027	.615	.321
16	Incorrect or missing preposition	Grammar	.024	.615	.320
17	Informal or discriminatory language	Style	.049	.538	.293
18	Unnecessary passive construction	Style	.015	.538	.277
19	Space missing or needed	Design	.014	.538	.276
20	Missing period	Punctuation	.012	.538	.275

[a]Each error was classified into one of six broad categories; these results were used to calculate contingency table analysis.
[b]The frequency index was calculated by dividing each specific error's frequency by the total number of errors (864) found across all tests in the sample.
[c]The dispersion index was calculated by dividing the number of tests each specific error was found in by the total number of editing tests (13).
[d]The weighted index was determined by relativizing the frequency index against the dispersion index (ie, adding the frequency and the dispersion indices and dividing by two).

Misspellings, the most prevailing error in many of the earlier-discussed taxonomies, ranked sixth in this study's weighted index.

DISCUSSION

Results from the contingency table analysis determined if the errors were evenly distributed across six broad categories (Table 1). Style errors and grammatical/mechanical errors had a higher than expected frequency, which could suggest that the sample's hiring managers found these errors easier to assess. However, this explanation does not account for the lower than expected frequency of punctuation and spelling errors, which are arguably the easiest error types to include and assess in an editing test. Similarly, style errors could be considered the most subjective error type and therefore the most difficult to assess. For example, different evaluators could have various opinions on what constituted redundant language, the second most prominent error in the weighted index (Table 2). The overall results from the contingency table analysis seem to suggest that hiring managers are more concerned with prospective employees' mastery of grammar, mechanics, and style and less concerned with their punctuation, spelling, and design abilities. Results from the weighted index further support this claim.

More than 60% of the top 21 errors were related to grammar/mechanics or style. The most prevailing error was "unnecessary or missing capitalization" (Table 2). Recent error taxonomies have noted a higher-than-expected frequency of capitalization errors but offered different explanations for its increased presence.[2, 9] Lunsford and Lunsford attributed the high frequency of capitalization errors in college writing to technology and the development of the students; Microsoft Word automatically capitalized words that follow a period (eg, a period used in an abbreviation) and students often capitalized terms to suggest significance (eg, "High School Diploma"). However, the high frequency and dispersion of capitalization errors in my earlier study of editing tests from a variety of industries was the result of style manual guidelines.[2] The types of capitalization errors identified in the current study align with that finding: the majority of capitalization issues related to the *AMA Manual of Style* guidelines, including the capitalization of organisms and pathogens, viruses, tests, and sociocultural designations as well as the decapitalization of common words derived from proper nouns (eg, parkinsonism). The finding extends the exploration of how context often shapes why specific writing errors are made as well as stresses the importance of knowing the stylistic standards and practices that govern a specific discipline.

In addition to errors related to capitalization, the weighted index identified "missing or wrong article," "unnecessary shift in verb tense," "misplaced/dangling modifier," and "incorrect singular/plural application" as the most predominant grammatical errors in the sample. Prospective medical editors should note that these error types are the ones that this sample's hiring managers were most concerned with their applicants recognizing and fixing.

Six style errors ranked highly in this study's weight index: "redundant, expendable, or incomparable language"; "vague or missing language"; "faulty parallel structure"; "inconsistent terminology"; "informal or discriminatory language"; and "unnecessary passive construction." The combination of the types of style errors in this sample emphasizes the importance of consistency and concision in medical editing as much as the respect that an editor must demonstrate toward people. Ninety-two percent of the sample (12 editing tests) included passages that discussed the safety or treatment of people, including patients, research participants, or health care workers. In particular, the presence of "informal or discriminatory language" as a predominant error reflects the *AMA Manual of Style's* human-centered guidelines that caution against labeling people with their disabilities or using terms that suggest helplessness.

The instances classified as "unnecessary passive construction" also suggest an awareness of human subjects and highlight the impressive detail that hiring managers afforded to designing these tests. Modified examples from the sample —"The *patient recovered* well and was discharged on the same day of surgery" and "The primary *tumor* was seen in the nasal cavity in 7 patients"—further illustrate how the context surrounding each sentence played an integral role in which subject (the person or the object) to emphasize. These examples reflect the *AMA Style Manual's* encompassing definition of voice: active voice should be used to clarify ideas or focus on the subject performing the tasks, and passive voice should be used to shift focus on mechanisms or processes.[11]

The higher-than-expected frequency of style errors in this sample (Table 2) suggests how the screening of medical editors might differ from that of other technical editors. My error taxonomy of editing tests from multiple industries demonstrated that the majority of style errors were concentrated frequently in a small number of the sample, which included only two tests from the health sciences.[2] The results of the present study, however, suggest that medical editors should be more mindful of style errors on their screening tests and that style-intensive tests may be a fixed convention in the field.

Of the remaining prominent errors in the sample, "misspelling" merits some discussion. The contingency table analysis showed a lower-than-expected frequency for this error, and the weighted index ranked this error sixth. These results are somewhat surprising, given that previous studies have shown a high frequency of misspellings,[2, 6, 8, 9] most notably, Connors and Lunsford's study, in which this error outnumbered all others by 300%.[8] Several explanations for the present study's results exist, all of which require further research.

First, the prevailing errors in this study were derived by relativizing each error's frequency against its dispersion. To my knowledge, no other study has provided a weighted index of formal errors. In fact, "misspelling" was the most frequent error in this sample but dispersed through 69% of the tests, accounting for its weighted ranking of sixth. The available published data are not sufficiently fine-grained for deeper analysis, so it is not possible to determine if spelling errors in earlier studies ranked high simply because of frequency or because of a combination of variables such as dispersion.

Next, the context of the spelling errors might explain its lower priority for the sample's hiring managers. Whereas "misspelling" outnumbered all others by 3:1 in the Connors and Lunsford study,[8] it ranked sixth in the later follow-up study and "wrong word" errors claimed the top spot.[9] The researchers attributed this shift to how students used electronic spellcheckers; the technology helped students remedy misspellings, but a reliance on the automated spelling suggestions likely resulted in the increased presence of wrong words. A breakdown of the spelling errors in the current sample showed that 62% were words that an electronic spellchecker could not detect, includ-

ing compound words, homonyms, and proper nouns. The remaining sample could be detected by the spellchecker, including general misspellings (26%) and British or alternative spellings of words (12%). Hiring managers may be less concerned with candidates' understanding of misspellings than expected, but the strong presence of errors undetectable by a spellchecker certainly suggests a means for assessing applicants' attention to detail. However, "wrong word" ranked lower (13) than "misspelling," so it is not yet possible to conclude if these results are an anomaly or an illustration of how developing student writers and expert hiring managers in the health sciences perceive error differently.

CONCLUSIONS

The results provide prospective medical editors and hiring managers with new insights into preparing for or creating an editing test. For medical editors, the list of predominant errors should alleviate some of the anxiety associated with taking an editing test. In addition to just understanding error types, however, future test takers must consider how context dictates the presence of specific errors. Understanding the contexts associated with capitalization, spelling, and passive voice (as examples) also offers hiring managers information on creating new or refining existing assessment tools. All of these conclusions must be heavily hedged, however, because of the sample size of the study.

Additional research with larger samples will extend the results as well as indicate if the privatization of editing tests (and therefore the lack of publically available examples) has produced disparity in what editing tests actually assess. The measures used to analyze this study's sample provide a first step to this deeper research. The contingency table analysis provides a means for measuring error distributions in previous studies, and these results could suggest how different populations as well as different industries prioritize error. Results from this study indicate that medical editing tests might be more style-intensive than technical editing tests. The weighted index, to my knowledge, is the first to consider both the frequency and the dispersion of specific errors. Future error research must consider error dispersion, particularly those errors that appear infrequently but are strongly dispersed in a sample. The ranking of "misplaced/dangling modifier" makes a strong case for using a weighted index in future research; it appeared infrequently but was found in 10 of the 13 tests, accounting for its weighted rank as the fifth most predominant error. These deeper explorations of error will better educate medical communicators on the skills they need to succeed in their profession and enhance the value associated with medical writing and editing.

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The appendix to this article can be found as a Journal Online Exclusive at **www.amwa.org**.

OVERVIEW OF HUMAN FERTILIZATION AND EGG ACTIVATION*

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ABSTRACT

The study of the cellular and molecular events of fertilization has contributed to the fields of cell biology and genetics and to the development of conception and contraception technologies. This review summarizes cellular and molecular events that occur in humans during sperm and egg development and during fertilization. Starting at puberty in male humans, sperm develop within the seminiferous tubules of the testes through meiosis (in which a cell with 46 chromosomes undergoes two cell divisions, creating four cells with 23 chromosomes each). These cells undergo morphologic changes, resulting in sperm with tails. Sperm mature and are stored in the epididymis. Starting at puberty in female humans, one oocyte matures each month within an ovary. At ovulation, the mature oocyte undergoes the first meiotic division and is captured by the fallopian tube. After sperm enter the female reproductive tract, they must first undergo the modifications of capacitation before they can fertilize an egg. A capacitated sperm cell must then reach the egg in the fallopian tube, penetrate the egg's protective coat (ie, zona pellucida), and fuse with the egg plasma membrane. Binding and fusion of one sperm with the egg plasma membrane triggers a large calcium rise in the egg cytoplasm. This increase in calcium stimulates the egg to modify the zona pellucida, preventing additional sperm from penetrating (creating a polyspermy block), and to complete the second meiotic division (creating an egg nucleus with 23 chromosomes). The fertilized egg (ie, zygote) has 46 chromosomes (23 from the sperm and 23 from the egg). The mitotic divisions of embryogenesis begin as the embryo journeys down the fallopian tube. About a week after fertilization, the embryo reaches the uterus, where it embeds and continues development until birth. Although much is known about the cellular and molecular events that occur during human sperm and egg development and during fertilization, unanswered questions remain.

> There is perhaps no phenomenon in the field of biology that touches so many fundamental questions as the union of the germ cells in the act of fertilization; in this supreme event, all the strands of the webs of two lives are gathered in one knot, from which they diverge again and are re-woven in a new individual life-history.
>
> **—Frank R. Lillie**[1]

How animals produce offspring that are of the same species as the parents but also with unique characteristics has been a biological phenomenon of great historical interest. One key to answering this question has involved uncovering the cellular and molecular events that occur during fertilization. Today, fertilization is understood to involve the fusion of one sperm cell with one egg cell. Understanding how sperm and eggs develop and interact during fertilization has not only advanced understanding of the biological processes of genetics, evolution, cell-cell fusion, cell division, and cell signaling but has also lent support to the cell theory (ie, all cells come from cells), which is a fundamental cornerstone of biology.[2,3] Furthermore, fertilization research has also advanced the technologies of contraception (eg, the birth control pill) and conception (eg, in vitro fertilization), which have affected human fecundity.[4] Thus, understanding human fertilization provides insight into important biological processes and clinical reproductive techniques.

This article provides an overview of the key cellular and molecular events that occur physiologically in the human body during sperm and egg development and during fertilization. This review also describes how a sperm signals an egg to complete the fertilization process and prepare for embryogenesis.

**This article is based on the AMWA Concepts in Science and Medicine workshop "Sex and Beyond: Fertilization and Early Development." Words in bold are defined in the glossary, which begins on page 111.*

DEVELOPMENT OF SPERM AND EGGS

A key aspect of animal fertilization is the development of sperm and egg cells that have half the number of **chromosomes** as that found in most cells of the parent organism. Most cells of the human body have 46 chromosomes organized into 23 pairs, with each pair of chromosomes containing similar genes (these pairs are referred to as homologous chromosomes).[5,6] Most cells of the human body with 46 chromosomes duplicate themselves through **mitosis**. During mitosis, one cell divides to create two cells with the same number of chromosomes. Thus, one human cell (eg, a cheek cell or liver

cell) with 46 chromosomes divides to create two cells with 46 chromosomes each.

Although most human cells have 46 chromosomes, the exceptions include mature egg and sperm cells, which have 23 chromosomes each.[6] Sperm and egg cells are referred to as being **haploid** because they have half the number of chromosomes. Cells that create sperm and eggs undergo a special process called **meiosis**, in which a cell with 46 chromosomes completes two cell divisions to create four cells with 23 chromosomes each. During human fertilization, one sperm cell with 23 chromosomes fuses with one egg cell with 23 chromosomes. The result is a single cell with 46 chromosomes referred to as a **zygote**, which is a **diploid** cell with the full complement of chromosomes. The zygote then undergoes mitotic cellular divisions to create an **embryo**, a **fetus**, and finally a baby whose cells each contain 46 chromosomes (until mature sperm and eggs are created later at puberty). Thus, fertilization allows for the continuation of a species with members that have a characteristic chromosomal number while also allowing for the creation of a new genetic mix since half of the chromosomes come from the father and half from the mother. This process can facilitate evolution by creating new phenotypes that may be better adapted to a changing environment.[5,7]

In male humans, meiosis occurs in the testes within structures called **seminiferous tubules**.[6] Starting at puberty, hormones stimulate special diploid cells in the seminiferous tubules to divide and create cells that will undergo meiosis. Each meiotic event creates four haploid cells with 23 chromosomes each (Figure 1A). These haploid cells then undergo morphologic changes, including the ejection of a cytoplasmic droplet and the creation of a long flagellum, or tail.[5] A specialized structure called an **acrosome** develops within the cytoplasm of the sperm head. The acrosome is a membrane-bound sac that contains enzymes that are important in fertilization.[5] The sperm cells then enter the central canal of the seminiferous tubules and are flushed away to the **epididymis**, where they finish maturation and gain the ability to swim. In one human testicle, about 100 million sperm are made daily (it takes about 70 days to make one mature sperm cell).[6] Unused sperm are reabsorbed or excreted in the urine.[5]

Baby girls are born with millions of immature eggs called **oocytes** that

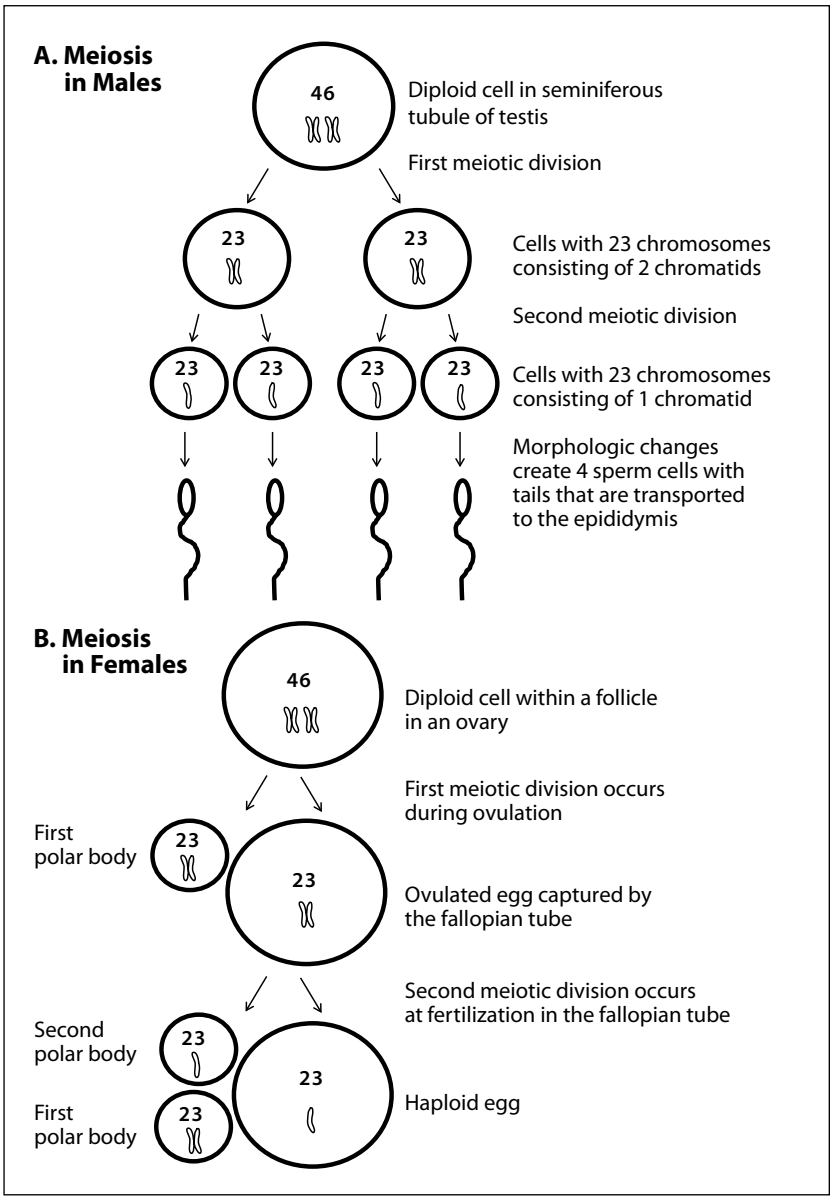

Figure 1. *Diagram of meiosis in male and female humans. During meiosis, the parent diploid cell with 46 chromosomes undergoes DNA replication so that each chromosome has two chromatids. During the first meiotic division, the homologous pairs of chromosomes separate. During the second meiotic division, the chromatids separate. For simplicity, only two chromosomes are shown instead of 46. (A) In male humans, a diploid cell with 46 chromosomes undergoes two cell divisions in the seminiferous tubules, resulting in four haploid cells with 23 chromosomes each. These haploid cells undergo morphologic changes, resulting in streamlined sperm with flagella. (B) In female humans, a diploid cell with 46 chromosomes undergoes two meiotic divisions, resulting in one large egg cell with 23 chromosomes and two or three small polar bodies (only two polar bodies are shown). The first meiotic division occurs during ovulation; the second occurs in the fallopian tube after fertilization. The first polar body may not undergo the second meiotic division (as shown here). The polar bodies eventually degrade.*

are arrested at an early stage of meiosis in the ovaries.[5,6] In contrast to the male human, who produces sex cells throughout the remainder of his life after puberty, a girl is born with all the sex cells she will ever produce. Starting at puberty, hormones in the female body trigger one oocyte in one ovary each month to mature within a structure called a **follicle**.[5] This process occurs monthly until menopause, by which time a woman will have ovulated 200 to 400 eggs (which ovary ovulates the egg each month appears to be random).[6] Both the oocyte and the follicle grow larger in the ovary each month. The oocyte increases in diameter from about 10 µm to about 80 to 100 µm and stockpiles the materials (messenger RNA, proteins, etc) needed for embryogenesis if fertilization occurs.[5] The oocyte is surrounded by an extracellular layer called the **zona pellucida**, which consists of glycoproteins[3] and is important in protecting the oocyte and in facilitating successful fertilization. An increase in levels of luteinizing hormone triggers **ovulation** of the oocyte from the ovary and the first meiotic division.[5]

During the first meiotic division, cell cleavage is unequal in that one daughter cell retains most of the cytoplasm (this large cell is now often referred to as the egg), with the other daughter cell retaining very little (this small cell is referred to as the first **polar body** and may not undergo the second meiotic division) (Figure 1B). After ovulation, the egg is captured by a **fallopian tube** and slowly progresses down the fallopian tube toward the uterus.[5] If copulation has occurred and sperm are present in the female reproductive tract, fertilization can take place in the fallopian tube (Figure 2). The interaction of a sperm cell with the egg at fertilization is the event that stimulates the second meiotic division in the egg and the completion of egg meiosis.[5] The second meiotic division is also unequal: one cell (the egg) retains most of the cytoplasm and the daughter cell (also called a polar body) retains very little (Figure 1B). Thus, in female humans, each meiotic event produces only one large egg with 23 chromosomes and two or three small polar bodies (which later degenerate). This process allows the egg to maintain enough nutrients, proteins, and other materials needed for embryogenesis.[5]

During the monthly reproductive cycle, the hormones responsible for oocyte maturation and ovulation also synchronize events in the uterus (eg, the lining of the uterus thickens) so that the uterus is prepared to accept an embryo if fertilization occurs.[7] If fertilization does not occur, fluctuations in hormone levels cause the egg and uterine lining to be sloughed off in the menstrual flow. If conception occurs, the fertilized egg completes meiosis and then the mitotic cell divisions of embryogenesis begin in the fallopian tube. The multicellular embryo continues traveling down the fallopian tube, reaches the uterus, and embeds itself in the uterine lining (Figure 2). These events trigger hormonal changes that maintain the pregnancy and also prevent oocyte maturation and ovulation during gestation.[7]

FERTILIZATION

Sperm and egg cells must complete several coordinated steps for fertilization to be successful. After sperm are deposited in the vagina, they must journey up through the vagina past the cervix, through the uterus, and up into the one fallopian tube that contains an egg. Although the journey of the sperm is often depicted as a race, with the fertilizing sperm being the "winner" that reaches the egg first, this depiction is not necessarily true. A sperm cell that reaches the egg too quickly may not be capable of successful fertilization. To successfully fertilize an egg, a sperm cell must first reside in the female reproductive tract long enough to undergo a process called **capacitation**.[3,5,8] A sperm cell that reaches an egg without first completing capacitation cannot fertilize the egg. All the changes to the sperm during capacitation are not completely understood, but research suggests that these modifications induce changes in sperm motility and in components of the sperm plasma membrane.[5,8] Approximately 200 million sperm are typically deposited during one ejaculation, but only

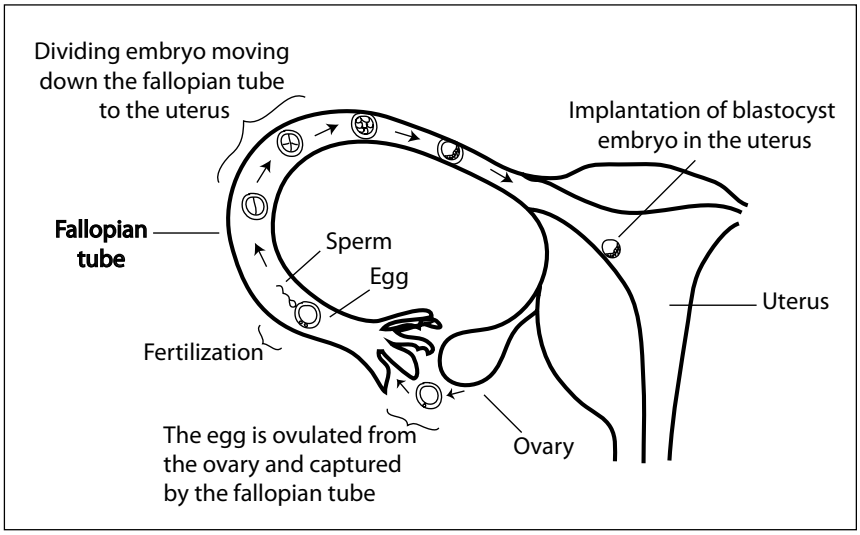

Figure 2. *Diagram showing location of fertilization and early embryogenesis. For simplicity, only one fallopian tube and one ovary are shown. After an egg is ovulated, it is captured by the fallopian tube, where fertilization can occur if sperm are present. After fertilization, the mitotic cell divisions of embryogenesis occur as the embryo migrates down the fallopian tube to the uterus. Upon reaching the uterus, the embryo is about 1 week old and is at a stage of development called a blastocyst. The blastocyst implants in the uterus, where the rest of development takes place until birth.*

about 200 sperm reach the egg in the fallopian tube.[5] After being deposited in the vagina, sperm usually reach the egg during a period that varies from 30 minutes to 6 days.[5] Sperm that reach the egg in as little as 30 minutes are believed to be helped by contractions of the uterus and are likely incapable of fertilization, because not enough time may have passed for completion of capacitation.

When an egg is ovulated, some cells from the follicle that surrounded the developing oocyte are also ovulated along with the egg. After reaching the egg in the fallopian tube, a sperm that has undergone capacitation must make its way through the layer of small follicle cells surrounding the egg. A membrane-bound enzyme on the sperm surface facilitates the movement of the sperm through this layer of follicle cells.[9]

The sperm must then penetrate the tough zona pellucida (the extracellular "shell" surrounding the egg) (Figure 3).[8] The sperm binds to the zona pellucida, triggering an event called the acrosome reaction.[3] During this reaction, rising calcium levels in the sperm cytoplasm cause exocytosis of the acrosomal vesicle from the sperm head. Exocytosis of the vesicle releases digestive enzymes onto the zona pellucida; the enzymes create a hole through this matrix, allowing the sperm to swim through.[5] The sperm cell can then approach the surface of the egg plasma membrane.

The sperm plasma membrane binds to the egg plasma membrane and the two membranes fuse. Next, the sperm nucleus with its cargo of 23 chromosomes enters the egg cytoplasm. The interactions that occur between the sperm plasma membrane and the egg plasma membrane during binding and fusion are not completely understood, but they trigger the egg to release enzymes that modify the zona pellucida so that no other sperm can penetrate the zona.[5] Modification of the zona pellucida thus acts as a block to **polyspermy** by preventing fertilization of an egg by multiple sperm. If more than one sperm cell penetrates the zona and fertilizes an egg, the result will be an embryo with an abnormal number of chromosomes (two sperm fertilizing an egg results in an embryo with 69 chromosomes instead of 46). Polyspermy usually leads to embryonic death.[8] Binding and fusion of the sperm with the egg also triggers the egg to undergo the second meiotic division and to complete meiosis,[5] creating an egg nucleus with 23 chromosomes.

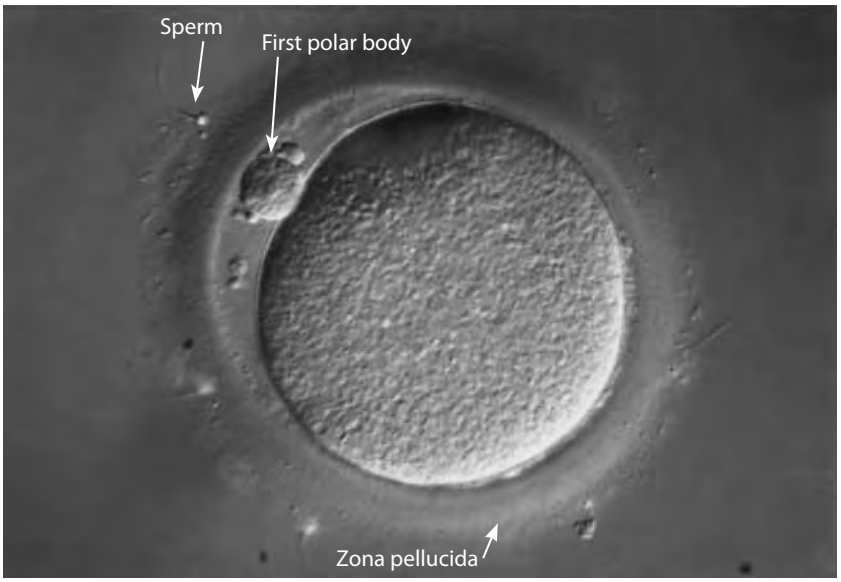

Figure 3. *Photomicrograph of a mammalian egg that has completed the first division of meiosis and has been inseminated. The egg is about 100 µm in diameter and is surrounded by the zona pellucida. This egg has completed the first division of meiosis (as evidenced by the presence of the first polar body next to the egg, under the zona pellucida). A sperm visible near the polar body has not yet penetrated the zona pellucida. This photograph was likely taken during an in vitro insemination; in vivo, the egg would be surrounded by small follicle cells that accompany the egg after ovulation. (Photograph reproduced from www.clipart.dk.co.uk. Used with permission. Arrows and labels added by author.)*

The sperm and egg nuclei, each with 23 chromosomes, then migrate toward each other in the egg cytoplasm over a period of about 12 hours.[5]

When the haploid egg and sperm nuclei meet, the nuclear membranes break down. The 46 chromosomes then line up in single file in the center of the zygote in preparation for the first mitotic division of embryogenesis,[5] which results in two daughter cells that each have 46 chromosomes. The early mitotic cell divisions of embryogenesis take place in the fallopian tube as the embryo continues to make its way to the uterus (Figure 2).[6] The zona pellucida protects the developing embryo and also helps prevent the embryo from embedding within the fallopian tube,[5] which is referred to as an ectopic pregnancy and usually results in pregnancy loss.[6] About a week after fertilization, the multicellular embryo, called a **blastocyst** at this stage of development, reaches the uterus.[6] The blastocyst then releases enzymes that create a hole in the zona pellucida, allowing the embryo to escape (or "hatch") from the zona pellucida and embed within the uterine lining.[5, 6] The rest of development occurs within the uterus until birth.

A KEY SIGNALING EVENT AT FERTILIZATION

By the early 20th century, fertilization researchers realized that the sperm cell not only delivers a haploid nucleus to the egg but also somehow signals or activates the egg cell to prepare for embryogenesis (in mammals, egg activation events include creation of the

polyspermy block and completion of meiosis).[10, 11] The signal for egg activation was not discovered until 1977, when two research groups studying fertilization in sea urchin and fish eggs independently discovered that a large increase in calcium levels occurs in the egg cytoplasm at fertilization.[12, 13] This calcium rise has since been found to occur at fertilization in eggs from all animal and plant species examined, including maize (ie, corn), jellyfish, bivalves (eg, clams), annelids (eg, polychaetes or segmented marine worms), sea urchins, starfish, ascidians (ie, sea squirts), frogs, mice, and humans.[14, 15] If this calcium rise is blocked, further development is inhibited because the egg will not reenter the cell cycle. In mammals, inhibiting the calcium rise prevents the egg from creating the polyspermy block, finishing meiosis, and initiating embryogenesis. In mammalian eggs, the calcium rise occurs when the sperm triggers calcium to be released into the egg cytoplasm from the egg **endoplasmic reticulum** (a membrane-bound organelle in the egg cytoplasm that is important in protein synthesis and in calcium storage).[14]

The calcium rise that occurs in eggs at fertilization has been visualized with calcium indicators and microscopy techniques. In eggs from vertebrate species (eg, fish, frogs, and mice), the calcium rise has been shown to occur first at the point of sperm-egg interaction and then to spread across the egg as a "wave" (Figure 4).[12, 16, 17] Although some vertebrate eggs (eg, those of fish and frogs) undergo only one calcium wave at fertilization, mammalian eggs (eg, those of mice and humans) undergo multiple calcium waves or oscillations (Figure 5) that continue for several hours after fertilization.[12, 14-18] In humans, these oscillations can occur about every 10 to 30 minutes.[18] In eggs from mice, creation of the polyspermy block requires four to eight calcium oscillations and completion of meiosis requires 16 to 24 oscillations.[19] Although the discovery of the calcium rise in the egg at fertilization was a crucial step toward understanding how the sperm activates the egg, the signaling molecules used by the sperm to initiate the calcium rise are not completely understood.[14, 20-22]

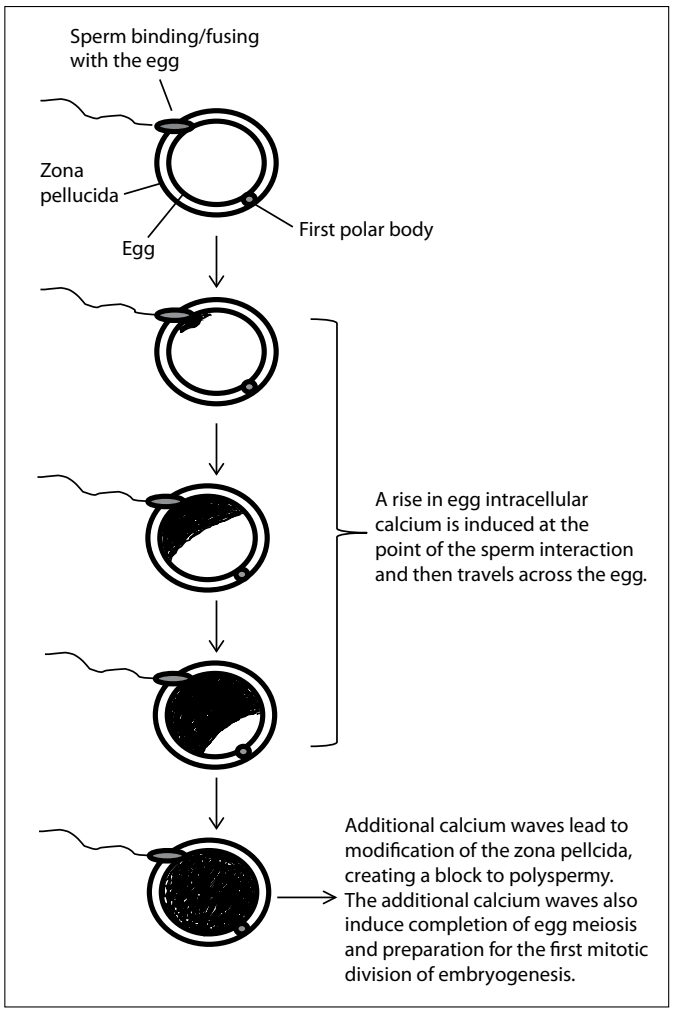

Figure 4. *Diagram showing the calcium rise at fertilization in the mammalian egg. Binding and fusion of the sperm with the egg stimulates a rise in egg cytoplasmic calcium starting at the point where the sperm first interacts with the egg. The calcium rise propagates across the egg to the opposite side (as indicated by the shading). Calcium levels in the egg cytoplasm then decrease until the next calcium wave occurs. In mammals, multiple calcium waves (or oscillations) are required to induce the egg to create the block to polyspermy and to finish meiosis.*

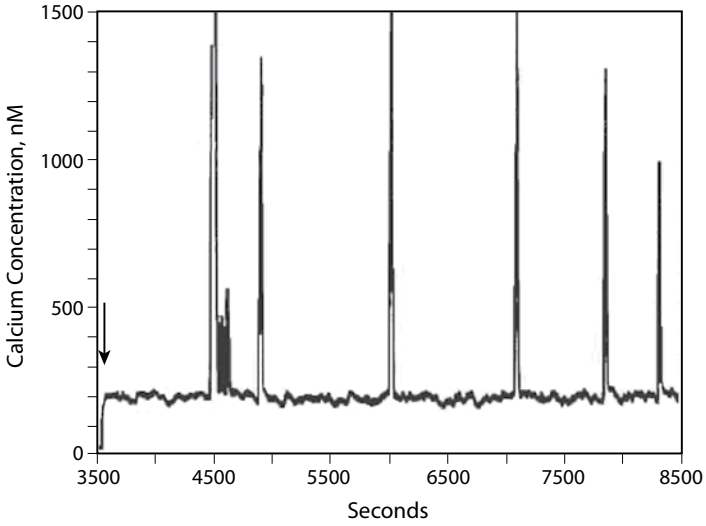

Figure 5. *Calcium level oscillations in a human egg at fertilization. A human egg was injected with aequorin (a calcium indicator that emits light upon binding calcium) and placed on a microslide under a microscope. Sperm were added to the microslide at the time point marked by the arrow (far left). Light emitted from the egg by the calcium indicator (indicating changes in calcium levels) was measured by a photomultiplier tube and charted. The first calcium rise occurred about 16 minutes after the addition of sperm; multiple calcium rises followed. Each spike in calcium levels corresponds to a calcium wave like that diagrammed in Figure 4. (Adapted from Taylor et al.[18] Used with permission from Oxford University Press.)*

CONCLUSION

This article provides an overview of sperm and egg development and the cellular and molecular events of fertilization in humans. Readers interested in obtaining more detailed information on these processes are encouraged to delve into some of the textbooks and articles in the list of references.

The purpose of this overview is to provide some insight into how understanding fertilization has led to many advances in the knowledge of basic biologic processes. There are still many unanswered questions about sperm and egg development and about fertilization, including the following:

- How is a cell signaled to undergo meiosis instead of mitosis?
- What are the essential modifications that occur in sperm during capacitation?
- What are the identities of the key molecules involved in sperm-egg binding and fusion?
- How does a sperm cell trigger the calcium rise in a mammalian egg?

Ongoing work examining these and other questions at the frontiers of reproductive research will likely provide important information on the biological processes of animal reproduction.

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Author disclosure: *The author is an employee of Amgen Inc (Thousand Oaks, CA) and owns Amgen Inc stock.*

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Glossary

acrosome—A membrane-bound structure containing digestive enzymes located in the cytoplasm of the sperm head. During fertilization, the acrosome fuses with the sperm plasma membrane, causing the digestive enzymes to be externally released. The enzymes create a hole in the egg zona pellucida that the sperm can pass through.

blastocyst—A stage of development reached by a mammalian embryo about a week after fertilization. The blastocyst consists of an outer layer of cells called the trophoblast, a fluid-filled cavity, and a cluster of cells called the inner cell mass located to one side within the embryo. The trophoblast cells create the embryonic portion of the placenta, and the inner cell mass develops into the embryo proper.

capacitation—A series of molecular changes that a sperm must complete in the female reproductive tract before becoming capable of fertilizing an egg. These molecular changes include modifications to the components of the sperm plasma membrane.

chromosomes—Structures consisting of a linear strand of DNA wound up with proteins. Chromosomes are located in the cell nucleus and are passed from one generation to the next. Chromosomal DNA contains instructions (or genetic code) for the development of an organism of a particular species.

Glossary (cont.)

diploid—A state of having two sets of each chromosome. In humans, the somatic cells (or nonsex cells) have two sets of homologous chromosomes in each cell (each somatic cell has 23 pairs of homologous chromosomes for a total of 46 chromosomes). Homologous chromosomes are similar in size and contain genes for the same characteristics.

embryo—In humans, the organism during the developmental period from fertilization through the eighth week after fertilization.

endoplasmic reticulum—A membrane-bound network structure found in the cytoplasm of many cell types. The endoplasmic reticulum has a role in protein synthesis and in storage of various components such as calcium.

epididymis—A cordlike structure located along the posterior border of the testes, where sperm mature and are stored.

fallopian tubes—Two tubes (also called oviducts) lined with cilia that extend from each end of the uterus toward the ovaries. Although continuous with the uterus, the fallopian tubes are not directly connected to the ovaries. After ovulation, a fallopian tube captures a mature oocyte (ie, an egg) and transports it and then the developing embryo (if fertilization occurs) to the uterus.

fetus—In humans, the organism during the developmental period from the ninth week after fertilization until birth.

follicle—A spherical cluster of cells in an ovary that surrounds and supports the development of an oocyte. In response to hormonal changes, one follicle each month (starting at puberty) will grow and support the growth of an oocyte. In response to an increase in luteinizing hormone, a mature oocyte will be ovulated from a mature follicle.

haploid—The state of having one set of chromosomes (ie, having only one member of each set of homologous chromosomes). In humans, the haploid number of chromosomes is 23; only sperm and egg cells attain the haploid state.

meiosis—A method of cell division that occurs only during the development of sex cells (ie, sperm and eggs). During this process, a diploid cell replicates its DNA (so each chromosome has two chromatids) and then undergoes two cell divisions to create haploid sex cells. The first cell division separates the homologous chromosomes, and the second cell division separates the chromatids. During sperm development, the result is four haploid cells. During mammalian egg development, unequal cell division during meiosis results in one large haploid cell (the egg) and two or three small cells called polar bodies, which eventually degenerate.

mitosis—A process by which one cell divides into two identical cells that have the same chromosomal number as the original parent cell.

oocyte—The female sex cell that develops within a follicle in the ovary. Through meiosis, the oocyte becomes an egg cell that can be fertilized. The first meiotic division occurs during ovulation, and the second meiotic division occurs during fertilization in the fallopian tube.

ovulation—In humans, the process during which a mature follicle ruptures and releases a mature oocyte or egg from an ovary. This process is stimulated by an increase in luteinizing hormone, which is secreted by the pituitary gland (this hormone also stimulates the oocyte to complete the first division of meiosis). After physical expulsion from the ovary, the egg and accompanying follicle cells are captured by a fallopian tube.

polar bodies—In mammalian females, two or three small cells produced during meiosis. The polar bodies eventually degenerate.

polyspermy—Fertilization of an egg by more than one sperm. This condition is usually lethal to the early embryo. (Note: Twins are not produced by two sperm fertilizing one egg. Identical twins are produced when an early embryo separates into two clusters of cells and each cluster develops into a fetus. Nonidentical twins result when a woman ovulates two eggs that are each fertilized by one sperm.)

seminiferous tubules—Channels in the testes that contain support cells and cells that undergo meiosis to create haploid sperm cells.

zona pellucida—A transparent, elastic, noncellular glycoprotein layer that surrounds and protects the oocyte, egg, and early embryo. The zona pellucida also helps prevent both polyspermy and ectopic pregnancies.

zygote—The diploid cell resulting from fertilization after the fusion of a haploid sperm cell with a haploid egg cell.

Cultural Diversity in the Workplace

Cultural diversity in the workplace is an important issue, as the breadth of diversity has expanded in terms of age, gender, race/ethnicity, language, religion, and sexual orientation. The following are just a few of the many online resources on this topic.

Workforce Diversity Network (www.workforcediversitynetwork.com)
Professional Resources (list of publications, many of which are accessible online)

Bloomberg Businessweek (http://bx.businessweek.com)
Business Exchange Topic: Workplace Diversity (includes more than 900 news articles and 127 blog items on the topic)

National Public Radio (www.npr.org)
Defining Diversity: Beyond Race and Gender
by Kevin Whitelaw

Microsoft Office (http://office.microsoft.com)
No more crabby workplaces: Working together on diversity
Crabby Office Lady column

ONLINE EXCLUSIVE

Be sure to visit the *AMWA Journal* online (**www.amwa.org**) to find additional content in this issue.

- Generational Diplomacy
- Podcast with John Hadley, Career Search Counselor, on networking
- In the Service of Good Writing: Between You and Me, Please
- Web Wanderings

COUNTING THE DAYS TO SACRAMENTO

By Brian Bass
2012 Annual Conference Administrator

The annual conference is just days away. Schedules are set, reservations made, and, for many of you, the packing is already underway. I'm hoping to see a thousand of my friends and fellow AMWA colleagues in Sacramento for the 72nd Annual Conference, and I wish I would see more of you. If members are the heart of AMWA, the annual conference is the electricity that keeps us pumping all year long.

Whether you're reading this as you wing your way toward Sacramento International Airport or over the weekend as you get ready to drive or train your way in for the big event, if you have a moment in your schedule to spare, following are some great ideas on how you can fill every minute of your conference experience with information and ideas that are sure to inspire you. If you're not able to attend this year's annual conference, I hope you'll continue reading anyway because the educational and networking activities and opportunities I'm about to highlight comprise the best value a professional medical communicator will ever find to enrich and advance their career. And if what I'm about to tell you motivates you to drop everything and join us in Sacramento, please find me and let me know!

WORKSHOPS

Workshops are, and always will be, the number-one reason AMWA members attend the annual conference. This year, attendees are able to register for more credit workshops than ever before—a total of four including up to three advanced workshops, and I know many people have taken advantage of this opportunity.

GUEST SPEAKERS

Dr Neal Baer, Executive Producer of CBS-TV's *A Gifted Man*, will give the keynote address on Thursday morning and receive AMWA's John P. McGovern Award. Mary Roach, award-winning author of *Stiff—The Curious Lives of Human Cadavers*, *Spook—Science Tackles the Afterlife*, *Bonk—The Curious Coupling of Science and Sex*, and *Packing for Mars—The Curious Science of Life in the Void* will receive the Walter C. Alvarez Award and speak at the Alvarez Luncheon on Friday.

Photo by David Paul Morris

OPEN SESSIONS

Over the span of 3 days, attendees have about 37 open sessions to engage their minds at this year's conference. You'll find hour-long and 90-minute sessions on a wide range of topics relevant to the broad interests of AMWA members. In listening to members, we made a special effort this year to offer open sessions of particular interest to medical editors and medical writers in the field of devices and diagnostics.

Especially notable this year are two open sessions hosted by the FDA: "FDA Drug Safety Communications: Principles, Practice, and Evaluation" (OS-04), presented by Laura L. Pincock, PharmD, MPH, and "FDA Dos and Don'ts of Advertising and Promotion" (OS-08), presented by Lisa Hubbard, RPh; an open session hosted by the National Library of Medicine (NLM): "After the Gold Rush: NLM and Gold Nuggets of Information!" (OS-16), presented by Kelli Ham, MLIS; and an open session hosted by the Drug Information Association: "Planning for Future Scenarios in Medical Product Development." Also look for the many sessions being presented by your fellow AMWA members, including "How to Get Your Second Medical Writing Job," presented by members of the AMWA Young Professionals group, as well as by esteemed guest presenters. Admission to all open sessions is included in your registration fee!

NETWORKING OPPORTUNITIES

Members asked for more networking opportunities and this year we deliver. There's the "California Dreaming" welcome reception on Wednesday evening, a new free Networking Luncheon on Thursday, a new free Networking Reception on Thursday evening, a free Networking Breakfast with the poster presenters and conference exhibitors on Friday morning, and another free Networking Luncheon on Saturday afternoon. All this is also included in your registration fee!

ROUNDTABLES

The Breakfast Roundtables are always popular with conference attendees, and this year is no exception. There are about 76 roundtables to choose from on a wide range of topics, offering an excellent opportunity for you to feed your body and your mind. From "How to Write a Book Proposal" to "How to Rock Conference Coverage" to "Biomarkers and Personalized Medicine" to "Transitioning from Benchtop to Medical Writing," there's something for everyone: freelances, staffers, seasoned medical communicators, and newbies alike.

POSTERS

The poster presentations have always been popular with annual conference attendees, and this year we have some great ones. Check out the abstracts of the posters beginning on page 114. You can read the posters at your leisure throughout the conference, but be sure to stop by Friday morning to visit with the presenters.

Eureka! There's a lot to discover at the 2012 AMWA Annual Conference. I look forward to seeing you there!

POSTER PRESENTATIONS AT 2012 AMWA ANNUAL CONFERENCE

Eight abstracts were accepted for poster presentations at the 2012 AMWA Annual Conference in Sacramento, CA. Posters are designed to allow medical communicators to share their recent innovations, advances, and discoveries in a number of areas. The abstracts for this year's posters are included here to provide a preview of the information to be displayed at the conference. The display times for poster presentations are Wednesday, 3:00 to 8:00 PM; Thursday, 7:00 AM to 7:00 PM; and Friday, 7:00 AM to 4:00 PM. In addition, conference attendees can meet the poster presenters on Friday, 7:15 to 8:45 AM.

Editor's note: To maintain version control, the abstracts are published exactly as they were submitted; they have not been changed during the copyediting or proofreading processes of the Journal.

A BIOTHERAPEUTICS PLAYBOOK

J. Nicole Earnhardt, PhD, *Regulatory Submission Expert, Worldwide Research & Development, Pfizer, Inc., San Diego, CA*
Gretchen E. Dean, MA, *Director, Worldwide Research & Development, Pfizer, Inc., Groton, CT*

Biotherapeutics (BioTx) or biologics are medicines for the prevention or treatment of human diseases. BioTx exist as numerous modalities, such as antibodies, antibody-drug conjugates, peptides, and oligonucelotides. From a drug development perspective, the studies to conduct to support first-in-human investigational new drug applications and ultimately for marketing authorization will vary based on the BioTx modality. Therefore, for the regulatory writer in the pharmaceutical/biotechnology industry, who supports BioTx programs and manages study components and regulatory submission contributions, this presents a challenge because of the diversity of BioTx modalities. In response to this challenge, we have created a generic BioTx playbook for our discipline, the nonclinical pharmacokinetic (PK), absorption, distribution, metabolism, and excretion (ADME) sciences. This playbook defines PK/ADME study deliverables at key drug development milestones for each BioTx modality, and thus, provides basic information to help our nonclinical PK/ADME writers plan for study components for regulatory submissions. We are taking the generic BioTx playbook a step further and creating a historical BioTx playbook for the nonclinical PK/ADME sciences, based on our company's portfolio. Since each BioTx program is unique and the timing of and the specific studies that are conducted will vary depending on numerous factors, a historical BioTx playbook maintained as a reference source/archival system will capture our learning's in this evolving cutting-edge field of medicines. This poster will include the generic BioTx playbook, with emphasis on the PK/ADME study deliverables at key drug development milestones, our approach to creating a historical BioTx playbook, and tips for translating this information to support authoring and preparation of regulatory submissions. Our goal is to share our knowledge and approach to breaking down a complicated process for training, guidance, and reference purposes to guide similar efforts by other regulatory writers in any drug development discipline (eg, drug safety, clinical pharmacology).

BYLINE AUTHORSHIP: RESULTS FROM A SURVEY OF MEDICAL WRITERS

Jon Nilsen, Erica Rockabrand, Paul Feinstein; *Amgen Inc., Thousand Oaks, CA*
Lucy Hyatt; *Amgen (Europe) GmbH, Zug, Switzerland*
Larry Kovalick, Shawn Lee, Dikran Toroser, Geoff Smith; *Amgen Inc., Thousand Oaks, CA*

Introduction: Recently it has been proposed that full authorship for medical writers, in accordance with the International Committee of Medical Journal Editors (ICMJE) authorship criteria, would help mitigate misperceptions concerning ghostwriting and unacknowledged contributions.

Methods: Medical writers were polled, via AMWA and LinkedIn™, to assess the prevalence of byline authorship by medical writers who made contributions to medical publications. The survey included additional questions exploring circumstances leading to this authorship decision and types of publications involved.

Results: Of 158 visitors, 76 completed the survey. Analyses included only medical writers (n=71). Most respondents (66% [47/71]) were experienced medical writers (≥5 years experience; 20% had 3 to 5 years experience, and 14% had <3 years experience) employed by industry (39% [28/71]) or as freelance writers (38% [27/71]). Of the 48% (34/71) of respondents who had been a byline author on a medical publication, most were included based on fully meeting ICMJE authorship criteria (50%) or by a co-author's invitation (26%); only 12% were included due to journal requirements. In all applicable cases, all co-authors agreed that the medical writer met full authorship criteria. Acknowledgement of medical writing support was more likely (72% [34/47] vs 40% [4/10]) among writers

who always communicated the need for authors to meet ICMJE criteria (n=47) than among those who never communicated ICMJE criteria (n=10). Writers who always communicated authorship criteria to the authors participated more often as byline authors than those who never informed the authors of the criteria (51% [24/47] vs 20% [2/10]). Article types with medical writers as authors were distributed across reports of original data (62% [21/34]) and review articles (32% [11/34]).

Conclusions: Routine communication of ICMJE authorship criteria is associated with a higher likelihood of proper acknowledgment of medical writing support and inclusion of medical writers as byline authors.

EVIDENCE OF DECREASED GHOSTWRITING IN A SERIES OF THREE SURVEYS OF MEDICAL COMMUNICATORS CONDUCTED BETWEEN 2005 AND 2011

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Adam Jacobs, PhD, MSc, *Director, Dianthus Medical Limited, London, UK*

Introduction.—The International Committee of Medical Journal Editors (ICMJE), American Medical Writers Association (AMWA), and European Medical Writers Association (EMWA) agree that substantial contributions to manuscripts submitted for publication should be disclosed in a byline (authorship) or an acknowledgment. Not disclosing such contributions (aka, "ghostwriting") is unethical and perceived to be common; however, the prevalence is unknown. To determine the proportion of substantial contributions by medical communicators that are undisclosed in submitted manuscripts, proportion of medical communicators who request acknowledgment of their contributions and disclosure of their potential conflicts of interest, and effect of familiarity with publication guidelines on disclosure, we conducted a series of surveys.

Methods.—Web-based, self-administered, confidential survey of AMWA and EMWA members conducted first in 2005 and repeated in 2008 and 2011. Our survey focused on manuscripts to which survey participants had made substantial contributions (not all published articles) and did not define "substantial" contribution.

Results.—The number of participants with valid data was 843 in 2005, 773 in 2008, and 620 in 2011. The mean weighted percentage of manuscripts with undisclosed contributions was 61.8% (95% CI, 59.0–64.6) in 2005, 41.7% (95% CI, 38.6–44.7) in 2008, and 33.0% (95% CI, 29.7–36.3) in 2011. In all surveys, participants' familiarity with publication guidelines was associated with fewer undisclosed contributions and an increased probability that participants would request acknowledgment of contributions and disclosure of potential conflicts of interest.

Conclusions.—Our findings indicate that the proportion of undisclosed substantial contributions by AMWA and EMWA members decreased by 47% between 2005 and 2011. Associations between disclosure and familiarity with guidelines suggest that education may promote good publication practices. The most important limitation is selection bias as participants may not have been representative of the entire community of medical communicators. More research is needed to confirm our findings.

A MEDICAL WRITER'S ROLE IN THE NEW PROTOCOL DEVELOPMENT PROGRAM AT THE NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES

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Doreen G. Chaitt, *Clinical Research Oversight Manager, Institutional Review Board,* and **Jerome F. Pierson**, *Branch Chief, Regulatory Compliance and Human Subjects Protection Branch, Division of Clinical Research, National Institute of Allergy and Infectious Diseases, Bethesda, MD*

Introduction: Founded in 2009 by the National Institute of Allergy and Infectious Diseases (NIAID), the Protocol Development Program (PDP) delivers early interventions in protocol development by expediting processes, managing administrative and regulatory requirements, and providing writing support within the institute. The PDP team consists of protocol navigators who assist with the logistical aspects of the program and medical writers who are responsible for writing and editing clinical protocols from study concepts (hypotheses, study objectives, and design), informed consent documents, standard operating procedures, and publications.

Methods: Process steps and milestones inherent to the protocol development process at NIAID were identified and mapped using the Six Sigma approach.

Results: The process mapping led to the development of a functional flowchart that tracks 48 steps and 8 milestones involving 12 departments/

functions; the medical writer plays an integral role in 16 of the 48 steps. The protocol development process begins once a concept of the planned protocol is approved and timelines are set to accommodate the needs of the study. The medical writer collaborates with the principal investigator to draft the protocol, which is then submitted for an intramural scientific review. Following approval, the medical writer drafts the informed consent, and all the documents are subsequently submitted for a pre-Institutional Review Board (IRB) and an IRB review. The documents may also be submitted for a simultaneous review by other committees if warranted by the study design. Throughout the process, the medical writer works closely with the principal investigator to help address any comments and stipulations received from the various review committees, while the protocol navigator ensures that all the logistical and regulatory requirements have been met.

Conclusions: Our program has successfully implemented a new approach to improve processes for intramural research at NIAID, and the medical writer plays a pivotal role in this approach.

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PREPARING HIGH-QUALITY SERIOUS ADVERSE EVENT NARRATIVES FOR CLINICAL STUDY REPORTS

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Serious adverse events (SAEs) are key safety information required for evaluation of a drug or a biological. In addition to analysis of these events at a subject population level, regulatory agencies require inclusion of a brief narrative of these events in the clinical study report (CSR). Assessment of these events by regulatory agencies may impact the drug approval and drug labeling. It is essential to prepare high-quality SAE narratives that provide accurate description and clear understanding of the events progression and management, which facilitates assessment of relevance and criticality of these events.

We developed a process that assures high-quality SAE narratives. We established a template based on ICH E3 guideline and the procedures from initial drafting to final incorporation into the CSR. First, the assigned medical monitor for a study evaluates the SAEs as they occur and drafts narratives based on the clinical data and pharmacovigilance data. The initial drafts are then reviewed by a team consisting of two to three clinical development physicians and a pharmacovigilance representative. During this review, additional queries may be generated. The responsible medical monitor works with the clinical study team or directly the investigative site to resolve the queries. All responses to queries are shared to update both databases. The narrative drafts are transferred to a medical writer for processing and further data verification against the final study data. After quality control review, the SAE narratives are incorporated into the CSR.

Our process utilizes a team approach including medical monitors' medical expertise and medical writers' technical writing skills. We are proactive in investigation of the events and query the site as close as possible to the event occurrence. This process is also useful in training new medical monitors. Participation of all medical monitors in medial review ensures consistency of the SAE narratives across different therapeutic areas.

THE SAFETY RISK MANAGEMENT PLAN (RMP) DEVELOPMENT AND GLOBAL IMPLEMENTATION

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Introduction: The Safety Risk Management Plan (RMP), a safety document required by the European health authority (European Medicines Agency [EMA]), is part of the drug regulatory approval process. An RMP includes various sections that require medical writing expertise on how to properly provide summaries of important identified and potential risks of an investigational product, which does include missing information. The role of the medical writer and interaction with other internal functions is crucial to the quality of the RMP from both a scientific and medical content perspective. The RMP requires the necessary safety and risk management strategies by communicating the pharmacovigilance activities that address the safety concerns for an investigational product.

Methods: The poster will summarize an RMP structure based on current pharmacovigilance guidelines. We highlight the level of interaction and communication required to successfully prepare an RMP, outlining the writing and review process and consensus agreements necessary to meet the required deadlines for regulatory submission. Best practices will include recommendations for conference attendees who may be new to risk management documents.

Results: Results will include relevant information on RMPs (e.g., number prepared a year, number of people involved, timelines based on submission RMP, etc) and synchronization with other aggregate safety documents and reports (e.g., Periodic Safety Update Report, Company Core Data

Sheet and local labels, Summary of Clinical Safety) that are not necessarily found in the regulatory submission. A literature review on industry-reported RMP metrics will be produced. Appropriate guidelines will be referenced.

SYSTEMATIC REVIEW ON THE PREVALENCE OF GHOSTWRITING: MISLEADING, MISGUIDED, AND MISTAKEN 'EVIDENCE'

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Sericka McGee, *Fellow of Medical Communications, Hamilton House, Virginia Beach, VA*

Introduction
As ghostwriting is unethical, the perception that '50 to 100%' of industry articles are ghostwritten is alarming. This perception, however, undermines advocacy efforts highlighting ethical publication practices. Challenging this perception requires a clear understanding of the underlying evidence. Our primary objective was to conduct the first systematic review on the prevalence of ghostwriting.

Methods
We searched electronic databases (eg, MEDLINE, EMBASE, Cochrane Library) in March 2011. Search terms included variations on ghostwriting and ghostauthorship. We included primary and secondary publications in English reporting a numerical estimate of the prevalence of ghostwriting. Two independent reviewers screened all publications; discrepancies were resolved by consensus.

Results
We retrieved 137 publications and excluded 112. There were 25 eligible publications (9 original research, 16 reviews / commentaries). Estimates on the prevalence of ghostwriting varied markedly. Estimates were influenced by whether: (1) a definition for ghostwriting was provided; (2) conservative definitions were used; (3) errors were made in re-reporting data. Recent estimates from original research using conservative definitions indicated that the prevalence of ghostwriting is low (0.2% - 4.3%) and is decreasing.

Conclusions
The evidence that ghostwriting is pervasive is often misleading, misguided, and mistaken. Ghostwriting is unethical, but sensationalising its prevalence won't reduce it. Our review highlights the importance of standardising the definition of ghostwriting and reporting results accurately. The most robust evidence indicates that ghostwriting is low and decreasing; this evidence should be leveraged in future advocacy efforts.

UTILIZING TECHNIQUES APPLIED BY COLLEGE WRITING CENTER TUTORS IN MEDICAL EDITOR-AUTHOR DIALOGUE

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The medical editor-author dialogue may be improved by applying coaching techniques used by college writing center tutors. Writing centers encourage tutors to consider themselves as coaches, there to improve students' overall writing and help them improve the writing in hand. In keeping with this goal, tutors practice and employ communication skills—active listening, body language, and verbal and written comments—that convey patience and respect and that encourage better written performances. These same techniques, when applied effectively to the medical editor-author dialogue, can increase the comfort level of both the editor and the author, as well as make their relationship more productive. For example, editors can improve the face-to-face, author-editor interaction by listening actively. Active listening includes allowing an author enough time to finish a thought before making a recommendation, making eye contact, mirroring and granting validity to author concerns, and maintaining friendly posture. An editor can further facilitate by asking guiding, open-ended questions, which might include requesting more information or clarification and then making formative suggestions for revision. In addition, inquiring about how a text might affect an intended reader (rather than how it affects the editor) allows an editor to maintain respect, professionalism, and empathy. Lastly, with electronic or pen-to-paper editing, some of these same techniques, especially open-ended inquiry methods, may be applied in written comments to the author. Using a professional and friendly tone is particularly important in written comments because, as with e-mail, the benefit of using body language to contextualize meaning is lost. Although the primary purpose of the editor may not be to coach or teach writing, editors—and the authors with whom they work—can benefit from utilizing such communication techniques employed by writing center tutors.

In the Next Issue

The December issue of the *AMWA Journal* focuses on mentorship, with articles highlighting successful mentoring, fellowship, and internship programs in medical communication.

How to Effectively Lead Your Team as the Medical Writer

By Julie Beyrer, MTSC, ELS

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Did you respond to a posted medical writing position that said something about leadership? It might have said something like the following.

- "Leads medical writing processes with project teams to develop new documents."
- "Has an excellent record of leadership, mentoring, coaching, and developing people."
- "Demonstrates project leadership expertise, including project management and interpersonal communication skills."

I responded to a posting like this. I was hired. And after the job interview, I did not give that L-E-A-D word another thought for a long time until I began providing oversight for third-party medical writers. I then became responsible for other medical writers in their delivery of projects. That was the point when "lead" suddenly began to mean something very big.

"Lead" seemed to be the key differentiator between successful versus poor outcomes on these third party projects. I observed that when the third-party medical writer acted as an effective leader of the project team, the team delivered high-quality documents, on-time, and developed (or at least, left intact) good collegial relationships. I found that the reverse was also true. When medical writing leadership seemed absent on the team, there was inevitably much more late-night heroic effort and crisis management, leaving the team feeling frazzled and beat up by the project's end. Fortunately, though, I work with many good third-party medical writers who demonstrate project leadership ability. I began to reflect on their leadership behaviors, and in 2008 I presented "How to Effectively Lead Your Team as the Medical Writer" at AMWA's annual conference. This article is based on that session. Although my experience has been in the regulatory setting, the behaviors discussed here apply to medical writers as leaders across multiple settings.

To begin, I feeI compelled to acknowledge that I am not a perfect practitioner of my own advice. But I do try. In addition, many medical writers are already practicing behaviors described here, so why share on this topic? I share because I believe that looking at medical writing through a lens of "leadership" helps writers become more of what project teams truly need from them, and more of what we all need to be. Perception is powerful. One of my favorite quotes about the power of perception comes from Johann Wolfgang von Goethe. The quote, in essence, is Treat a man as he is and he will remain as he is. Treat a man as he can and should be, and he will become as he can and should be.[1]

If you never perceived yourself as a leader in your medical writer role, start now. It will help you become more effective in your work, much of which is probably team-based. Also, reflect on and practice behaviors that will make you a more effective leader of project teams. Observe others who model medical writing leadership and emulate their successful behaviors. The purpose of this article is to help medical writers perceive their roles as leadership roles and to develop or enhance specific behaviors for success when leading project teams.

What Does it Mean to Lead?

I heard someone recently respond to this question as follows: "Turn around. If no one is following, maybe you're just out for a walk." This response reveals a major defining trait of leadership. Having followers is a pre-requisite for leadership. However, there must be more to it. After all, celebrities are followed. So are NFL fantasy football and the *Twilight* Facebook page. Remove charisma, popularity, and leadership accolades, and what are you left with? Maybe not a leader.

Business management guru Peter Drucker says that a leader is someone who[2]

- has followers
- sets examples
- achieves results
- takes responsibility

That is, leadership denotes purpose. The purpose of leadership is to work with people ("followers") to achieve results. Setting examples means that leaders set the standards. And leaders are responsible for the performance of the teams they support (not just their own performance).

When you remove the razzle-dazzle and leave in the effort and responsibility, leadership does not sound very glamorous, does it? But that is often the leader's role.

As a Medical Writer, How Do I Lead?

Integrity

Before delving immediately into leadership behaviors, I want to start with character—specifically, with integrity. Leadership must begin with integrity. Your followers will not

trust you for long if they see that your actions do not match your professed values, your words, and your promises. You cannot fake it, at least not all of the time. Integrity and sincerity do matter in leadership. Big things and small things count. Here are some examples for medical writers.

- Do you fake data in your publication in order to have a publication-worthy paper? (Shocking! You say, "Of course, not!")
- Do you expense non-work items to your company?
- Do you cut corners by not fact-checking all the data when doing a quality review?
- Do you make promises to your team knowing you may not be able to deliver? But what if you have "good" intentions (eg, to placate individuals on the team, resolve conflict, or just motivate them to get the work done)?

Followers may forgive a leader's technical incompetence, but they will not forgive lack of integrity. Integrity is key to trust, and trust is key to leadership. Lack of trust can ruin execution of even the best laid project plan and will sour a team's dynamic.

Effective Leadership Behaviors

The leadership behaviors as they apply to medical writers are described within three broad categories, along with some specific examples.

- Demonstrating technical proficiency (credibility)
- Managing projects
- Building and maintaining positive work relationships

Demonstrating Technical Proficiency

Demonstrating technical proficiency is about you, as the writer, showing you know your "stuff." By demonstrating technical expertise, you build credibility with your team—they have confidence that the right person is leading the project. People can follow an expert's lead; they do not want to follow an individual who appears to either lack the vision of the end product or to lack the knowledge required to get there. Therefore, hone your craft; become proficient in what you do. As a medical writer you demonstrate your technical proficiency by the following.

- **Understanding your industry and therapeutic area.** Some advice for anyone who, like me, did not begin medical writing with a PhD in the assigned scientific area: read and train. Get to know the topic you are writing about. Medical writers are usually not expected to be the therapeutic subject matter experts, but a moderate amount of scientific understanding is expected. You can win some trust from team members by showing that you understand their work.
- **Writing a good first draft.** Whenever possible, be proactive about writing a good first draft. You might compare writing the first draft with the leader concept of communicating the vision. Stephen Covey's habit #2 for highly effective people says to "begin with the end in mind."[3] Put on your leader mindset and take responsibility for co-creating the project vision with the team and communicating the vision effectively through a good first draft. This is your best—and maybe only—opportunity to get the project started in the right direction.
- **Sharing with/coaching others on the things you know really well.** Maybe you know journal conventions. Or maybe you are an expert on the regulations that govern your project or the company policies and procedures. Whatever it is, share when the information is relevant and can add value. Enhance your credibility. Don't hold back.
- **Asking questions in an intelligent way.** Do not be afraid to ask questions, but ask them in an intelligent way. In fact, your questions may be the same questions that other team members have, even though they are not voicing them aloud. To ask questions in the right way, use this filter before asking: Is this the right time, right place, right person, right question?

Managing Projects

Not all leaders are project managers, but effective project managers are leaders. Effective project managers lead because they see themselves as stewards of the team's time, resources, and energy (ie, they see themselves as leaders). As such, one of their highest priorities is to remove obstacles that stand in the way of the team's progress. Most medical writers I know, including me, wear the project manager hat. And we are almost always managing multiple projects. One might think that effective project management skills should be a given, but surprisingly, I have observed they are not. Some tips for effective project management include the following.

- **Develop a work plan the team will commit to.** How are you going to get to the end product? Start by developing a document work plan. Identify the tasks, durations, and the people who are responsible. Understand how the tasks are related to each other (eg, predecessors). You may not know all the tasks that need to be completed to get to the final product; ask team members to share their tasks with you as well as how long their tasks take.

  Do not leave deadlines ambiguous. What happens when you ask someone to do something but don't give or ask for a commitment date? Often it does not get done on time (or maybe at all). When you give an important deadline, do not stop there. Ask team members to commit to

the deadline. Get buy-in up front, and help team members understand how their tasks relate to others' tasks and to the overall success of the project.

- **Communicate and regularly review the plan.** The work plan sets the expectations; reviewing it regularly and adjusting plans as needed is the key to making progress. Not doing so can lead to misdirection and wasted time and effort.
- **Develop risk contingency and mitigation plans, even if simple ones.** Drucker says that the most important task of the leader is to anticipate crisis; "perhaps not to avert it, but to anticipate it. To wait until crisis hits is abdication."[1] Prepare for potential setbacks in your project. A typical mitigation plan for medical writers might address "How do we prevent out-of-office time from holding up the document timeline?" A contingency plan would answer the question "What do we do when out-of-office time is holding up the timeline?" If you are in a relationship with a different organization, find out what the resolution process is for dealing with risks/problems in the project. Risk contingency and mitigation plans do not need to be elaborate; tailor your plans to the project's needs. The key is to prepare them up front.
- **Measure and monitor progress and provide continual updates to your team.** Best laid plans easily fail if you do not monitor the team's progress. And, importantly, if you are the "owner" of the project plan, YOU are the one who should do this, ie, take ownership. (I actually put my name in the work plan footer so it's very clear who is responsible for the plan.) As the medical writer, you may sometimes not be the "owner" of the project plan. For example, I often work with project managers in my organization; as long as we establish up front who is responsible for which project management responsibilities, we avoid stepping on each other's toes and giving mixed signals to the team.
- **Motivate your team to action.** You might be thinking, "Motivate? Who, me? Just how am I supposed to motivate my team members as the medical writer?"
  - **During the project, build goodwill by recognizing team members' successes and giving praise.** Find out what motivates your team members. Drucker says that leaders should look for ways to tap into others' strengths and desires to contribute: "to multiply the performance capacity of the whole by putting to use whatever strength or aspiration there is in individuals."[1]

    Praise is a common motivator. Do not wait until the end of the project to recognize others. Sharing feedback and recognition toward the beginning of a project helps build goodwill up front. You might think of goodwill like a bank account that you want to fill so that, later, you can draw on it when it's needed for the good of the project. However, be sincere—praise only the behaviors you intend to encourage; you get more of what you praise.
  - **Stay positive.** A positive attitude has a motivating effect. Your team will see you as someone with high energy and a capacity for accomplishment, which will encourage them to follow you. A couple of simple strategies include the following.
    1) **Frame negative statements in a positive way.** For example, instead of "I won't be able to do this until tomorrow morning," say "I will be able to take care of this first thing tomorrow."
    2) **Focus on resolving the issues.** Avoid whining, at least to your team members. If others need to vent, listen and empathize, but then do what you can to redirect their energy to take needed action.
  - **Show you care about others' perspectives.** Listen. Ask for input and feedback. Then listen. Thank others for sharing and do not get defensive. Listening does not mean that you agree. Leaders do not lose their cool because someone disagrees or gives criticism. In fact, a quick way to lose followers is to lose your cool because your ego got in the way. When you get feedback that you do not agree with, you can ask for examples that illustrate the feedback and consider them.

    If you ask for feedback, do something with it. Doing nothing with feedback may be more de-motivating to your team than not asking for it in the first place. Gain trust by listening, respecting others' perspectives, and following up.
  - **Celebrate successes!** Remember to celebrate! I am often guilty of saying, "Oh, but this is all in a day's work. I just did my job." Consider this: missed opportunities to celebrate successes with the team are missed opportunities to build on team strengths and engagement for future projects. Celebrations do not have to be big. For example, even a shared note of positive customer feedback can be a very meaningful celebration.
  - **Set a culture of excellence.** Demonstrate excellence in what you do and expect excellence from others. When you do so, you set the bar high for others as well. Drucker calls a leader "the person who has the strength to do the outstanding, the pacesetting job."[1] Model the values you want others to demonstrate.

Building and Maintaining Positive Work Relationships

Building and maintaining positive work relationships is about managing your relationship with the team as well as helping team members to collaborate. You can do both by the following.

- **Demonstrate that you are reliable.**
  - **Tackle the first task immediately.** Something very simple such as sending out meeting minutes imme-

diately after the project kickoff demonstrates reliability. First impressions matter. Make a good one.
  - **Do what you say you will do when you say you will do it.** It can be easy to let a commitment fall through when you are very busy. A helpful strategy that has worked for me is to put private reminders on my electronic calendar for any commitment, along with auto-notification for important reminders. You might record even small things like a promised phone call to avoid forgetting about it. Whatever you say you will do, always follow through.
  - **Do it right the first time.** Enough said.
- **Facilitate effective interpersonal communications and meetings.** Communication is important to relationship management because it sets the tone for the team (eg, formal/informal, organized/sloppy).
  - **Be prepared with an agenda.** Busy coworkers are understandably irritated by unproductive meetings. Wasting people's time is being a poor steward of your resources. Effective leaders always have an agenda for meetings, whether it is published or not. Be prepared with the points that need to be discussed.
  - **Keep the team focused on the purpose of the meeting.** If a meeting digresses from the priorities and purpose, interrupt the devolving conversation and pull the discussion back to the agenda/purpose of the meeting. My colleagues frequently hear me say, "Now, back to the purpose of this discussion…." It works. If it is your meeting, lead it.
  - **Tailor oral communication to your audience.** I have found that medical writers often follow this principle while writing but forget it in their day-to-day communication with team members. Effective leaders adapt the way they approach different people. Adapting your style for your team members may mean using different communication avenues (e-mails, voice mails, etc) to reach different people. Your physician does not respond to e-mails? Communicate by phone, in person, through an assistant, or whatever works. In addition, be aware that many decision-makers are not "detail people" even though medical writers often are. When speaking with decision-makers, spare the details and give the bottom line first (ie, "Here is the decision I need from you"). Then, you can fill in with key supporting details or answer questions that arise.
  - **Make sure that action items are understood.** Everyone who leaves the meeting should know what she or he is responsible for. A good practice is to summarize actions and the responsible party(ies) in minutes and/or restate them at the meeting's end.
  - **Record decisions.** Busy people (including you) can forget the decisions made. Records also help to prevent the need to revisit decisions because of forgetfulness. However you need to do it (eg, meeting minutes, document draft) record the decisions.
- **Resolve conflict; don't leave it.**
  - **Confront conflict early.** Leaders confront conflict early instead of waiting for problems to become worse. Maybe you think "I can't possibly be a conflict mediator." Yes, you can, and sometimes you are in the best position to do it. Consider this situation: Near the start of one project between two companies, and sensing some tension between them, the medical writer asked team members, "What's working well for you now? What's not working well?" In this real-life experience, nobody responded immediately or with much feedback. The writer felt a little awkward. However, after the meeting, she received additional responses via e-mail, including a few thank you's for asking the question of the other company. She tried to use their feedback, and some aspects of the collaboration between the two companies seemed to improve.
  - **Seek first to understand, then to be understood.** Focus on others' interests first. Avoid jumping immediately to solutions. Leaders should begin negotiation by focusing on the interests of the parties and by listening.
  - **Did someone disengage from the conversation?** Follow up with that person after the meeting and determine what should be done to resolve the conflict.
  - **Identify the decision-makers up front.** Knowing who the decision-makers are and having them make the decisions helps prevent the rest of the team from going around and around on a decision. Conversations can become (unnecessarily) overheated when team members voice contradictory opinions but cannot reach a decision. Sometimes team members do not reach a decision because none of them is the decision-maker; the true decision-maker is absent. If that happens, invite the decision-maker to join or collect the team's perspectives and take the information to the decision-maker.
  - **Show respect for others.** What makes you feel respected? What makes others feel respected? Show you are engaged and interested. Look the other person in the eye if speaking face-to-face. Avoid tapping on your keyboard, multi-tasking, or interrupting. Let there be a pause after someone speaks. (Pauses also help me to stay calm and give me a chance to frame my response during contentious conversations.) You can communicate unpopular decisions while still acknowledging concern for individuals' perspectives and showing respect.
  - **Admit when you are wrong or do not know.** Some feel that such an admission is a sign of weakness, but

that's really the dishonest talk of the ego. Your team members can probably guess the truth and will be more likely to perceive admission (as opposed to denial) as a sign of strength, especially if they already know you are wrong or lack knowledge. Admitting means that you, as a leader, can subordinate your ego to the task at hand and builds trust. Similarly, say you are sorry when you have hurt a team member. Apologies can clear a lot of mistrust and rancor that may be just under the surface souring the team dynamic.

In Summary

Effectively leading project teams as the medical writer requires integrity and the right behaviors. Different teams may have different dynamics, but the principles remain the same. To build credibility, medical writers need to demonstrate technical proficiency. To gain and maintain the team's trust, medical writers need to be effective at managing the project and the relationships.

Medical writers are called to lead. When it is your turn to lead, embrace the opportunity to make a powerful, positive difference. Although we work with many talented professionals, the success of team projects often lies in effective leadership—and that includes us!

Author disclosure: *The author notes that she has no commercial associations that may pose a conflict of interest with the the content of this article.*

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Q – *How do we help close the gap between older (40-something) and younger freelances and clients?*

Because our Freelance Forum panelists are all on the "older" side of the gap, we reached out to freelances on the "younger" side to gain their perspectives as well. The "younger" perspectives follow the responses of our panelists.

I can only wish I was still at the 40-something point in my career! But no matter, because my answer would be, and will be, the same no matter how young or old I am. In my opinion and personal experience, the way to close the age gap is with a single word. Aretha Franklin said it best, R.E.S.P.E.C.T.

Each person has a unique way of doing things, with different expectations and different needs. To me, differences due to age are no different than differences due to training, education, life experience, or geography. They're all differences. Frustration comes when we resist those differences instead of embracing them; for example, when an older person assumes a younger person's ideas or ways of doing things are half-baked or unproven, or when a younger person assumes an older person's ideas or ways are boring or stale.

As a freelance, we have to be on top of our game to be successful. That means embracing new technology, new media, new assignments, and new clients (who are often younger than we are). In this respect, I believe freelances have a leg up on closing the age gap compared with those who work on staff. Every member of my client's team is the client to me, and rule #1 says the client is always right. Note there's no reference to age in that rule. Rule #2 says when the client is wrong, see rule #1. When you work on staff, it's easier for egos, as well as seniority and territory, to get in the way.

I like to challenge my own thinking as well as that of my clients (when appropriate, that is). So when faced with something new, I look to see how I can become comfortable with it. Make it my own. I ask myself how this new idea can benefit from my experience. This way, we get a synergy instead of a road block. Great solutions come from the combination of experience and innovation, and as a freelance I want to be a part of the engine that creates those solutions, working with people of all ages. Hopefully, my younger clients will want to continue working with me!

—Brian Bass

I am well past 40-something, so it would be a rare occasion for me to actually deal with a client who isn't considerably younger than I am. Fortunately, I can't think of a situation in which this age gap has seriously affected my ability to communicate with a much younger client or to successfully complete a project. However, I know this gap exists and, in some circumstances, it can make employee/client situations complicated. For older freelances with many years of experience, it can be difficult to take instructions or, worse yet, criticism from relatively inexperienced, 20-something clients; and it can be tempting to assume that they are too young and inexperienced to possibly know what they are doing. Whether this is true or not is irrelevant. The point is, they have the upper hand in the freelance/client relationship. For this reason alone, I believe the primary responsibility for closing the age gap in this situation rests with me.

Although it may seem too obvious, the key to any successful relationship is mutual respect. Whether or not there is an age difference, respect should always be the starting point. Beyond that, it is important for "old timers" like me to recognize that there are very real generational differences in how individuals approach the whole work process. This is particularly true when it comes to the use of technology. We need to make an effort to learn about these differences in attitudes and practices and use that knowledge to build good working relationships with our younger clients. Certainly, there is much we can teach the 20-somethings (and the wise ones will take advantage of that), but there is also much we can learn from them. Back in the mid-1980s, when I was working in hospital public relations, I was pulled kicking and screaming into the world of computers. I am grateful every day for that much younger boss who forced me to give up my electric typewriter and use a computer. Gaining that knowledge was the first step in my journey toward building a successful career as a freelance medical writer. Today, even as my career is winding down, I continue to try to stay abreast of the latest electronic technology and Web-based communications, including social and professional networking. I take pleasure in interacting with, and learning from, my young colleagues and friends, and I try never to act my age.

—Donna Miceli

We all must remember that each of us, no matter our age or years of experience, has something to bring to the table and to the projects. I work with many clients who are both younger and older than I am. Younger clients often have enhanced computer skills that facilitate literature searches. Some of them also have more recent "real world" expertise, having been on a pharmaceutical sales force before coming inside as a product or project manager. Many of my clients recognize that my 30+ years as a freelance medical writer makes their job easier, since they don't have to keep in constant contact during the writing process. "I just give you a project and know you will do it right the first time" is a comment I often receive from younger clients. I also have "saved" them at times, when they are not as familiar with the requirements for continuing medical education or journal article submissions as I am. It often is a good give-and-take relationship. Of course, we've all had the young "hot shot" clients who want to micromanage every detail, make multiple changes (whether they benefit the project or not), or who have unrealistic goals and deadlines! But, luckily, in my experience, they often don't last long in their position. Once we recognize each other's area of expertise and establish a good working relationship, we know that the projects benefit from the association.

—Elizabeth Smith

As I am getting older and my clients are getting younger, I am finding more opportunities to act as a consultant. Many of these younger clients are not well versed in medical writing activities and processes (for example, how to assemble the appendices of a clinical study report or how to prepare a document for electronic publishing). These are teachable moments! I also have more opportunities to do things the way I think they should be done rather than to follow a set of rules/guidelines/templates that are already in place, as they typically are for more established, older companies. I can be the one to write the style guide, put together a template, and develop medical writing/review processes (and these sorts of tasks can even be separate billable projects). One challenge I've found working with younger companies is that some want to cut corners and demand "fast" over "accurate" or "complete." In my experience, this seems to be especially true for companies funded by venture capital and who are thus very pressured to meet certain milestone dates. It can be hard to curb this rush to finish, and I try to rely on input from regulatory personnel or consultants working for the company to help provide caution and guidance when necessary.

—Sherri Bowen

Writing this as a 45-year-old freelance, I would have to say that I still feel "pretty" young, and I have not experienced any shocking or incomprehensible interactions due to an age difference between me and a younger client. The one observation I would make is that younger clients can sometimes seem a bit more stressed. But this could be because of fewer years of experience on the job more than an age difference. When you've been verbally abused by a few doctors, had your recording equipment die mid-interview several times, spilled an entire cup of coffee on a brand new laptop, and missed conferences because of plane delays, you tend not to sweat the small stuff. It all works out in the end, right? I would also say that most of my clients are right around my age. And when I find out a client is exactly my age, and is also a woman, that paves the way for all types of "get to know you" conversations regarding perimenopause, Botox, and other things that do not need to be mentioned here. An age difference that I do tend to notice is with those who are about 15 to 20 years older than me (ie, in their 60s). I can't say I grew up with the Internet, but I would say I came of age in the electronic era. I was in graduate school when the whole e-mail/Internet thing came out, where I had early access to it. I just feel it is an advantage for anyone my age or younger that we have been immersed in computers and the Internet. I certainly wouldn't want to say that people in their 60s can't use computers because they can. I am just saying that it is a difference I've noticed in some older clients. As an example, they will try to e-mail an 80 MB attachment and will not understand why I didn't get it. I guess the best quality to cultivate in that situation is a little patience. And that's what I'd say to the 20-year-olds as well (not to mention my former 20-year old self).

—Emma Hitt

At the "Projects from Hell" roundtable at the 2011 AMWA Annual Conference, the winning tale involved redoing 150 slides the night before (of course) during the era of slide carousels. At the table, some of us began our professional lives post-PowerPoint, but we all recognized the compounded agony of this tale. The frustrations of our profession as well as the principles for success transcend age and time. One principle is "show, don't tell." I repeatedly heard this axiom in creative writing workshops. "Show, don't tell" also applies when presenting myself to potential and current clients. Asking intelligent questions is one of the best ways to "show" professionalism as a medical writer at any age. Asking pointed questions about client processes, specific project details, or noting some potential pitfalls, I instill the trust in clients that I can swim in the medical writing pond.

Another principle is "to thine own self, be true." After a couple years, I learned to ask potential clients "What are your pet peeves or prior bad experiences?" This question demonstrated a certain professional maturity. It acknowl-

edged that projects sometimes go badly and that everyone carries a little baggage into the client-medical writer relationships, and helped me identify potential hot buttons with clients. Also, I used this question to weed out clients. For example, when meeting a typo-obsessed client, I gently passed them along to another professional. At multiple AMWA panels, the client speaker said they distrusted a medical writer who claimed to do everything. We gain more credibility by honestly answering what we can't do besides selling what we can do.

Asking the right questions and self-honesty are more a function of previous professional environments, supervisors, project exposure, and individual personality traits than the year someone was born. The actual question is how does any freelance medical writer emphasize their value in our constantly changing industry.

—**Heather Haley**
Cincinnati, OH

Social media and technology seem to be places where the generation gap is most obvious. One of the things I always try to convey is that I understand both sides: the younger tech-savvy side and the older relationship-oriented side. There are so many ways that technology can improve what we aim to do—communicate more quickly, more effectively, or to more people. But, in our zealousness to adopt it, we devalue our relationships, which are the foundation of everything we do.

Most people in their 20s and 30s like to do things quickly and rely heavily on e-mail conversations, slide decks, and social media. I may get a message from the same person in a different way every day of the week—a Facebook message, a wall post, a text message, a LinkedIn comment, a Pinterest comment, or an instant message via Skype. I am on the older side of that generation, at 34, but I try hard to keep up on the latest trends. On the other hand, I also have enough experience to know what works and to address any potential relationship issues or communication pitfalls right away. In working with more established (and yes, older) people, I find that they prefer a phone call or meetings that include an introductory conversation and then a follow-up meeting with a pre-set agenda—it smoothes the transition to working together.

While different generations of people have grown up with different models of doing business, I've found that just as many people defy the stereotypes of their generation. There are many older people who are tech savvy, and social media growth shows a sharp spike in adoption by older audiences. I think we'll see an evolution that reveals personal preferences rather than generational groupings.

Unfortunately, technology is unlikely to slow down, so I'll probably be on the other side of this phenomenon soon, dealing with whatever method of communication technology the future holds, possibly something we can't yet imagine. We can all adapt, and as long as we communicate effectively, I think we'll make great partners to all different styles of communicators.

—**Natalie Miller-Moore**
Williamsburg, VA

I'm frequently pegged for someone much younger than I am—at least once every few months, I'm asked what high school I attend. That being said, I'm keenly aware of how difficult it is to be taken seriously by others because of my age. I'm 31, which puts me right at the tail end of the Millennial Generation. I think that people from my generation value flexibility over security, which may give the impression that we are impatient. My generation also values formal and informal mentoring relationships, and I would encourage experienced freelances to pitch themselves as team players who enjoy teaching as part of the process.

—**Lesly Anne Lopez-Skinner, MS**
Houston, TX

AMWA Journal Earns Recognition

The December 2011 issue of the AMWA Journal has won a 2012 Apex Award for Publication Excellence. The issue, with its "green" theme, won the award in the category of "Green Magazines and Journals." More than 3,400 entries were submitted to the competition, which is sponsored by Communications Concepts, Inc., Springfield, VA. The Apex Award marks the second honor for the Journal, with a 2009 Excel Award for general excellence in the scholarly journal category.

Team Training in CME

By Johanna Lackner-Marx, MPH, MSW, CCMEP

President and Founder, InQuill Medical Communications, LLC, Soquel, CA

The adage "it takes a village" applies well to health care today. Effective patient care requires specialized approaches that are often more effectively provided by teams of practitioners than by a single physician. For example, a growing body of literature supports the use of outpatient multidisciplinary interventions as an effective strategy for the treatment of obesity among children and adolescents.[1]

Until recently, our health care system supported the assumption that each particular clinical specialty "owned" a distinct area of medical care and delivery. Within these individual silos, practitioners were further divided by hierarchical job descriptions. Even when clinicians of different professions and titles worked together, research on teamwork indicated they were often working individually *beside* each other and not collaboratively as a team.[2]

Medical education providers are beginning to address these findings by developing education interventions that enhance team work, and a growing body of literature demonstrates that these programs successfully result in a number of positive outcomes, including enhanced learner knowledge, skills, attitudes, and behaviors, and improved patient outcomes in specific disease conditions.[3]

We discuss here the trend toward team training. Karen Thomas and John Juchniewicz define multidisciplinary, interprofessional, and team-based learning and tell us how to decide if a multidisciplinary or interprofessional education design is more appropriate than a traditional uniprofessional learning format. In an interview with Eduardo Salas, PhD, you will learn about the elements of effective team-based training and how to incorporate them into medical education for mixed professional audiences.

Multidisciplinary and Interprofessional Education in CME: Relaxing the Siloed Framework of Learning

By Karen J. Thomas, MEd, FACEHP, CCMEP,[a] and John J. D. Juchniewicz, MCIS, CCMEP[b]

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Think of the last time you were a patient. Did you interact with only one medical professional or were multiple professionals involved in your care? In some cases, the team works together. In other situations, a patient might be referred to a specialist who must collaborate with the patient's primary care clinician (not necessarily a doctor) to disseminate results, diagnosis, next steps, recommended care, and follow-up.

Communication and interaction of medical professionals has become so vital to patient care that evidence of competency in these areas is outlined by the American Board of Medical Specialties (ABMS) Six Core Competencies for Quality Patient Care specific to interpersonal and communication skills and system-based practice.[4] With the reality that patient care is a coordinated and care-focused collaboration, it is logical that educating the patient care team incorporates learning approaches that move beyond uniprofessional and instead are inclusive of multidisciplinary and interprofessional educational formats.

Multidisciplinary educational formats consist of having multiple disciplines within a target audience contributing to and participating in an educational activity. This format may consist of learning objectives that focus on providing knowledge and/or enhancing competency of the target audience as a whole and may also focus on the dissemination of new diagnosis and treatment protocols, communication skills, and management of the patient's disease respective of differing roles and the interaction of those roles.

Interprofessional education involves multiple types of health care professionals participating in a cooperative learning environment. It is purposefully created to address specific goals of the interprofessional team relative to the system(s) in which they function. As defined by the Centre for the Advancement of Interprofessional Education, "interprofessional education occurs when two or more professions learn *with, from and about each other* to improve collaboration and the quality of care"™ [emphasis added].[5] These types of activities focus on enhancing the collabora-

tive skills of the total health care team, resulting in improved patient outcomes.[6]

Team-based learning is defined as an active learner-centered instructional design strategy that focuses on small group learning typically composed of individual learner assignments, group assignments/interaction, and immediate team feedback.[7] This format acknowledges individual roles and responsibilities and further assists in the evaluation of the system itself for cohesiveness of the team and team functions. Team-based education is only one type of group-learning-based educational design format. This format is recognized as being within the realm of interprofessional educational designs. Actual interprofessional team-based learning will focus on authentic teams within specified environments. The advantage of this strategy is that systems in place specific to the environment in which the team functions may also be assessed for improvement to further support the evolution of the team.

Cross-disciplinary education is a great design framework for accredited providers and educational design experts to consider when evaluating their armamentarium of educational formats. Based on the professional practice gap analysis and identified needs, the educational design may warrant a multidisciplinary or interprofessional approach to educating the appropriate target audience. Following are some key considerations when deciding if a multidisciplinary or interprofessional education design is appropriate rather than traditional siloed learning formats.

- Did the needs assessment identify more than one professional type that had the same professional practice gap?
- Is the identified problem occurring within more than one institution?
- If you only educated **one** discipline type, and those clinicians make a practice improvement, is that enough to close the practice gap and thus improve patient care?
- If you educated **two or more** professional disciplines, and those individuals make practice changes, would that be enough to address the gap?
- Based on your educational focus, would **individual** team members benefit or would the **whole** team benefit more from an educational intervention?

If you decide that siloed learning would not be appropriate based on the identified gap and considerations above, reflect on the following to determine if a multidisciplinary or an interprofessional education design would be more beneficial for your target audience.

- Are the learning objectives appropriate across all learner types?
- Based on learner roles, should different educational objectives be developed specific to each learner type?
- Again, does the educational content speak specifically to the various learner types that you are targeting?
- Is the practice gap that you identified specific to individuals or is it a team system or functioning problem?
- Are the issues underlying this gap more knowledge or systems oriented?

Developing an interprofessional educational activity requires more than adding multiple certifications and listing multiple groups in the target audience. Interprofessional education must take into account the roles of the entire team and consider how each team member's responsibilities are linked to others. Interprofessional education may require customized objectives that are based on roles that are dependent on function. It also means recognizing that learners (as well as planners and faculty) may have little experience with interprofessional educational formats, as their own professional training did not involve these types of formats. It is further important for the planner and/or medical writer to note that barriers to changing practice behavior may have a significant impact and thus need to also be addressed within the educational activity.

Designing education for the individual learner or the team requires planning with the end result in mind. Multidisciplinary and interprofessional educational formats provide great educational opportunities to address the needs of the total health care team.

Author disclosures: *Johanna Lackner-Marx notes that she is a principal in InQuill Medical Communications, LLC, which creates continuing medical education content for a diverse clinical audience. Karen Thomas and John Juchniewicz note that they have no commercial associations that may pose a conflict of interest in relation to this article.*

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Team Training in Medical Education

A Conversation with Eduardo Salas, PhD

Dr Salas is University Trustee Chair and Pegasus Professor of Psychology, and Director of Human Systems Integration Research, University of Central Florida, Orlando, FL. He is a renowned expert on team training and has been a consultant in a number of industries.

We know from current literature that team training improves the function of multidisciplinary care delivery. What recommendations can you give us for developing CME programs for diverse multidisciplinary audiences?

Dr Salas. I think there is a lot that can be included in CME to foster teamwork. Any kind of well-designed training, regardless of the industry, involves four elements: information about the topic, demonstration, practice, and feedback. We know from the literature that people learn best when they can practice what they are taught and get direct feedback. This is especially true of adults. The key is to have practice-based training on teamwork and give the participants as much feedback as possible.

If I were to design a CME program around teamwork, I would set it up so that the participants would be able to practice working in teams and get as much feedback on their performance as possible. They would receive information about teamwork in clinical situations—why it's so important in patient care. They would see demonstrations of team interaction as it relates to patient care. And then I would put them in simulations such as role playing where they would have an opportunity to practice aspects of team interaction like communication, exchange of information, and group decision-making; and receive direct feedback from experts and educators.

This makes a great deal of sense, given that health care is increasingly delivered by teams rather than sole clinicians. Why do you think so few medical education programs include team training?

Dr Salas. I think one of the problems is that the programs are often created by clinicians who are not familiar with the science of learning, so they don't consider that they need to teach teamwork. This challenge is not unique to medical education. I've consulted with many industries in addition to health care—manufacturing, oil, aviation, military—and even though good teamwork is desired, training doesn't usually incorporate ways to improve team functioning.

CME is still largely centered on diagnosing and treating specific conditions and not the process of practicing medicine, especially as it relates to working in multidisciplinary teams. How can we integrate team training into a typical CME program that is highly clinical in nature?

Dr Salas. In the case of medical education, it is very easy to get bogged down in clinical content. However, some of the learning objectives have to go beyond diagnosis and treatment and deal with coordination, cooperation, and communication. Each of these elements is a requisite competency that is expected of individual clinicians and is vital to patient care.

The question we're often faced with is how to create CME for a diverse audience once objectives on teamwork are included in the design. What advice can you give us for integrating actual team training into CME?

Dr Salas. The CME writer needs to start with teamwork in mind. Even CME that is condition-focused should include some discussion on the interdependencies of the people managing the patient and how care is to be implemented. This involves talking about when coordination begins, for example, or what communication needs to happen in order for good cooperation to occur. And then the writer should try to create scenarios in which clinicians can practice some of the elements of teamwork and get feedback during the CME session.

Key Success Factors for Effective Team-Building Activities

By Nicola Bond, MBA

Senior Manager, Research Operations, Department of Clinical Immunology, Amgen Inc, Thousand Oaks, CA

Team-building activities promote teamwork and collaboration and provide opportunities for team members to work as a cohesive unit to achieve a common goal. Managers often conduct team-building activities as a way to assimilate a team that is diverse in some way, such as culturally, socially, or logistically. As a new generation enters the workforce and more workers remain employed beyond retirement age, managers may also need to look for ways to assimilate team members who are generationally diverse and may span four generations, often with an age difference of up to 50 years.

Successful team-building activities seek to integrate diverse teams and remove potential barriers by encouraging participants to share ideas, demonstrate skills, and interact with one another in a safe and stress-free environment outside of the normal work routine. These activities may provide an opportunity for participants to share personal information, such as hobbies, talents, cultural interests, or family. They may also serve to provide motivation, boost morale, and build trust between team members, all of which are beneficial, regardless of age differences.

Team-building activities are often based on problem-solving activities or friendly competition and range from simple to elaborate. They can be organized by external corporate team building professionals or by volunteer staff members who take time from core work responsibilities. Some activities can be conducted over a period of days and cost thousands of dollars, whereas others might require an hour or two, with little or no cost.

Regardless of the size, cost, and time involved and before proceeding with any activity, managers should consider the following questions.

- Does the activity allow for various roles and levels of participation?
- Does it require any specific knowledge, skills, or experience?
- Does it allow for creative solutions or responses?
- Is it scalable?

Factors to Ensure Success of Team-Building Activities

Enables various roles and levels of participation and allows team members to change roles or level of participation during the activity. The objective is to create an environment where no one is uncomfortable and where everyone has a role in which they can be successful. Levels of participation can be described as active (first to respond, willing to take on a leadership role, and participate to the fullest extent), supportive (cautious, willing to participate but do not want to be in the spotlight), and passive (observer, may lack self-confidence or the commitment to be fully engaged).

Is not dependent on specific knowledge, skills, or experience, except where the knowledge, skill, or experience is common among members of the group. Participants may be unintentionally excluded if they don't feel "qualified" to participate or feel isolated from the group. For example, a team-building activity that requires participants to bring in a Halloween photo of themselves as a child might exclude team members who did not grow up in a country where this holiday is celebrated. Instead, ask participants to bring in their favorite holiday photo to share with the team. This opens the activity to all participants and encourages creative responses and team member interaction. Consider factors such as age, culture, and physical ability as they relate to knowledge, skill, or experience.

Solicits creative solutions and responses and encourages team members to collaborate and exchange ideas and information. Participants may have the opportunity to demonstrate personal skills and show their team spirit, which may not be possible with activities that have rigid solutions or fact-based answers.

Includes teams that are easily scalable and can be modified on short notice. Activities that depend on a specific number of team members may result in exclusion of some participants or may create unbalanced teams. Either scenario may be counterproductive to the planned objectives, particularly when teams are perceived to have an advantage or a disadvantage. When this factor has been eliminated, the team members can better focus on team building without distractions.

Examples of Team-Building Activities

The Marshmallow Challenge,[1] the String Problem,[2] and

Potluck Themes (an idea from a brainstorming session among colleagues) are examples of effective team-building activities.

Marshmallow Challenge
Once teams are assigned by the coordinator, 20 sticks of spaghetti, 1 yard of masking tape, 1 yard of string, and one marshmallow are distributed to each team. Teams then have 18 minutes to use these materials to build the tallest free-standing structure. The marshmallow must be on top at the end of the 18 minutes or the team is disqualified. When the time has expired, the coordinator measures the structures to determine the tallest. Afterward, the team can also enjoy ice cream or snacks while watching a 6-minute video from **TED.com** that discusses how various teams around the country performed this challenge. This video is available at: **www.marshmallowchallenge.com/TED_Talk.html**[1]

String Problem
Two pieces of string are attached to the ceiling, with each string hanging to within 12 inches of the floor and far enough apart that with one string in hand, the other string cannot be reached. The challenge is for the assigned team to tie the two strings together without removing them from the ceiling. The team may invent or use other props in the room to accomplish this. Each team has 20 minutes to find as many solutions as possible.

After 20 minutes, the teams share their solutions, which fall into one of four categories, depending on how the participants perceive the problem (*see box*).

String Problem Perceptions and Possible Solutions

Perception	Possible solution
My arms are too short.	Use a broom to reach for the second string.
The string is too short.	Use a belt or a necklace to extend the length of the string.
The first string won't stay in place.	Tie the string to a chair and move the chair towards the second string.
The second string is too far away.	Open a window and have a breeze blow the string toward the middle.

Participants have the option to begin each of these activities in an active, supportive, or passive role. They can then increase their level of participation, offer solutions or decrease their level of participation, which may allow others to lead. No specific knowledge, skill, or experience is required, although a team member with an engineering background may prove useful for the Marshmallow Challenge! The outcomes are creative and nonrestrictive and encourage collaboration, critical thinking, and flexible problem-solving. Although these activities are best performed with teams of four to eight participants, they can easily be modified to contain more or fewer team members with no advantage or disadvantage to any team.

Potluck Themes
Team members form sub-teams to provide a dish that meets a particular theme of a potluck (ie, "Foods to eat on vacation," "Teenagers are coming for dinner," or "Looks bad, tastes great"). After the dishes have been completed, each team presents its dish and all team members are invited to taste the food and vote for their favorite based on taste and creativity.

This activity provides opportunities to collaborate and interact with other team members; demonstrate leadership, personal skills, and talents; and share cultural background information. It is reasonable to expect that most teams will have someone with acceptable culinary skills. If they do not, there is nothing in the 'rules' that prohibits the team from purchasing a dish from a store or a restaurant. Themes should also be broad enough to encourage a creative response, and team size can vary without causing any significant benefit or disadvantage.

Other Considerations

Team assignment. The decision to organize teams in advance or arrange them randomly on the day of the event depends on the objective for the team-building activity. For example, if the objective is to strengthen relationships across generations, teams should be organized in advance to ensure there is an appropriate range of ages on each team. If the goal is to encourage collaboration and interaction across the team, a random assignment on the day of the event may suffice. Asking participants to organize their own teams should be avoided, as this may cause anxiety for some team members.

Know your audience. The team-building coordinator should be aware of any personal issues that may exclude a participant or any other constraints that might interfere with the success of the event. Common issues to consider include the following:
Photographs and videos. Some team members will not participate in activities that involve being in a photograph or video, and some locations do not allow photography or video recording. If the team-building activity involves any kind of picture, video, or sound recording, make sure the location permits it. Also, ensure that an easy 'opt out' option is available for staff who may be uncomfortable with being photographed or filmed.

Physical requirements. Team members may have physical or emotional disabilities that will prevent them from participating fully in some activities. Avoid strenuous physical activity unless everyone on the team is able to participate.

Food. If food is involved in the activity, make sure that safe food handling practices[3] are followed and that ingredients are clearly listed in case staff have allergies.

Additional Resources

Many resources are available on the Internet and in bookstores that provide information on team-building activities to meet a variety of needs. Some examples include: *Quick Team-Building Activities for Busy Managers* and *More Quick Team-Building Activities for Busy Managers* by Brian Cole Miller; *The Big Book of Team-Building Games* and *The Big Book of Business Games* by John Newstrom and Edward Scannell; and *Ice Breakers and Teambuilding Exercises* by Gregory Smith.

Summary

Managers who wish to organize team-building activities can assess the potential effectiveness and possible barriers by ensuring different roles and levels of participation; no dependencies on specific knowledge, skills, or experience; opportunities for creative solutions; and scalable teams and activities. The primary goal of team building is to break the barriers that prevent people from working together effectively. Having fun is a great side benefit!

Author disclosure: *The author notes that she has no commercial associations that may pose a conflict of interest in relation to this article.*

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Taking Improv from the Stage to the Conference Room and Beyond

By Jennifer King, PhD, ELS

President, August Editorial Inc., Durham, NC

Improv is not just for actors and comedians anymore.

At least, the principles of improv are not. Many regional comedy clubs offer corporate development workshops with the idea that being receptive to new ideas and thinking fast on one's feet can help further a person's career or a department's performance.

You don't have to be Tina Fey or Amy Poehler to practice the foundation of improv, which is summarized in two words: "YES, AND." "Yes" means accepting—if just for a few minutes—what someone says. "And" means building on or enhancing the premise provided. Improv scenes go nowhere if they lack a foundation of "YES, AND." As actress Jane Lynch explained in a May 2012 commencement address at Smith College, "If I say to you, 'Stick 'em up!' and you say, 'That's not a gun, that's your finger!' we've got nowhere to go."

As many have painfully experienced, the corporate world—and the world in general—is full of "BUT, NOs." "No" is conveyed in all kinds of ways—by not listening, by asking questions in a critical manner, or by changing the subject. Too many "nos" in the workplace can stifle innovation and cause apathy or even bitterness.

Corporate development programs in improv are designed to help organizations and departments move toward a culture of "YES, AND." Curricula can be tailored to a group's goals for a workshop. "Sometimes companies just want employees to feel more comfortable talking in front of a group," Paula Pazderka, artistic director at DSI Comedy in Carrboro, NC, explained. Sometimes they want employees to work better as a group. Sometimes they want leaders to become more comfortable with failure. And sometimes the goal is to just have fun.

Having fun is a worthwhile pursuit because it can bring employees together. "Through an improv workshop you are creating a bond because you're pushing people out of their comfort zones and doing something that for some people is the scariest thing they could possibly do," Pazderka said. "And being able to laugh at yourself and with other people is something that you will talk about and reminisce about for probably the rest of the time that you are working with this group. It enables people to see a side of you that maybe they don't normally get to see. And that bonding experience enables better communication."

Workshops can be tailored to different-sized groups. Limiting the number of participants to fewer than 25 gives all participants time to practice new techniques. In groups of 70 to 100, attendees do more watching than acting. Workshops are commonly half-day, but the time frame can be varied to accommodate a group's particular goals.

For medical writers, especially those who spend most of their time interacting with word-processing software, the benefits of improv may not seem obvious. But the principle of "YES, AND" has direct application to assembling seemingly disparate pieces of information and synthesizing them into a specific kind of output or document. It means actively listening to and saying "yes" to whatever message is given and then figuring out how to strengthen and deliver the message.

The active listening piece is key. "What happens so often is that you assume you know what people are going to say, and so you kind of stop listening," Pazderka said. "If you do that, you're going to miss out on something. It could be something really important and awesome. What improv does is that it really forces you to be in the moment and take in rather than judge."

By simply listening to other people and adding to their ideas, you are giving their contributions weight and meaning. This not only strengthens relationships, it allows ideas to be explored without judgment.

Of course, "YES, AND" is not always an appropriate approach in our professional or personal lives. Deadlines have to be met, resources can become strained, and some strategies are unworkable. But for people who like to plan and take comfort in knowing in advance exactly what will happen, spending some time in a state of uncertainty can yield some surprising benefits, like a rush of new ideas or the excitement of being in the moment.

As Lynch advised in her commencement address, "In order for our lives to go forward, in order to engage fully in life, we need to be willing and able to accept what is right in front of us….You can't make a cloudy day a sunny day, but you can embrace it and decide it's going to be a good day after all."

Note: The author's personal take on participating in an improv class is described the June 2012 issue of the AMWA Journal.

Report from The National Academy of Sciences Arthur M. Sackler Colloquium, "The Science of Science Communication"

May 21 and 22, 2012 • Washington, DC

By Min-Fang Huang
Freelance Science Writer and Translator, San Diego, CA

The purpose of this National Academy of Sciences colloquium was to discuss how lay audiences perceive science information and to provide suggestions about the science communication skills needed to help physical scientists engage the public in science. The following are highlights from three presentations.

"Generating the Science Needed for Relevant Communication: How Can Social, Behavioral, and Decision Research Extract the Information that the Public Needs Most from the Wealth of Scientific Knowledge?"
Lisa Schwartz, MD, MS, and Steven Woloshin, MD
Dartmouth Medical School, Hanover, NH

According to Dr Woloshin, there are three approaches to communicating about prescription drugs. The first approach is commercial communication, such as direct-to-consumer drug advertising. This approach is often appealing, fun, and easy to understand but can be misleading. The second approach is public communication, such as US Food and Drug Administration (FDA) approval documents. Although FDA approval documents are more comprehensive and useful than direct-to-consumer advertising, the documents are often poorly organized, weakly summarized, dense, and frustrating to read. To combine the advantages of these two approaches, Dr Schwartz and Dr. Woloshin proposed a third approach: the drug facts box. The design was inspired by nutrition facts labels on food packages, using the simple tabular layout to display data on the benefits and side effects of the drug. They also introduced the drug facts box to FDA, and conducted extensive studies to see how people react to the design. Their results showed that consumers want and can understand the drug facts box. In addition, compared with traditional drug advertising and the laundry list of drug side effects, the drug facts box enabled people to choose the more effective drug between two similar drugs, even when participants only had a high school education or less. Although the drug facts box has been introduced into the Patient Protection and Affordable Care Act (Section 3507), it will take 3 to 5 years for the design to be implemented. Dr Schwartz commented, "Getting more science into communication is one thing. Getting science communication implemented is another."

"Institutional Constraints and Incentives: What Factors Determine When Scientists Act as Communicators and How They Succeed?"
Hans-Peter Peters
Institute of Neuroscience and Medicine, Jülich, Germany

Dr Peters has spent the past 30 years studying the relationship between scientists and journalists. From multiple surveys he has conducted with colleagues, Dr Peters has discovered that in general, scientists felt satisfied with their experience with media contacts. Scientists also thought that media contacts would give their careers more advantages than disadvantages. Science organizations, such as research institutions or universities, were also satisfied with their contacts with journalists because the visibility of science organizations through mass media channels helps secure the organizations' legitimate roles in science research. Also, individual scientists as well as science organizations thought that enhanced visibility would increase their chances of getting potential funding. On the basis of his research, Dr Peters highlighted three points regarding the current phenomenon of public science communication. (1) When scientists have contact with the media, they are subjected to more influence from organizations than from the science community. (2) Organizations and scientists are willing to help increase communication resources for science journalists, and more organizations are conducting media training for researchers to improve their competence. (3) Public information departments and scientists now worry more about their visibility in the mass media than on the scientific truth delivered to the general public. In the long run, this shift in attention could be a risk to scientists' credibility. In addition, scientists may try to increase their visibility in the media by focusing more on the application aspects of their research because of the media's expectation that science must be relevant to society. Dr Peters said that the result may be an overemphasis on the practical aspects of research and a neglect of scientific truth.

"Building Organizational Infrastructures for Effective Communication: What Have We Learned from Experiences in the Corporate, Governmental, and Academic Worlds?"
Edward Maibach, MPH, PhD
Center for Climate Change Communication, George Mason University, Fairfax, VA

Dr Maibach offered five recommendations for improving an organization's science communication program. First, organizations should coordinate their communication with others, both internally and externally. Internal effort will make sure everyone is on the same page, he said. The external effort will bring other trusted sources into the conversation about scientific issues. Second, organizations should systematically collect audience data and conduct audience research. Conducting audience research will help define the needs of the audience, determine the most important scientific facts to be delivered, identify the most serious misconceptions that should be eradicated, and clarify the composition of the audience, so that communication approaches can be based on the characteristics of the targeted audience. Third, organizations should help their scientists—and their institution—become more familiar, liked, and trusted by the people with whom they hope to communicate. Dr Maibach noted, for example, that, in a 2009 survey, about 65% of Americans failed to name a living scientist. If people become familiar with the face of a scientist, they are more likely to know who they can trust when they encounter scientific issues. Fourth, organizations should build an interdisciplinary team whose mission is to improve both information design and delivery. Dr Maibach suggested that this team should include at least three types of people: content experts, who know the actual scientific content; social scientists and decision science experts, who can provide insight into how the audience thinks, feels, and behaves; and communication experts, who know how to reach members of the audience. Fifth, organizations should make program evaluation a priority. Many organizations lack this evaluation, which can help them assess the quality of their science communication, identify ways to improve their science communication programs, and increase the future quality of science communication research.

➲ Videos of these presentations and others given at the colloquium are available at **http://events.tvworldwide.com/Events/NAS120521.aspx**. In addition, you will find the colloquium agenda, profiles of the speakers, current research findings in science communication, and more comprehensive discussions on approaches to engage audiences in science.

Calendar of Meetings

American Medical Writers Association
October 4-6, 2012
Sacramento, CA

Public Relations Society of America
October 13-16, 2012
San Francisco, CA
www.prsa.org

American College of Clinical Pharmacy
October 21-24, 2012
Hollywood, FL
E-mail: accp@accp.com
www.accp.com

Association for Business Communication
October 24-27, 2012
Honolulu, HI
www.businesscommunication.org

Regulatory Affairs Professionals Society
October 26-30, 2012
Seattle, WA
www.raps.org

American Public Health Association
October 27-31, 2012
San Francisco, CA
www.apha.org/meetings

National Association of Science Writers Workshops/ Council for the Advancement of Science Writing New Horizons in Science Conference
October 28-29, 2012
Research Triangle, NC
www.casw.org

Alliance for Continuing Education in the Health Professions
January 30-February 2, 2013
San Francisco, CA
www.acme-assn.org

American Academy for the Advancement of Science
February 14-18, 2013
Boston, MA
www.aaas.org

American Pharmacists Association
March 1-4, 2013
Los Angeles, CA
www.pharmacist.com

› *For a complete list of meetings, visit Conferences > Related Meetings on the AMWA website (**www.amwa.org**).*

The Physician-Pharmacist Team

By Arnold Melnick, DO

It was very early in my practice. The local pharmacist, whom I knew slightly, was on the phone. "Dr Melnick, I need to ask you a question about the prescription you wrote for Jennifer Jones yesterday. The prescription says 5 mg and the usual recommended dose is 1 to 2 mg. Did I misunderstand what you wrote?"

What a polite, courteous, interprofessional, cooperative way to communicate and inform me I had made a mistake—possibly saving my hide from who knows what! And it taught me a lesson I never forgot in my entire professional career: the epitome of good medical communication!

Similar communication happens daily between many pharmacists and physicians. But why is it so important (except for ego)? It has been estimated that anywhere between 44,000 and 98,000 deaths occur each year in the United States—and most of them are medication mistakes. MEDMARX (US Pharmacopeia) found 105,603 medication errors in a single year. The US Food and Drug Administration has reported that approximately 7,000 medication-error deaths occur each year, with the number increasing. The Institute of Medicine has estimated that there are 1.5 million preventable adverse drug events annually, with more than a third of them injurious or harmful. The cost of such errors has been variously estimated to be from many millions to billions of dollars. Many of these errors occur in hospitals, some in practice—but in either case, the pharmacist-physician team is in a position to reduce these numbers.

Several suggestions have been made—and some implemented—to try to eliminate many of these errors, chief among them the use of electronic records, a move that has already started. Another way a reduction can be brought about in medical practice is for the physician to include on every prescription the age, weight, and diagnosis of the patient. These three parameters are not ordinarily required by law and most frequently are omitted, especially the diagnosis. Age matters: Either end of the age spectrum may require different dosage and often choice of drug. And especially at the lower end: a 2-year old child may need a different dose than a 12-year old child. Weight is pertinent because a 50-pound patient often may need a different dose than a 250-pound patient.

The recording of weight on a prescription may rattle some people, fearing a violation of privacy. However, it is important and privacy is not affected! First, the prescription is a sacred private matter between the doctor and the pharmacist, and, in most instances, the diagnosis would be known from the drug ordered; good examples are vaginal creams, antiepileptic medications, contraceptives, Rogaine, and Preparation H. The important fact is that when pharmacists cannot decipher the written drug name on a prescription, most times they can determine it from the diagnosis and need not guess or call the physician—thus reducing errors.

Why is that so difficult to do? Inertia. Physicians, like professionals in many other occupations, sometimes resist change. As a personal example, when Florida changed its laws to require that all prescriptions be either printed or typed, I called this to the attention of several of my personal doctors, who are splendid and cooperative physicians, and even gave them a copy of the law. Several months later, all of them were still writing prescriptions in cursive—a total violation of the law. Habits are hard to break.

We all also have to remember that at least the most recent classes of pharmacy were trained as clinical pharmacists (thus the Doctor of Pharmacy degree), stressing the relationship of illnesses to drug therapy. Many schools have their students serve medical-pharmaceutical rotations in various medical specialties. And today, in many major institutions, a pharmacist or two accompanies the attending physicians on teaching rounds and they are depended on to offer advice about choice of medication and dosages.

There are many danger spots in the prescribing and administration of medication. A glaring one is the use of abbreviations. Many physicians create their own abbreviations and they are difficult or impossible for anyone else to decipher—that's a no-no. But even in the realm of "standard" abbreviations, it may be difficult to know the intended meaning, as many abbreviations have multiple meanings. For example, among the 13 meanings of OD listed by Neil Davis, PharmD, in his splendid tome *Medical Abbreviations*, are "once daily" and "right eye." He notes a case in which Lugol's solution (iodine) was placed in the patient's right eye by mistake!

Recognizing equivalent professionals, and using their assistance when needed, can help reduce these great numbers of prescriptions errors. When I was a practicing pediatrician, I always welcomed the fact that I knew, for every prescription I wrote, that a pair of professional eyes would scrutinize it, a well-trained backup prepared to offer assistance whenever necessary.

The physician-pharmacist team, with good medical communication, actually can produce productive teamwork. And save lives!

Share and Share Alike: From Website to LinkedIn to Twitter to…

By Scottie Kersta-Wilson, MFA

Freelance Writer, Editor, Photographer, Chicago IL

I don't know what your experiences have been; however, over the past 20 years, every job of mine—full time or contract—has been from a referral. Referrals come from getting in touch and staying in touch with people you work with as well as people you meet along the way. But you know that, right?

For example, I have spent the last 11 years working for and with an AMWA member I met at my first local chapter meeting. The last 6 years I have been editor of a free website that highlights news and evidence-based therapies for autism, **www.HealingThresholds.com**. I will use Healing Thresholds as an example to show an effective way to use social media to expand connections for yourself and your employer or clients. These suggestions are designed for people with a blog or website, but the ideas can work with any social media you are comfortable with.

Our site is updated daily to keep it fresh as well as to provide content for our Facebook page, our LinkedIn group, and our Twitter account. We formed our LinkedIn group, Healing Autism, in late 2008. We joined Facebook in January 2009 and started our Twitter account at the same time.

We have found that the potential to link our content among social media venues is exponential; I have tried a lot of them. I'll bet if you shouted out the name of a social media site, there is a good chance I loaded Healing Thresholds content on it. I could spend my life doing social media content wrangling, but I, as you, have other places to go and people to meet. I have to earn a living. Fortunately, there is a way to keep you, your work, and your site in the forefront of people's minds and not spend a lot of time or money. So grab your laptop, and I'll tell you what I know.

Overall Strategy

I focus on what I want social media to do for me and then find the most efficient way for that to happen. I'm going to share what has ultimately given me the most bang for my buck (or for free!).

At Healing Threshold, we focus on getting people to visit our website. That's where our content is, and it is the base from which I send my expertise into cyberspace. I have been using Facebook, Twitter, and LinkedIn simultaneously—and gotten a lot of traction from all three.

Facebook: As many of us have discovered, Facebook (FB) can be a time waster, but it also can provide a way to plan an event, and it can be the foundation of your online presence with people in and outside of your professional niche. Many of my "friends" overlap between my personal FB page and the Healing Autism FB page.

LinkedIn: When we started our LinkedIn group, we initially required that members ask to join; now it is an open forum with more than 570 members. I monitor the forum through a daily LinkedIn e-mail message. The one other group I joined and have contributed to regularly is Autism Researchers Link. It is by invitation only and has nearly 4,000 members. In my early days on LinkedIn, I was overeager and joined a lot of groups that seemed of personal or professional interest. Not only did I overextend myself and end up not reading any of the updates from the groups, but also I couldn't find time to contribute to all of them or get to know any of the members. So, finding one or two work-related groups and then a group for my passion (for example black-and-white photography), keeps me up to date and allows me to get to know the group members and be a regular contributor.

Twitter: No, I do not subscribe to Ashton Kutcher's tweets; however I do use a Twitter feature that gives me the flexibility to follow all tweets with "#autism" in the body of their message—if I choose to. And, I make sure that all my tweets (that of course come from our website news) contain "#autism." This narrows my community, and my messages are more targeted.

I am going to assume that you don't want to be connected to a social media dashboard all day; you therefore need a plan and consistency. Here's how I do it. Are there better ways? Probably. Do I want to spend more time than I do every day? No. Does this work for Healing Thresholds and me? Absolutely.

Specifics

On the Healing Thresholds website, I feature a daily news story about autism therapy and people who work in the autism community. At some point during the day, I share the most recent summary to Twitter and at least one of my two LinkedIn groups (*see figure on next page*).

First thing the following day, I post on Facebook the previous day's news story headline, with a link back to Healing Thresholds. Because I've linked Facebook and Twitter, I get another hit on Twitter. Linking Facebook and Twitter is a piece of cake. Log into your Facebook account, then type the URL, **https://www.facebook.com/twitter**. This will enable you to associate any of your pages to send all status updates to your Twitter account.

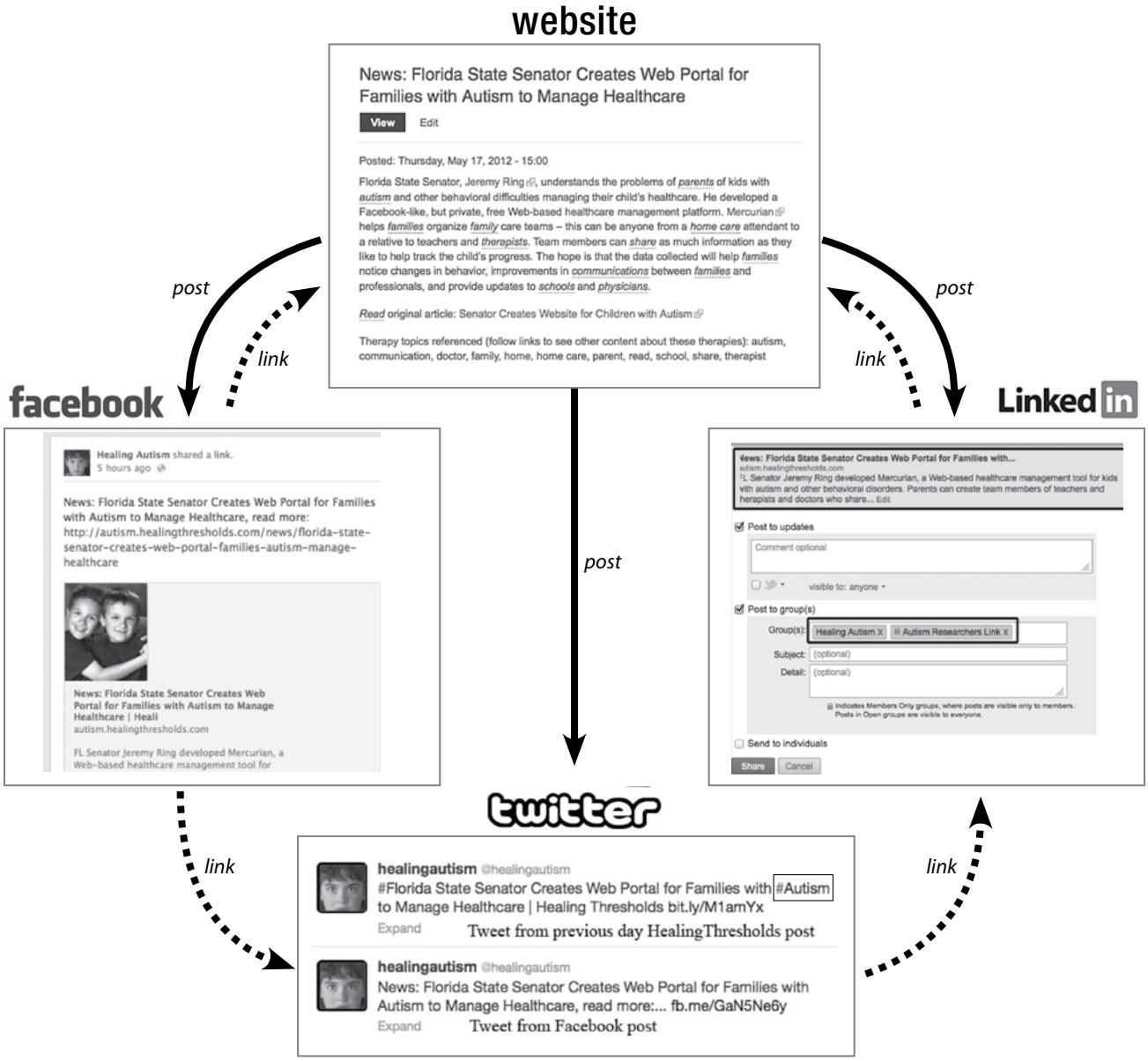
Once a week, if possible, I contact the people mentioned in the news that I have summarized. Some I write to through Facebook, and others I contact by e-mail. This has proved valuable in getting links back to our site as well as making new social connections.

Tips

Stay in contact with your social networking groups; pass along information you find that might be interesting to the group, whether or not it is about your work. Ask questions—people *love* to answer them.

Bookmarks in Web browsers are one way to keep track of information for later sharing; however, if you're like me, you have hundreds of bookmarks and have forgotten what they're about. Evernote Web Clipper, available at **evernote.com/webclipper,** is a useful tool for saving Web pages and keeping them organized. The free tool can be added to the Firefox, Chrome, and Safari web browsers.

Finally, to bring it full circle, mentor as you were mentored. It doesn't have to be for free; two of my clients each overheard me talking to someone about Facebook, networking, and writing. I don't charge these clients my full rate, but I do try to give them answers to questions they have and the respect due a colleague.



LinkedIn Group Update

By Mali R. Schantz-Feld, MA
Freelance Medical Writer, Seminole, FL

"Sign me up!"
"Sounds interesting. Sign me up, too. Will you be meeting at the conference in Sacramento?"
"I'm interested; please tell me what's involved."
"Let's do this."
"Sounds exciting! I can't wait to hear back from you!"

These enthusiastic responses to a call for AMWA Social Media Committee volunteers illustrate the fact that when a task involves working together, nobody does it better than our AMWA LinkedIn discussion group! The theme of this issue of the *AMWA Journal*, "working together," is a perfect fit for this networking social media site.

During the past few months on LinkedIn, AMWA members shared experiences, gave advice, joined committees, and posed questions regarding many aspects of medical writing. One member received valuable opinions on how to disclose a possible conflict of interest when publishing research in a medical journal. Another member started a thread after discovering that Google Scholar was a valuable resource. A colleague exclaimed, "I didn't know about it and did a trial search. I think it will be useful to me." Another concurred, "I found articles I couldn't find elsewhere—including very, very old ones not in PubMed. Thanks so much for unearthing this resource. I plan to spread the word!"

One participant posted a link to his blog post about making the transition from academia to industry, and another shared his blog post about launching his freelance medical writing business shortly after the birth of his daughter. Knowing that serious medical writers need inspiration, not to mention a good chuckle, now and then, someone posted a link to "The Ultimate Guide to Writing Better Than You Normally Do," an article in *McSweeney's* by author Colin Nissan.

Group members continued to offer suggestions on how to find consumer medical writing opportunities, responding to a request from a downsized medical writer. The thread, also mentioned in the last issue of the Journal, had grown to 50 responses, with great suggestions for finding a job and honing the consumer medical writing style. The group even worked together to get together, resulting in a consumer writing table at the networking luncheon at the October conference.

LinkedIn discussion participants understand that working together keeps AMWA members working.

Until next time—looking forward to connecting with you on LinkedIn!

Erratum: In the LinkedIn Group Update in the June 2012 issue of the Journal (page 84), Michele Hanley was incorrectly identified as Michael Hanley.

Blog Log

By Debra Gordon, MS
Independent Medical Writer, Williamsburg, VA

Working Together: Accountable Care Organizations on the Blogs

When I learned that the theme of this issue of the Journal was "working together," my mind went immediately to accountable care organizations (ACOs). (What? Yours didn't?) I have been writing a lot about these arrangements, which require that physicians, hospitals, other providers, even insurance companies, work together to provide coordinated care across health care settings to improve outcomes and reduce costs. The Affordable Care Act supports their implementation, and Medicare has already named more than 30 ACOs as part of its Pioneer ACO pilot program. The benefit? Show better outcomes at lower costs and you get to share in any savings between what would have been spent and what is spent. If this works, it could have a potentially transformative effect on the health care system.

If you want to learn more about how ACOs work and what they might mean for you, here are some sites to visit.

Kaiser Family Foundation (www.kff.org). Ok, it's not really a blog but, seriously, the line between blogs and websites gets thinner all the time. The bottom line is that no other site or organization provides as much quality information on all aspects of health care reform, including ACOs, as the Kaiser Family Foundation.

The Medicare Newsgroup (www.medicarenewsgroup.com). This is a relatively new site that turned up in my e-mail box about a month ago. It aggregates stories about Medicare and other health policy issues, as well as provides original content and analysis. One article that caught my eye touted the ability of Medicare ACOs to transform the entire health care system. One can only hope.

Accountable Kidney Care Collaborative (www.accountablekidneycare.com/akccblog). This blog seeks to educate and inform nephrologists and others who care for patients with kidney disease about ACOs. It's written by Robert Provenzano, MD, an associate clinical professor at Wayne State University in Detroit. He also includes links to other ACO-related news.

Accountable Care Forum (www.accountablecareforum.com). This site is sponsored by the large health care law firm Squire Sanders and the Association of Medical Device Reprocessors. It provides news and analysis from experts throughout the country on ACOs and related health care system issues. Their guest bloggers seem to have the background; two are former employees of the health policy consulting firm, the Lewin Group. Definitely worth an RSS feed for policy wonks.

Working Together When You Can't Be Together

By Jeanne McAdara-Berkowitz, PhD

Principal, Biolexica LLC, Longmont, CO

Whether an independent contractor or on staff, whether working onsite or remotely, it's the rare medical communicator who works in complete isolation. But ever-tighter production schedules, geographic dispersal of team members, and use of disparate technology platforms pose challenges to collaboration. Fortunately, there are Cloud-based tools that can help medical communication teams collaborate in real time over the Internet when a face-to-face meeting isn't possible.

The number of applications (apps) available or in development is staggering, and the user-public is still collectively deciding which features and pricing models are most desirable and what privacy levels are tolerable. Shakeout is inevitable, but for readers willing to take that risk in the hopes of finding a killer app, a good starting place is the thorough—though perhaps overwhelming—mind map of online collaboration tools (**www.tinyurl.com/7pdjkzu**), maintained by Robin Good from **MasterNewMedia.com**.

For some specific suggestions, here are a few available tools in each of several categories. It's not an exhaustive list but it might spark some new ideas for collaborating. Just remember to always review and understand any app's privacy and security policies to ensure they are compatible with employer, client, and personal policies and risk tolerance.

Review and Edit Documents Online

A fundamental responsibility for many writers and editors is to coordinate feedback from multiple contributors. Many tools are available for collaborative document review and editing, including Google Docs **www.docs.google.com** (free; undergoing transition to a revamped service called Google Drive); HyperOffice **www.hyperoffice.com** (free trial; plans start at $3 per user per month); eXpresso **www.expressocorp.com** ($1 per year with IBMSmartCloud/LotusLive subscription); Office365 Small Business **www.microsoft.com/en-us/office365** ($6 per user per month); and Acrobat X Pro **www.adobe.com/products/acrobatpro.html** (full program $449; upgrade from previous version $199).

Web conferencing services can also be useful for collaborative review. Well-known examples include Webex **www.webex.com** (basic services free; extended plans $24 per month and up); GoToMeeting **www.gotomeeting.com** ($49 per month); and Adobe Connect **www.adobe.com/products/adobeconnect.html** (plans for a small number of users available for $55 per month or pay-per-use).

Collect and Share Ideas in a Digital War Room

Project teams sometimes use vision boards to foster discussion of images, messaging, and overall plans. Public sites such as Pinterest are inspiring developers to experiment with adaptations for business use. Try these free sites: Juxtapost **www.juxtapost.com**, Springpad **www.springpad.com**, and Clipboard **www.clipboard.com**.

Evernote **evernote.com** (basic free; premium $45 per year) is also a useful app for collecting, organizing, and sharing information and ideas from text notes, documents, Web clips, photos, and images.

Brainstorm With Virtual Whiteboards

The whiteboard is the classic brainstorming and group mind-mapping tool, but its functionality is dependent on all parties gathering around it, pens in hand. A virtual whiteboard facilitates brainstorming and image collaboration when your team can't be in the same room. Try Scribblar **www.scribblar.com** (basic functionality free; pro version for private website integration has custom pricing); Scriblink **www.scriblink.com** (basic free; custom integration $9 per month and up); Dabbleboard **www.dabbleboard.com** (basic free; pro version $8 per month and up); and Twiddla **www.twiddla.com** (30-day trial free; plans start at $14 per month).

Who's Doing What by When? Teams and Project Management

From simple shared to-do lists to fully featured "collaboration workspaces," a wide variety of apps are designed to keep track of responsibilities and timelines, and to keep tasks synchronized across team members. Some of the larger suites also feature customer-relationship management tools.

Do.com from Salesforce **www.do.com** (free) adapts Facebook-style social networking for team collaboration. Also try Asana **www.asana.com** (free for teams up to 30 members; $100 per month and up for larger groups).

SmartSheet **www.smartsheet.com** (30-day trial free; paid plans $15.95 per month and up) is an alternative to

Microsoft Project for collaborating on Gantt charts, project timelines, and budgets.

Multifunctional suites for project and task management, group discussion, real-time document creation and review, and scheduling include BaseCamp **www.basecamp.com** (45-day trial free; plans start at $20 per month for 10 projects); Salesforce Small Business **www.salesforce.com** (7-day trial free; plans start at $5 per month per user); IBMSmart Cloud/LotusLive **www.ibm.com/cloud-computing/social/us/en** (starts at $7 per month per user); Solve360 **www.solve360.com** (14-day trial free; plans start at $39 per month); Teamlab **www.teamlab.com** (app and 1 GB storage free; extended storage and advanced file management $49 per month); and Zimbra **www.zimbra.com** (pricing and features vary widely by organization size).

It's unlikely that technology will ever substitute perfectly for a brainstorming session around the conference table or a thoughtful chat in a colleague's office. But online tools can supplement and enhance face-to-face collaboration, helping team members stay connected.

Acknowledgment
I thank Karen Golebowski, Jennifer Maybin, Natalie Miller-Moore, Elizabeth Ramicone, and Christine Welniak for their helpful suggestions.

TECH TIP

Point, click, present!

If you give talks—whether at meetings, pitches, or AMWA workshops—consider stashing a wireless presenter or "clicker" in your laptop bag. Bringing your own means you won't have to fumble with unfamiliar equipment, and you'll never experience that "uh-oh" moment when you are handed a presenter that is incompatible with your computer.

There are many styles available, so it is a good idea to try them in person for weight, fit, and button size. Key features to look for: a wireless USB receiver that can be stored inside the presenter itself when not in use; an integrated laser pointer; page-up and page-down functions; and mousing capability. No matter which presenter you buy, consider keeping spare batteries in your bag so you're always prepared.

– Jeanne McAdara-Berkowitz, PhD

Biolexica, Longmont, CO

TECH TALK REVIEWS

FREESCREENSHARING (www.freescreensharing.com)
Mac or Windows
Free

FreeScreenSharing.com is an online visual conferencing platform that allows you to host meetings and webinars in which participants can view each others' computer screens. Each call can accommodate up to 96 participants. Audio is not supported by this platform, but can be easily integrated using **www.freeconferencecall.com** or Skype. While not as visually appealing as WebEx or GoToMeeting, this service is free and functions well.

—Hilary Graham, MA

University of Texas MD Anderson Cancer Center, Houston, TX

TIME OUT (www.dejal.com/timeout)
Mac
Free

When I'm deep into work, I can sit scrunched in front of my computer for hours. My eyes, neck, and back let me know just how bad that habit is. I found a free program for the Mac, Time Out, that lets me set two kinds of breaks, "micro" breaks (for example, a 20-second break every 20 minutes to look away from the screen) and "normal" breaks (say, a few minutes every hour or two to get up and move around). The program will block my view of my computer screen during a break, but if I'm really deep into writing, I can postpone or skip a break. I can configure how long each kind of break lasts, the time between breaks, and assorted other options. I need the occasional reminder to move or look away, and Time Out is a simple way to automate that.

– Mary E. King, PhD

King Medical Communications, Boulder, CO

Wireless presenter
Buy at: Online retailers such as Amazon.com or Best Buy, or your local electronics retailer.
Brands to consider: Logitech, Kensington, Targus, Dekcell, HDE.
Cost: $30 to $40.

Note from the President

By Barbara Snyder, MA, 2011-2012 AMWA President

When I addressed the attendees at the 2011 AMWA Annual Conference, I outlined five goals for 2011-2012. In this article, the last of my presidential year, I'll tell you what progress we've made toward these goals.

Goal 1 was to work with the Certification Commission, the Executive Committee (EC), the Board of Directors, and AMWA staff at headquarters to advance the initiative of certification for medical writers. As noted in the Backgrounder document (available on the AMWA website), AMWA has hired Schroeder Measurement Technologies (SMT) to help us develop certification policies and procedures that adhere to established, legally defensible guidelines and certification best practices. In May, several members of the Commission and other esteemed AMWA members met with SMT for 2 days to conduct a job analysis—a detailed description of the critical competencies required of practitioners within a specified field. Starting with a discussion of AMWA's definition of a medical communicator, the group went on to identify the knowledge, skills, and abilities currently required of competent medical communicators across work settings. From this meeting came a survey that was sent to all AMWA members, as well as to members of the European Medical Writers Association, Drug Information Association, Board of Editors in the Life Sciences, Council of Science Editors, the International Society for Medical Publications Professionals, and the Society for Technical Communication, among others. The results of this survey are currently being analyzed and the results will be published in a forthcoming issue of the *AMWA Journal*.

Goal 2 was to support our new Executive Director, Susan Krug, CAE, and the AMWA staff to ensure a smooth transition at headquarters and to take full advantage of Susan's ideas and experience. Susan has eagerly given the officers and EC the benefit of her expertise, enthusiasm, and connections in the association arena. On Susan's recommendation, the EC has approved funding for a) an association management system that is the first step in updating our currently overtaxed technology system at headquarters and will accommodate a new website, and b) a new phone system to better direct callers to the right staff person (includes voice mail and expands our conference call functionality). In addition to a monthly teleconference with all the officers, Susan and I have a weekly call to discuss current activities and any new issues facing the association.

Goal 3 was to support Donna Miceli and the search committee in their efforts to find a new editor for the *AMWA Journal*, in preparation for Lori Alexander's departure after the December issue. We were fortunate to have several highly qualified candidates, out of whom we chose Vicki White to succeed Lori. Vicki has worked closely with Lori on the current issue of the Journal and will assume primary responsibility for the December issue.

Goal 4 was to explore new ways to recruit and better support and reward AMWA's dedicated volunteers, particularly the workshop leaders who give so generously of their time and talents. Under the direction of Tami Ball, Administrator of Special Projects, we developed a new call for volunteers, which is near launch as of this writing and should be public by the time you read this. For our workshop leaders, the 2012 Annual Conference will include a complimentary Workshop Leaders Breakfast. And, at its summer meeting, the EC approved a plan by Administrator of Education, Sharon Nancekivell, to increase compensation for all workshop leaders starting with the 2013 Annual Conference.

Goal 5 was to work with the EC, the Board of Directors, and AMWA headquarters staff to support our chapter volunteers. In conjunction with the Spring Board of Directors meeting, chapters were invited to send a delegate and an additional participant to take part in an AMWA Leadership Event. In addition to learning about association management best practices for chapters, this event was intended to help chapter leaders identify common issues and potential solutions, open communication between chapter leaders and AMWA staff, and help chapter leaders develop or reinforce their peer network. The interactive style set the stage for a more cohesive Board of Directors meeting. In addition, Administrator of Chapters and Membership, Kathy Spiegel, has been holding monthly teleconferences in which chapter leaders can ask questions, seek advice, and offer solutions to issues raised by other participants.

With tireless effort, dedication and talent, the staff, officers, EC, and other volunteers have accomplished much this year and have positioned AMWA to achieve even more in the future. It has been my honor to serve as your 2011-2012 President, and I look forward to working with incoming President, Doug Haneline, and the 2012-2013 EC.

Fast Facts: AMWA's Medical Writing Certification Initiative

Why is AMWA creating a certification program for medical writers?
Certification is not a new idea for AMWA. In fact, an AMWA task force considered certification in 1996, building on earlier work that included a recommendation from a long-range planning committee report, but the idea was not pursued given various legal, financial, and other considerations. Over the years, AMWA leaders have been repeatedly approached by members asking about a certification exam.

The goal of the current certification initiative is to define key competency areas within the field of medical writing and establish basic standards by which related knowledge can be assessed uniformly. In 2011, after 2 years of research by a special task force appointed by AMWA leadership, the Board of Directors approved the formation of a Medical Writing Certification Commission to initiate, evaluate, maintain, and oversee a credentialing program for medical writers.

How is AMWA developing the certification program?
The AMWA Board approved the use of funds from reserve accounts to support the Certification Commission, which will oversee the development of a certification program. This investment was the result of the review of research, gathered by a certification task force, on best practices in certification program and test development, information on existing programs, and many discussions among the AMWA leadership over several years.

AMWA contracted with a testing agency to assist us in developing certification policies and procedures that adhere to established, legally defensible guidelines and certification best practices.

To keep up with trends and best practices in certification, AMWA is also a member of the Institute for Credentialing Excellence (ICE). ICE is a nonprofit, 501(c)(3) organization dedicated to providing educational, networking, and advocacy resources for the credentialing community. Visit the About Us page on the ICE website at www.credentialingexcellence.org.

How can one test cover all areas of medical writing?
The current exam will be designed to cover knowledge and skills that are common to medical writing across settings (for example, ethical or data reporting guidelines, basic literature searching, types of clinical trials, statistical concepts such as risk ratios or significance, and applying language standards and rules to improve clarity or reorganize content). The weighting system of the exam will yield an overall score that will determine whether minimal competency standards have been met.

Will a writing component be associated with the certification program?
A writing component (for example, exercises, portfolio submission, or a writing resume) will likely be included as part of the application and eligibility process. Although a major portion of the exam will be a multiple-choice format, the Commission is also considering the inclusion of a writing exercise, realizing that this type of component involves greater time and resources to coordinate, implement, and evaluate.

Who will be able to take the exam?
The Commission will be determining eligibility requirements for the certification examination. The application process will be detailed in an extensive candidate handbook that will describe the eligibility requirements, application process, policies and procedures, and testing information.

Can only AMWA members become certified?
No. The certification program will be open to all eligible medical writers globally.

Do I have to go through AMWA's certificate program to pursue certification?
No. Completion of the AMWA's educational certificate programs will not be a requirement of the certification for medical writers, and they will be considered separate endeavors.

Will the certification exam guarantee that those who pass are highly qualified medical writers?
The certification exam is not meant to show aptitude or skill level in the field of medical writing. Rather, it will be designed to show that those who pass the test demonstrate a basic, minimum skill set that all medical writers should have to work in the field. Having such a certification may or may not be as important for senior writers as for those who are newer to the field and who need to show a certain level of competency to be hired.

Will the existence of a medical certification program imply that those medical writers who are not certified are unqualified?
No, not at all. For those who wish to pursue it, certification will provide a means of demonstrating some core knowledge and proficiency specific to medical writing. It will not demonstrate skill level or aptitude. Certification will not replace any need for continuing education and professional development. Experience, portfolios and writing samples, resume or CV, and business or peer recommendations will remain ways to recognize one's expertise and proficiency.

Supporting certification is AMWA's investment in the future of our profession. Certification may apply far less to those medical writers who are well established in the profession than to the medical writers of tomorrow.

➲ For more information on AMWA's medical writing certification initiative, read the backgrounder available at **www.amwa.org/default/publications/AMWACertificationBackgrounder.pdf.**

Characteristics of the Four Generations Currently in the Workforce*

›*Working well together requires an understanding of the "world" and typical attributes of each generation.*

	ATTRIBUTES	GENERATION [a]			
		Traditionalists (1937-1945)	Baby Boomers (1946-1964)	Generation X (1965-1984)	Millennials (1985-2005)
1.	Coming of age era	Great Depression and World War II	Spiritual awakening, sexual revolution, and women's liberation movement	Oil crisis, economic uncertainty, high divorce rates, and "latchkey care"	High-speed communication, abundance in society, doting parents, and high levels of diversity
2.	Generational "personality"	Conforming Conservative spenders Oriented to past Hard times in childhood	Competitive Driven Soul searchers Willing to "go the extra mile"	Self-reliant Skeptical Risk takers Seek balance and a sense of family	Realistic about the present Optimistic about the future Prefer collective action Tenacious
3.	Core Values	Dedication/sacrifice Loyalty Honor Patriotism Family	Optimism Personal growth Personal gratification Team player Health and wellness Work	Technoliterate Fun and informality Pragmatism Global thinking Results-oriented Challenge the system	Social consciousness Morality Achievement-oriented Respect for diversity Money
4.	Definition of work	Obligation	Adventure	Challenge	Means to an end
5.	Workplace values	Respectful of authority Age equals seniority Hard-working Dedicated Reserved Obedient	Avoid conflict Formal Follow protocol Social Idealistic Driven	Fast-paced Independent Confident Value personal time Challenge the status quo Loyal to staff leader	Task oriented Want options Expect feedback Multitask through multi-media Resist rules Value work/life balance
6.	Interactive style	Individual	Team player	Entrepreneur	Participative
7.	Leadership style	Directive; command and control	Consensus-building	Everyone is equal	Yet to be determined
8.	Preferred communication style	Memo	Face-to-face	E-mail	Instant messaging, texting
9.	Rewards	Satisfaction in a job well done	Money, recognition, title	Money, freedom	Meaningful work
10.	Motivators	"We respect your experience"	"You are valued and needed"	"Forget the rules, do it your way"	"You will work with other bright, creative people"

Compiled from the following sources: Ethics Resource Center. Supplemental Research Brief. 2009 National Business Ethics Survey; Hammill G. Mixing and managing four generations of employees.* FDU Magazine Online. *Winter/Spring 2005 (www.fdu.edu/newspubs/magazine/05ws/generations.htm**); Jones D. Co-existing with Millennials: what we and they need to know to improve the workplace. Presentation at AMWA Annual Conference, Jacksonville, FL, October 21, 2011.*

[a]*The years defining the generations vary according to sources. These year intervals are approximates for those defined in the sources used in compiling the list.*

For advice on communicating across generations, read Generational Diplomacy online.

Generation Gaps in the Workplace: Making Friends With Technology and Millennials

By Eleanor Vincent

When I left high school in 1966, the typewriter was my ticket to success and one I used extensively as a reporter for my college newspaper. Then came graduate studies in journalism, and again, the typewriter was king.

The newsroom at journalism school was a veritable beehive of clacking keys. As the assistant managing editor of *The Minnesota Daily,* it was my job to ensure stories were turned in on time. Copy had to be double-spaced on sheets of yellow paper taped together. Reporters typed the "slug" 30 at the end to signal that the story was complete—the height of journalistic excellence in the early 1970s.

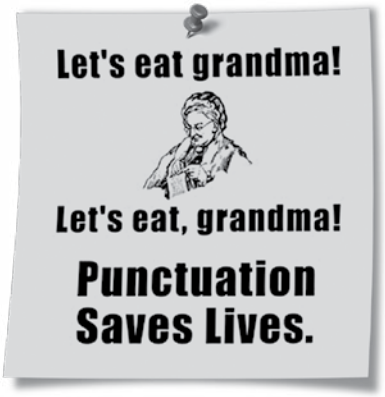
I first saw a computer keyboard in 1977. I became an early adopter of the new technology quite by accident because the newspaper I worked for began using a rudimentary form of desktop computing years before it became routine. The newsroom keyboards were connected to dumb terminals, and no fooling, they possessed not an ounce of intelligence. There was a large mysterious box (an early forerunner of today's computer server) kept in the production room that translated what I typed on my keyboard directly into finished type. It was a huge leap forward.

Fast forward. It's 2012 now and far from being an early adopter, I struggle to keep up. I work with colleagues for whom technology is a way of life, not just a handy tool. Known as "Millennials" or members of "Gen Y," they are highly tech savvy and prefer communicating quickly via text or instant message (IM). Meanwhile, I stutter over words like hypertext, once joked that I wished server farms included ponies, and still can't fully wrap my head around the intricacies of global search, search engine optimization, and taxonomy, let alone understand all the icons on the Microsoft Word toolbar.

Compared to my younger colleagues, I feel like a dinosaur. Don't get me wrong. I love working with these energetic young people. I love their spirit, their intelligence, and—yes—their superior technical know-how. They grew up with a mouse in their hands and cell phones in their pockets. They send text messages and notes through instant messenger systems, use Google Docs to track work, and move documents with lightning speed across huge screens with multiple open windows—all simultaneously. I stand over their shoulders watching them flick the cursor hither and yon faster than an extreme Frisbee player tosses a plastic disc. I don't have the vaguest idea what they are doing.

That level of multitasking drives me mad. To edit complex clinical content, I need to concentrate. It seems as if we are living and working in parallel universes.

I recently posted a sign outside my cubicle with a picture of an elderly lady. The caption says, "Let's eat Grandma!" Below that, it reads: "Let's eat, Grandma!" And below that, the statement: "Punctuation saves lives."



At first, my younger colleagues looked puzzled. But soon, I heard guffaws once they got the joke. Despite their speed and agility, they still value working with someone who knows grammar rules that seem to have become extinct in our texting culture in which smiley faces take the place of sentences.

I'll always have a special place in my heart for my generation of Baby Boomers who grew up using typewriters and know an elegant sentence when we see one. But when I need the latest iPhone app or access to a cleverly hidden Google Doc, I take my questions to a Millennial. Different generations in the workplace? Bring it on!

Eleanor Vincent lives and writes in Oakland, CA. Her essay "The Resurrection of Wonder Woman," appears in the anthology At the End of Life: True Stories about How We Die *(Creative Nonfiction, 2012). She is a senior editor for The Permanente Medical Group.*

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Appendix A. Additional Predominant Errors in the Sample, Ranked by Their Weighted Index

Rank	Error	Broad Error Category	Frequency Index[a]	Dispersion Index[b]	Weighted Index[c]
21	Error with citation format	Style	.054	.462	.258
22	Incorrect text styling	Design	.031	.462	.246
23	Error with acronym or abbreviation format	Grammar	.016	.462	.239
24	Missing or incorrect in-text reference to table or figure	Content	.014	.462	.238
25	Lack of an organizational element	Style	.012	.462	.236
26	Missing comma after an introductory element	Punctuation	.009	.462	.235
27	Factual error	Content	.030	.385	.207
28	Unnecessary comma	Punctuation	.015	.385	.200
29	Missing comma in a series	Punctuation	.010	.385	.197
30	Fused (run-on) sentence	Grammar	.006	.385	.195
31	Lack of pronoun-antecedent agreement	Grammar	.012	.308	.160
32	Emphasis error	Style	.009	.308	.158
32	Vague or missing title for content section or graphic	Content	.008	.308	.158
33	Unnecessary comma with a restrictive phrase	Grammar	.006	.308	.157
34	Fancy tone/language	Style	.008	.231	.119
34	Nominalization	Style	.008	.231	.119
35	Missing comma in a compound sentence	Punctuation	.006	.231	.118
35	Sentence fragment	Grammar	.005	.231	.118
36	Comma splice	Punctuation	.003	.231	.117
37	Unnecessary or missing apostrophe (including its/it's)	Punctuation	.008	.154	.081
37	Poor integration of source material	Content	.008	.154	.081
37	Missing semicolon with an independent clause or list item	Punctuation	.008	.154	.081
38	Error with quotation format	Style	.007	.154	.080
38	Missing comma in a parenthetical/transitional expression	Punctuation	.006	.154	.080
39	Missing comma in a complex sentence	Punctuation	.005	.154	.079
40	Unnecessary colon	Punctuation	.002	.154	.078
40	Missing conjunction	Grammar	.002	.154	.078
40	Faulty predication	Style	.002	.154	.078
40	Missing word	Grammar	.002	.154	.078

Appendix continued on next page

Rank	Error	Broad Error Category	Frequency Index[a]	Dispersion Index[b]	Weighted Index[c]
41	Incorrect colon use	Punctuation	.006	.077	.041
42	Incorrect pagination	Design	.002	077	.040
43	Adjectival for adverbial form—"ly"	Grammar	.001	.077	.039
43	Missing colon in explanation	Punctuation	.001	.077	.039
43	Missing comma with paired adjectives	Punctuation	.001	.077	.039
43	Unnecessary negative construction	Style	.001	.077	.039
43	Incorrect punctuation of a foreign word	Punctuation	.001	.077	.039
43	Lack of imperative mood	Style	.001	.077	.039
43	Extra letter	Grammar	.001	.077	.039
43	Incorrect or missing pronoun	Grammar	.001	.077	.039

[a]Each error was classified into one of six broad categories; these results were used to calculate contingency table analysis.
[b]The frequency index was calculated by dividing each specific error's frequency by the total number of errors (864) found across all tests in the sample.
[c]The dispersion index was calculated by dividing the number of tests each specific error was found in by the total number of editing tests (13).
[d]The weighted index was determined by relativizing the frequency index against the dispersion index (ie, adding the frequency and the dispersion indices and dividing by two).

GENERATIONAL DIPLOMACY*

By Candace Moody

Vice President, Communications, WorkSource, Jacksonville, FL

"If you can't go around it, over it, or through it, you had better negotiate with it"

—Ashleigh Brilliant

For better or worse, the Baby Boomers are staying in the workplace much longer than they—and their successors—had anticipated at the turn of the 21st century. Not only are they staying under duress (both their retirement plans and savings have been reduced because of the current recession) they are also taking positions that pay much less than their former jobs. This makes them cranky.

If the Baby Boomers are cranky, Generation Xers are furious. For nearly five decades now, this smaller "sandwich" generation has followed the Baby Boomers through the marketplace and workplace. Generation X is smaller in number than the Baby boomers by an estimated 30 million members. The Baby Boomers represent nearly one-quarter of the US population, with an estimated 65 million members of the cohort still alive.[1] That means that Generation X has been waiting to take over the corner office for more than 30 years, and it looks like they'll have to wait a little longer still.

Jeff Gordinier, author of *X Saves the World: How Generation X Got the Shaft But Can Still Keep Everything From Sucking*, clearly believes that the Baby Boomers have had their time and should be moving on. He's quoted in a *Time* magazine interview as saying:[1]

> "All the mass-media oxygen seemed to be sucked up by baby boomers and millennials. The baby boomers were turning 60, and that's all you heard about. How the boomers were turning 60 and they were still sexy and they're hot and they're launching their second acts…"

Gordinier is speaking for many of his generation. I presented a workshop on generations in the workplace a few years ago for a manufacturing company that employed many more Baby Boomers than other generations. In the management group I was speaking to, I noted only one 30-something in the crowd. He sat slumped through the presentation, nodding grimly when I talked about waiting for promotions, for pay increases, for a crumb from the table—any crumb. Finally, I addressed him directly. "It's not fun being you, is it? How many people in the company have to die before you get your promotion?" I was simply asking for comic effect, but he delivered a laconic response that stole the show: "I have a list," he muttered darkly.

The Millennial generation (born in the early to mid 1980s to mid-2000) will be about 100 million strong, according to demographers,[2] and this generation has its own issues with Baby Boomers in the workplace. One young worker asked my advice about mentoring. "I don't understand why the older women [Baby Boomer age] in the office are so cold and unhelpful. I'm like, really nice to them, and they just refuse to help me learn anything I need to know. What's up with that?" It never occurred to this 20-something that once she learns the job, she will be able to perform it competently for about half the salary of her more experienced peers. Twenty years of experience and well-honed survival instincts are sometimes the only thing standing between the Boomers and a pink slip.

Can the generations overcome their distrust and the generational and cultural gaps between them to thrive in the workplace? Here are some ideas for them, based on the Rules of Diplomacy from John T. Rourke and Mark A. Boyer from the University of Connecticut.[3]

- You're entitled to have an embassy, but you must learn the language, laws, and customs of your host country.
- When people say something that starts with "in my country," they are correct (no matter how strange the idea is to you.) Respect their customs and learn how to be heard in their language.
- Learn a few key phrases (even if they seem foreign to you): "What I like about that idea is…" and then "Tell me more about that."
- Get to "yes" quickly and often; agree on the many things you can. Save the tough negotiations until after you have agreement and trust built on the easier ones.

Getting to yes is easier than you think. When you're all in the same business, there must be some common ground you share. You can start

**Based, in part, on a presentation at the 2011 AMWA Annual Conference, Jacksonville, FL.*

by focusing on values—why we do what we do. For example,

- "The patients come first."
- "Good health should be accessible to everyone."
- "Our data will always be accurate and tested using the proper methods."
- "We serve the entire community."

You can also get to yes by focusing on strategies and goal—what we plan to do. The organization's goals should be clear and negotiated in advance. "We will reduce deaths by making sure every patient can understand the prescription information" and "We will increase the number of women signing up for health classes by 50%," for example.

The rest is negotiable: who, when, where, how; these are all simply tactics. They can—and should be—revisited, revised, and revamped. The only right answer is what is actually working right now; keeping that in mind can go a long way toward helping the team stay focused on the end goal.

Author disclosure: *The author notes that she has no commercial associations that may pose a conflict of interest in relation to this article.*

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In the Service of Good Writing

ONLINE EXCLUSIVE

Between You and Me, Please!

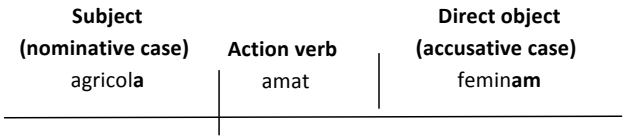
By Laurie Thomas, MA, ELS
Madison, NJ

Many of the grammatical mistakes that people make in ordinary speech involve use of the wrong case of pronoun. People end up making these mistakes because they try to "play it by ear." Then they end up saying things like "between you and I" when it should be "between you and me." Yet once I teach people the simple underlying rules, they get it right from that point forward.

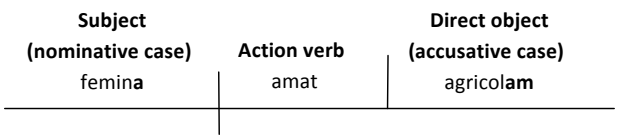
First, a Little Latin

It's easier to understand the rules on pronouns if you understand how the rules came about. Our use of *I* versus *me* and so on are vestiges of our language's ancestral case structure. English is an Indo-European language, like German and Latin. Unlike German and Latin, however, English doesn't require you to change the endings of a noun (and the words that modify that noun) to show what role that noun plays in a clause or sentence. Instead, we English-speakers use word order and prepositions for that purpose.

Just for the sake of illustration, consider the following sentence in Latin, as shown in a Reed-Kellogg diagram:

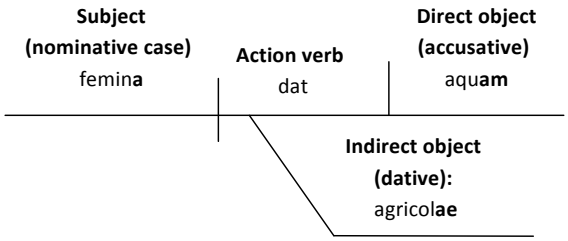


You could present these words in any order whatsoever. Changing the word order might change the emphasis, but it doesn't affect the literal meaning. If you said *Agricola feminam amat* or *Feminam agricola amat*, it would still mean that the farmer loves the woman. In English, if you want to say instead that the woman loves the farmer, you change the order of the words; but in Latin, you change the endings on the nouns as follows:



Thus, you could say *Femina agricolam amat* or *Agricolam femina amat* and it would still mean that the woman loves the farmer.

If you wanted to say that the woman gives water to the farmer, you'd say *Femina agricolae aquam dat*:

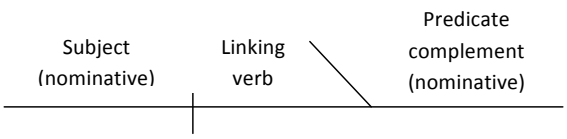


The *-a* ending says who is giving the water. The *-am* ending signifies that the water is what's being given, and the *-ae* ending indicates to whom the water is being given. (Note that these nouns are all from the first declension. Nouns from other declensions take different endings.)

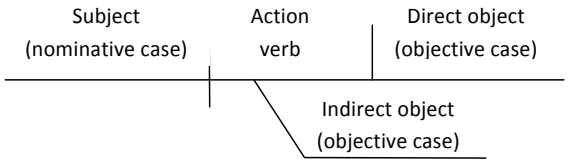
In addition to modifying the endings of Latin nouns, you also have to modify the endings of the Latin adjectives to reflect the number and gender and case of the noun. That gets tricky, because Latin has five declensions of nouns, three genders, singular and plural number, and seven cases, which means that Latin students have to do a lot of memorization. In contrast, in English you have only two cases (nominative and objective) and you have to think about case and gender only for pronouns! There's really no excuse for getting it wrong!

Choose the Right Pronoun

To choose the right pronoun in English, every single time, first find the verb. The subject of a verb is always in the nominative (*I, you, he, she, it, we, they, who, whoever*). So is the predicate complement of a linking verb. (I am I. It was he. This is she.) The linking verb that links a pronoun to a subject is usually some form of the verb to be (*am, is, are, was, were*). The other linking verbs usually link the subject to an adjective or to a noun (eg, I feel sick, he became king).



If the pronoun isn't the subject of a verb, and it isn't a predicate complement linked to the subject by a linking verb, then it is in the objective case (me, you, him, her, it, us, them, whom, whomever). This includes direct objects, indirect objects, and the objects of prepositions.



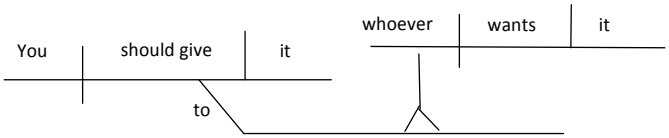
☺ I like *him*. (direct object)
☺ I wouldn't give *her* the time of day. (indirect object)
☺ Between *you* and *me*.... (object of a preposition)

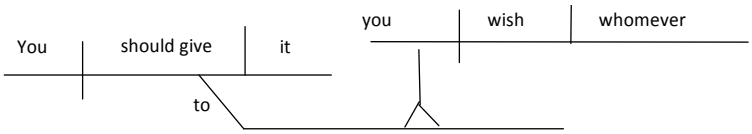
One other point: don't use *myself* (a reflexive pronoun) when you mean *I* or *me*.
☹ Lee, Pat, and myself were present at the meeting.
☺ Lee, Pat, and *I* were present at the meeting. (Put *I* at the end, for modesty's sake.)
☺ He gave the report to Lee, Pat, and me. (*Me* goes at the end of the list, too.)

Now Comes the Tricky Part

Okay, so now you know that unless a pronoun is the subject of a verb or being linked to the subject with *am, is, are, was,* or *were*, it should be in the objective case (*me, you, him, her, it, us, them, whom, whomever*). The tricky part is when you have a clause that serves as a subject or direct or indirect object. You have to remember that the case of the pronoun depends on the role that the pronoun plays within the clause, not the role that the clause plays within the sentence! Consider the following two examples:
☺ You should give it to whoever wants it.
☺ You may give it to whomever you wish.

In these sentences, an indefinite relative clause serves as an indirect object. Therefore, the clause as a whole is in the objective case. However, the case of a pronoun within the clause depends on the role that the pronoun plays within the clause, not the role that the clause plays within the sentence. Find the subject (and predicate complement, if there is one) of the clause and put it in the nominative case, and put the direct and indirect objects in the objective case.





Another problem concerns the pronouns that follow *except, but, than*, or *as*. If you are using these words as prepositions, then you might be able to get away with using the objective case for their objects. To avoid controversy, just add a verb, whose subject would therefore be in the nominative case:
☹ Why should a man be better than me because he's richer than me? — William Faulkner
☺ I am taller than he is.
☺ He is as cautious as I am.

Conclusion

If a pronoun is the subject of a verb or the predicate complement of a linking verb, use the nominative case (*I, you, he, she, it, we, they, who, whoever*). Otherwise, use the objective case (*me, you, him, her, it, us, them, whom, whoever*). It's that simple.

Practice Exercises

Take some online quizzes to check your comprehension:

http://grammar.ccc.commnet.edu/grammar/quiz_list.htm

www.grammarbook.com/grammar_quiz/who_1.asp

www.writingenglish.com/test1

ONLINE EXCLUSIVE

WEB WANDERINGS

By Barbara Woldin
Freelance Writer/Editor, High Bridge, NJ

Following the "working together" theme of this issue of the AMWA Journal*, Web Wanderings features sites that address such a spirit.*

Henry Ford once said "Coming together is a beginning; keeping together is progress; working together is success." As an industry, medical communication is not likely to join the ranks of the automobile industry, but we can adopt Ford's mindset to further our profession. By working together, we can become a formidable force in educating big pharma, academia, government regulators, and publishing houses about the value that we bring to the table as professional medical communicators.

Pharmaphorum
Bringing healthcare together
www.pharmaphorum.com

Started by D. Paul Tunnah, pharmaphorum.com is an online venue whose mantra is to bring health care together by being a facilitator of thought leadership and innovation within pharma. By fostering collaboration in the sharing of experiences, ideas, and inspiration, the site hopes to help the pharmaceutical industry adapt and meet the challenges brought on by declining levels of innovation, increasing cost containment by governments, and growing urgency for the globalization initiative, and thereby, become more efficient and able to deliver better health care solutions.

The pharmaphorum.com site provides a platform in print, audio, and video formats for presenting new content that addresses crucial pharma issues from around the world; showcases service providers of new business models; curates global news, industry events and job opportunities within pharma; and advocates the use of social media within pharma to effectively connect companies, share innovation, and improve public relations.

At pharmaphorum.com, you will find advice on using social media to build business-to-business brand awareness, access to social media training workshops, and a stream of interesting and relevant content, including disease-state articles, interviews with key opinion leaders, and commentary or opinion pieces. To whet your appetite, some article topics include the following.

- Comparative effectiveness evidence: Comparing apples and oranges?
- To tweet or not to tweet
- Empowering patients with education
- Translating Science to English
- Delivering a consistent brand vocabulary
- FDA guidelines and social media for the pharma industry
- CME: the first step is understanding how we learn
- Ghostwriting: myths and realities

ResearchGate
A professional network for scientists and researchers
www.researchgate.net/aboutus.AboutUs.html

It was not that long ago when collaboration between scientists who were countries or oceans apart was a convoluted and arduous, if not next-to-impossible task. With the advent of the Internet Age, geographic barriers have become a non-issue, allowing for the global exchange of ideas and the sharing of research. ResearchGate is a Web portal designed to perpetuate this flow of scientific data; it was built for scientists by scientists, with the idea that science can do more when it's driven by collaboration. ResearchGate strives to facilitate scientific collaboration on a global scale by providing its users who register and create a profile (it's free) with a centralized hub where they can upload and present their research, highlight their expertise, expand their contacts, and connect with the global scientific community. It's a place where researchers can discuss their work, their methodologies, and their challenges; it's also a place where members can ask questions, get answers, and then find solutions together. ResearchGate literature search also gives you access to publication metadata of more than 40 million documents.