

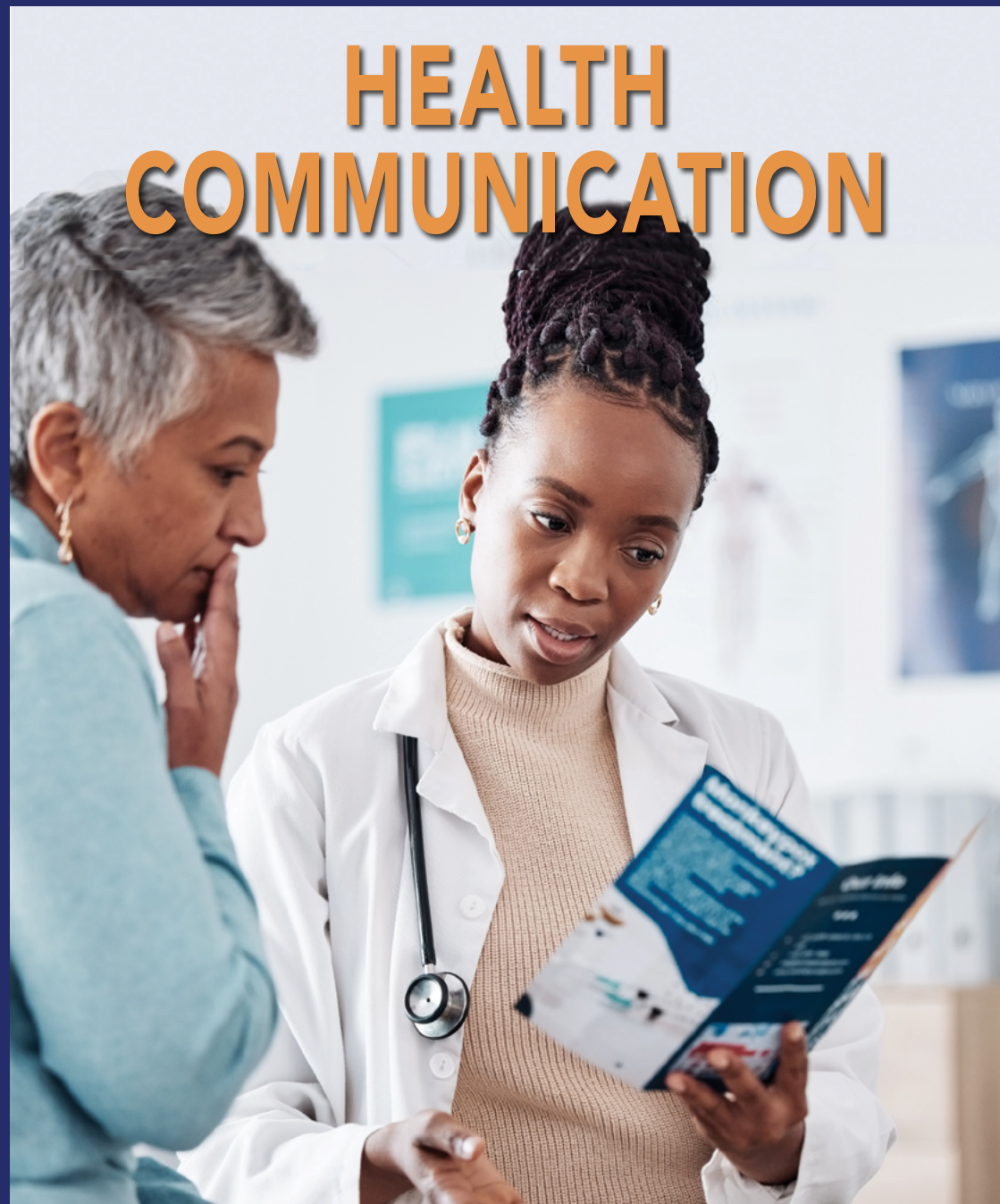
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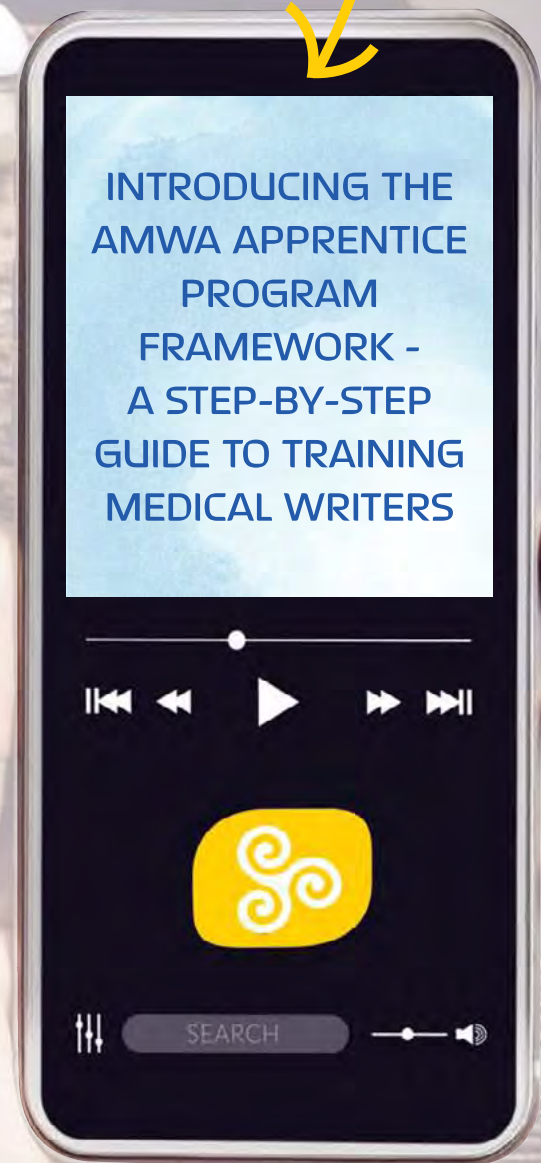
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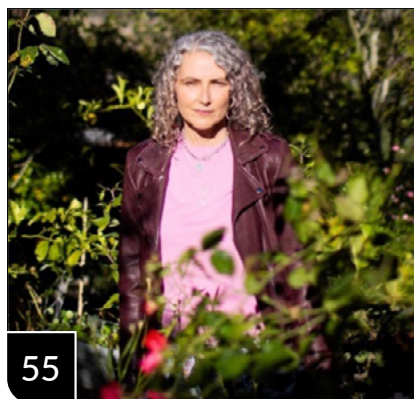
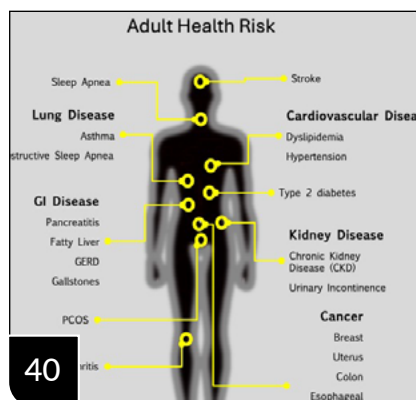
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FROM THE GUEST EDITOR

(Re)Discovering the Necessity of Craft in Health Communication

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As I write this in May, the tumult of public life has challenged even those who typically reach for the assurance of “this too shall pass.” It will. But what will we find there? That answer, of course, is being worked out—in classrooms, boardrooms, examination rooms, courtrooms, and kitchens.

As health communicators, our work to bring clarity to complexity, to connect evidence with empathy, has never felt more essential or exposed. Between the still-unfolding dilemmas around the use of generative artificial intelligence (AI), dwindling grant funding, and the shifting presence of trusted authorities in public health, we find ourselves rafting through turbulent waters.

Talking about craft, I admit, might seem like a luxury. But in truth, it is a lifeline. Craft—the intuitive, skilled decisions that lead to clear, effective communication—is what holds when everything else shifts. It helps the public navigate the whitewater of disinformation, fragmented care, and confusion. It steadies them long enough to understand, to choose, to act. It earns back trust. And trust, right now, is endangered.

For decades, we operated in a shared public square—imperfect, yes, but functional. Experts were trusted. Guidelines were followed. Institutions held weight. Today, that square is fractured and noisy. The voices that people once leaned on are now just one among thousands. And because information moves faster than understanding, the public is left adrift, trying to make confident decisions in a sea of contradiction and noise.

This issue of the *AMWA Journal* arrives at a moment when craft is more than a professional virtue—it is a moral necessity. Clear, thoughtful communication is essential to serving the public interest and supporting the public in making informed health decisions for themselves and their families. Whether someone is considering a treatment, enrolling in a clinical trial, or caring for a loved one, the way we craft words and images shapes those choices not just in clinical settings, but across the full spectrum of health literacy.

In this issue, you’ll find themed articles looking at ethics and use cases for generative AI in developing images, the role and vulnerabilities of readability tools, and the place of metaphor in health communication, backdropped by the primacy of craft in health communication. This issue, I hope,

also offers a reminder that writing is not merely a conveyance of facts.

Every paragraph we write contains a small social contract between communicator and audience, between subject-matter experts and laypersons, or between a system and someone trying to survive within it. We uphold those contracts with the decisions we make not just as researchers and experts, but as practitioners. As those responsible for choosing the right words in the right order for the right audience, when we uphold that contract with humility, accuracy, and empathy, we help the public move forward even amid the noise, even when trust is scarce.

But we cannot extend clarity to others unless we cultivate it ourselves. That begins with our commitment to craft, not just a commitment to accuracy nor to correct grammar. True craft—the slow and principled work of listening, distilling, shaping, and refining, choosing structure with intention, translating complexity without flattening truth.

Yes, we use tools. Yes, we adapt to platforms. But craft is what makes us trustworthy in a landscape that desperately needs people who still care about getting it right. When we’re tempted to shrink back or to wait for stability to return before we write bravely again, let this serve as a reminder: the public doesn’t have that luxury. Health decisions don’t pause until the world calms down. And so, our work—sometimes invisible, often unglamorous—becomes all the more vital.

Keep refining your skill. Keep sharpening your ear for plain language. Keep advocating for transparency when others are hedging. This is how we meet the moment—not with panic or passivity, but with purpose.

In all the noise, people still want to understand. That’s still our job. And it still matters—for this too shall pass.

Author declaration and disclosures: *The author notes no commercial associations that may pose a conflict of interest in relation to this article.*

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THEME ARTICLE

Artificial Intelligence Bias in Health Communication: Risks and Strategies for Medical Writers

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ABSTRACT

Artificial intelligence (AI) is rapidly changing the field of health communication. Medical writers, who are central to making complex medical information understandable and usable, now face both new opportunities and new risks. AI can speed up content creation, improve workflow efficiency, and scale production. At the same time, it introduces concerns related to bias, accuracy, and accountability. This paper focuses on 3 core types of bias that affect AI-generated content: data-driven bias, algorithmic bias, and human bias. These biases often arise from unrepresentative training data, flawed system design, or lack of contextual understanding. Left unchecked, they can lead to misinformation and worsen health disparities. Medical writers play a critical role in mitigating these risks by evaluating AI outputs for accuracy, completeness, and fairness. When guided by clear standards, collaborative practices, and sound editorial judgments, medical writers can help ensure that AI supports ethical, equitable, and effective health communication. This paper offers practical strategies to help medical writers integrate AI tools responsibly without compromising the integrity, ethics, or patient equity of health communication.

INTRODUCTION

Health communication shapes how people understand medical information, make care decisions, and engage with the health system. It influences patients, clinicians, and the public, affecting everything from treatment to trust. Medical writers are central to this work, translating complex science into clear, accurate, and audience-specific content.

Effective communication requires more than accuracy. Language, tone, and context must support understanding and reduce confusion. Poor communication can cause harm, whereas strong communication improves outcomes and public health.

Artificial intelligence (AI) is now frequently part of health content creation. Large language models (LLMs)

are used to draft patient materials, clinical summaries, and public messages. These tools are fast and consistent, but they do not understand science. They rely on patterns, not reasoning, and may produce fluent but inaccurate or misleading content.

As AI becomes more common, concerns about quality and accountability grow. Medical writers are often reviewing or using AI-generated text. They must check for accuracy, assess relevance, and intervene when needed. This requires a clear grasp of both AI's strengths and limitations.

This paper examines common biases in AI-generated health content and offers practical strategies for responsible use. The aim is not to reject AI but to use it in ways that uphold the core values of health communication: clarity, accuracy, equity, and trust.

BIASES IN AI USE IN HEALTH COMMUNICATION

As AI tools enter health communication, biases become a major concern. These biases can arise from training data, model design, or how systems are used in practice.¹⁻³ If not addressed, they can distort medical information and reinforce health disparities. To use AI responsibly, we must first understand where these biases come from and how they affect communication.

For example, training data often lacks representation from diverse populations.^{3,4} This leads to outputs that ignore or misrepresent certain groups, especially those already underserved. AI may also "hallucinate" facts or apply findings too broadly, further weakening the credibility of the content.^{5,6} Another possible issue is a substantial gap between AI developers and health communication experts.^{3,7} Without adequate collaboration, AI outputs may fail to meet clinical or ethical standards. When human oversight is limited, flawed content can easily go unnoticed.⁸ Table 1 provides detailed information regarding these biases.

STRATEGIES TO MITIGATE AI BIASES

Medical writers play a key role in identifying and correcting AI-related bias. Unchecked, these issues can lead to

Table 1. Key Biases in AI and Their Implications for Medical Writers

Category	Core Issues	Examples and/or Evidence	Implications for Medical Writers
Data-Driven Bias			
Biased Training Data Sets	- Nonrepresentative training data sets - Lack of data set transparency - Misclassification or omission of demographic subgroups	- A scoping review of 70 studies found that AI training data sets in dermatology often lacked transparency, used unverified labels, and failed to report patient diversity.¹ - A review of 74 studies on image-based diagnostic algorithms revealed a systemic geographic bias, with most US models trained on data from just 3 states, namely California, Massachusetts, and New York.⁹ - A scoping review of 7,314 articles published using AI techniques found that US and Chinese data sets and authors were disproportionately overrepresented, amplifying global health inequities by favoring data-rich regions over data-poor ones.²	- Risk of reinforcing biased or incomplete narratives - Misrepresentation of underrepresented populations - Risk of content lacking global applicability - Risk of amplifying global health inequities
Algorithmic Bias			
Model Limitations	- Design flaws and poor generalizability - Inability to handle context or nuance - Generation of fabricated or hallucinated content	- Overfitting the model to a training data set leads to poor generalizability to new, unseen cases.⁴ - AI can confidently generate plausible but fabricated data or references.^{10,11} - A study appraising 2 AI-generated minireviews on hereditary angioedema and eosinophilic esophagitis found that although AI used well-articulated language, the content lacked depth, analytical insight, and contained fabricated references. Despite being instructed to use scientific references, the AI chatbot relied on freely available resources.¹²	- Risk of including false or unverifiable information - Inconsistencies in tone, structure, or depth - Compromised credibility of written outputs, especially on topics with limited resources
Linguistic and Cultural Gaps	- English- and Western-centric training - Exclusion of non-English-speaking populations - Mistranslation and cultural misrepresentation	- The dominance of English in benchmarks and training data for LLMs exacerbates challenges for individuals and organizations in the developing world, predominantly non-English speakers.¹³ - Machine translation errors in public-health communication included inconsistent use of terminology, unidiomatic or awkward style, and untranslated text.¹⁴	- Miscommunication due to inaccurate or culturally inappropriate phrasing - Barriers to multilingual inclusivity - Limited accessibility for global audiences
Human Bias			
Lack of Interdisciplinary Collaboration	- Limited engagement with domain experts - Limited efforts for data exchange - Unstandardized health data systems	- Without standardized terminologies and data formats, integrating AI tools into clinical workflows becomes challenging.¹⁵ - A study assessing health care standards in ophthalmology identified multiple gaps, including limited adoption of imaging standards, lack of use cases for integrating AI-based decision support tools, scarcity in common data models to harmonize large data repositories, and the absence of standardized interfaces and outputs for AI algorithms.¹⁶ - The absence of interdisciplinary collaboration in AI-driven public-health initiatives leads to a lack of standardized classification and summarization of both traditional and AI-based methods. This fragmentation hampers informed decision-making, delays implementation, and deters broader adoption of effective tools.⁷	- Incomplete or contextually flawed content - Lack of alignment with clinical realities or public-health messaging - Inability to critically assess or interpret outputs - Incomplete understanding of AI functionality or context - Undermined reproducibility and generalizability of AI-generated evidence

Table 1 continued on next page.

Human Bias (cont.)			
Infrastructure Inequity	- Disparities in digital infrastructure and funding - Resource disparities in data collection - Underrepresentation of low-income and non-Western regions	- Low-resource or underfunded settings are underrepresented in data sets and model development due to disparities in infrastructure, data access, and resource availability.¹⁷ - Racial, gender, and age disparities are affecting clinical decision-making, quality of treatment, and outcome prognosis.¹⁸	- Biased messaging rooted in data-rich regions - Exclusion of underrepresented communities - Risk of medical writing failing to address the needs of diverse populations
Lack of Human Oversight	- Overreliance on AI tools (automation bias) - Opaque AI decision-making (“black box”) - Inadequate validation and ethical safeguards	- Frequent false alarms can desensitize users, leading to ignored alerts and perpetuation of AI-generated errors (feedback loops).³ - Many AI models function as “black boxes,” making their internal logic opaque and limiting humans’ ability to interpret outputs.¹⁹ - Overreliance on AI tools can diminish human critical thinking, leading to uncritical acceptance of AI outputs. This issue is exacerbated by human cognitive fatigue during sustained oversight tasks.⁸ - AI systems often depend on large volumes of sensitive personal or biological data, raising ethical and regulatory concerns. Without effective oversight, the balance between data use and individual privacy rights cannot be adequately maintained.⁸	- Overdependence on AI-generated text without verification - Reduced editorial quality and integrity - Risk of ethical or privacy violations in published content

AI, artificial intelligence; LLM, large language model.

misinformation and reduce the quality of health communication. A practical way forward involves combining human oversight, collaboration, and clear editorial standards.

Writers do not need to be programmers to make an impact. They can flag biased language, correct errors, and ensure that outputs match clinical evidence. They can also help ensure that information reflects the needs of diverse audiences.

Working with developers, ethicists, and clinicians strengthens the process. Together, these teams can build AI tools that are more accurate, inclusive, and context aware. Writers can also help create quality control checklists and review protocols specific to different health communication settings.

Bias cannot be eliminated entirely, but it can be reduced. Through careful review and strong editorial judgment, medical writers can guide AI outputs toward accuracy, fairness, and relevance.

Human Oversight

Ensuring Accuracy and Clinical Relevance

Despite their remarkable capabilities, AI systems are not infallible. They lack human qualities such as cognitive reasoning, contextual judgment, and emotional intelligence. These limitations introduce serious risks, especially in high-stakes fields like health communication. In this context, medical writers serve as critical safeguards respon-

sible for validating the consistency, accuracy, and clinical relevance of AI-generated content. This includes checking facts, identifying discrepancies, and correcting biased or misleading content.

A common issue when relying on AI-generated data is the overgeneralization of specific findings beyond the populations studied, especially in summarized medical information.²⁰ When AI systems generate diagnostic content or treatment suggestions, they may generalize findings toward an irrelevant population, without considering individual patient needs.²¹ For example, in a study of chest radiograph classifiers trained on 3 large chest x-ray data sets and 1 multisource data set, AI systems were found to selectively underdiagnose conditions in underserved patient populations.²² The underdiagnosis rates were even higher for intersectional subgroups, such as Hispanic female patients. These frequent misclassifications increase the risk of delayed or missed treatment. This illustrates how algorithmic generalization can perpetuate or amplify disparities when AI systems are deployed without accounting for specific variations or patient context. Medical writers should remain alert to this dynamic as overgeneralizations produced by AI can distort scientific understanding and undermine the standards of precision and equity required in health communication.

Another issue is hallucinations, in which even the most advanced and well-trained AI tools can generate fabricated

data or references. Hallucination in scientific citation was shown to affect approximately 20% to 50% of AI-generated content, depending on task complexity.^{6,23} In response to these challenges, medical writers must always scrutinize the sources cited and referenced by AI tools. Their oversight helps uncover potential inaccuracies or hallucinations, which may otherwise go unnoticed.⁵ This can be facilitated by the use of citation verification tools that automatically flag fabricated or incorrect references generated by AI.²⁴ Another effective strategy is applying retrieval-augmented generation, which can constrain AI outputs to trusted, real-time databases, thereby mitigating AI hallucinations.^{25,26}

Evidence suggests that AI cannot be solely relied upon to produce complex health communication materials without human oversight. A recent study by McMin et al highlights the ongoing need for editorial review when using LLMs to generate plain language summary abstracts.²⁷ The study found that LLMs can introduce persistent errors, such as misrepresenting clinical content, reinforcing inaccurate associations between conditions and demographics, and omitting or misusing sensitive terms. Although AI-assisted approaches improved readability and reduced drafting time, the authors stressed that medical writers remain essential for reviewing and refining content to ensure accuracy, clarity, and appropriateness for lay audiences.

Reviewing Fairness, Equality, and Equity

Medical writers must remain vigilant to detect embedded biases in AI outputs, such as skewed disease associations, exclusion of certain populations, and the use of inequitable language. Although these issues are best addressed at the levels of data collection and algorithm design, human oversight at the postprocessing stage remains critical. By carefully inspecting and revising the generated AI content, medical writers can correct language that may exacerbate existing inequalities, discriminate against marginalized groups, or perpetuate gender stereotypes. Additionally, they can mitigate bias through implementing content filters and transfer learning methods to adapt models to diverse populations. They can also be part of regular audits, continuous monitoring, and feedback loops that are performed to enhance fairness, equality, and equity over time.²⁸

A key element in promoting fairness, equality, and equity in health communication is the use of appropriate terminology and word choice. AI content does not consistently use appropriate or inclusive terminology, which highlights the need for supervision by medical writers. For example, medical writers can rely on established terminology standards such as the *International Statistical Classification of Diseases*, *Systematized Nomenclature of Medicine—Clinical Terms*, and *Logical Observation Identifiers Names*

and Codes.¹⁵ The American Medical Association and the Association of American Medical Colleges have further emphasized the medical writer's role in their guide, *Advancing Health Equity: A Guide to Language, Narrative and Concepts*, which offers comprehensive support for equity-focused, person-first language.²⁹

Understanding the characteristics of the targeted audience is essential to effective health communication. However, AI may not be able to implement audience-specific writing in the same way humans do. Medical writers must think about who will read their content and how word choice will influence interpretation. Accordingly, they must tailor their writing tone, structure, and technical depth to suit the target audience. The impact of word choice goes beyond clarity; it shapes perception and can either foster inclusivity or perpetuate exclusion. By being aware of audience needs, both medical writers' expertise and AI can combine to produce content that is accurate, culturally sensitive, and tailored to diverse audiences.

Training and Education

Several studies suggest that training and educating relevant stakeholders can help mitigate AI bias, which can be applied to users such as medical writers. Hasanzadeh et al highlighted the need for training and educating users on how to critically evaluate AI-generated recommendations.³⁰ They suggested that routine engagement in critical thinking exercises helps teams recognize and overcome AI pitfalls and biases. In addition to improving awareness, these exercises help maintain mindfulness of sensitive attributes such as age, gender, or ethnicity that may be unintentionally amplified in AI outputs. Other studies support this approach, showing that training improves how health care professionals use and assess AI tools.³⁰⁻³² One important area for training is explainability, which refers to understanding how AI systems produce their outputs. Many AI models operate as "black boxes," offering little insight into how decisions are made. In health care, in which such outputs can influence care, medical writers must be able to assess whether AI-generated content aligns with clinical standards. This ability to interpret and question AI outputs helps writers ensure ethical, accurate, and safe communication.³¹

Collaboration With Different Stakeholders

Addressing bias in AI requires a coordinated effort across health communication stakeholders, including clinicians, developers, policymakers, and medical writers.^{3,17} As digital health tools evolve, medical writers must move beyond content creation and take on more active, collaborative roles.

From the early stages of AI development, writers can help apply clinical terminology appropriately and develop

quality control tools, such as standardized review checklists. One example is the model, evaluation, timing, range/randomization, individual factors, count, and specificity of prompts and language checklist, designed to improve consistency in generative AI health care studies by addressing model design, evaluation, timing, and other key factors.³³ These tools can be adapted for use in patient education content, clinical summaries, and public-health messaging.

Interdisciplinary collaboration also helps align AI outputs with current evidence and ethical standards. By working with ethicists, clinicians, and technologists, writers can define limits for appropriate AI use and support policy development for transparent disclosure of AI involvement.³⁴

Writers also play a key role in promoting patient-centered communication in AI outputs. AI tools may lack empathy, but writers can help ensure outputs reflect patient needs and values by collaborating with care teams.³⁵ This improves engagement, supports individualized care, and strengthens trust.

Finally, medical writers can share best practices through conferences and forums. These platforms offer opportunities to refine how AI is used in health communication, promote responsible use, and lead training on reviewing and editing AI-generated content.

Transparency in AI Usage

Transparency is essential to the ethical use of AI in medical writing. Writers must take full responsibility for disclosing when AI tools are used, in line with guidelines from the International Committee of Medical Journal Editors, which state that AI systems do not meet the criteria for authorship.³⁶ Authors must also ensure that AI-generated content is accurate, free from plagiarism, and properly sourced. Because language models may overlook or exclude alternative viewpoints, writers must actively check for balance and ensure content reflects a full range of perspectives.³⁷

Clear disclosure builds trust. When clinicians, policy-makers, and the public understand how AI was used to produce medical content, they are more likely to accept it. This includes not only acknowledging AI use but also providing details about model decisions and data sources. Proper citation also gives credit to the creators of the model and its training data.³⁸

Public trust is essential for AI adoption in health care. Studies show that lack of transparency leads to skepticism, even when the technology offers real benefits.³⁹ Medical writers can address this by reviewing AI outputs carefully and ensuring that content remains clear, accurate, and accountable. Rather than resisting new tools, writers can use AI responsibly to strengthen communication and build public confidence in its use.

CONCLUSION

As AI continues to shape health communication, the role of medical writers must adapt. AI tools can support efficiency and help generate various forms of content, but they cannot replace human expertise. The risks of misinformation, hallucination, and bias remain significant. Writers must apply critical thinking and understand the origins of these risks to ensure content remains accurate and responsible.

AI should be used as a tool, not a source. It can assist with early drafting or summarization, but final content must be guided by human input. This approach reflects writing by design, in which writers take intentional control over how content is created, verified, and communicated.

Keeping a human in the loop is essential. Medical writers must stay involved throughout the process to evaluate quality, correct errors, and ensure the message is clear and equitable. Those who learn to work with AI, rather than against it, will help lead the field forward. By using AI responsibly and thoughtfully, writers can maintain high standards and strengthen public trust in digital health communication.

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THEME ARTICLE

The Power and Peril of Metaphor in Health Communication

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ABSTRACT

Metaphor is foundational to human cognition and language. It makes abstract concepts accessible through comparisons to concrete forms. In health communication, metaphors are indispensable tools for translating complex concepts into accessible, relatable language for the public. This article examines the cognitive underpinnings of metaphor, its roles in public health discourse, and its strategic use in health campaigns, particularly during the COVID-19 pandemic. Through case studies, including the use of metaphors in messenger RNA vaccine messaging, the article demonstrates how metaphors can clarify, motivate, and guide public understanding while having inherent risk to mislead, stigmatize, or oversimplify. Supporting this analysis is the work of cognitive scientists and linguists, such as Steven Pinker, as well as seminal texts like Lakoff and Johnson's *Metaphors We Live By*. Practical strategies for effective and ethical use of metaphor in health communication are provided, emphasizing the importance of cultural sensitivity, audience testing, and clarity. Ultimately, the article argues that although metaphors are powerful and necessary, they must be used carefully.

THE COGNITIVE FOUNDATION OF METAPHOR

Imagining human thought and communication without metaphor is like trying to imagine a structure without a foundation or paint without color or life without oxygen or Paris, France, without bridges.

Without metaphor, ideas and language would be emptied of color, vitality, flexibility, and accessibility.

A cursory survey of iconic figures begins to demonstrate the ubiquity of metaphor. Iconic communicators have long relied on metaphor to convey profound truths. Religious figures such as Jesus of Nazareth described faith as a mustard seed and his followers as sheep, invoking images from daily life to express spiritual concepts. Civil rights leader Martin Luther King, Jr, spoke of "cashing a check" when demanding justice, using financial metaphors to frame the struggle for equality. Environmental scientist Rachel Carson

described ecological degradation in *Silent Spring* through metaphors of silence and sickness, making the invisible consequences of pollution tangible and urgent.

Once considered the province of poets and novelists, metaphorical thinking and speaking is deeply rooted in the brain's preference for concreteness—connecting meaning, words, and definitions to tangible objects or lived experience. This cognitive trait predates our capacity for processing abstract concepts. As cognitive scientist and linguist Steven Pinker observes, metaphorical abstraction is central to the development of human intelligence. Abstract thought relies on the brain's familiarity with concrete, lived experiences to make sense of new or complex ideas—acting like a bridge to make abstract concepts accessible.^{1,2}

This can even be seen in children as they develop. Consider telling a small child the following 2 statements:

1. Go to sleep.
2. Lie in your bed; close your eyes.

Of the 2, a child is more likely to comprehend the second statement earlier in development than the first. The second relies on simple actions (the lived experiences of "lie" and "close") and concrete objects (bed, eyes), which the developing brain has apprehended first. The same child will likely grasp the meaning of the former abstract statement following more development, making sense of the former by relying on understanding of the latter.³ The brain is wired to grasp new or complex concepts by mapping them onto older, more intuitive schemas. Pinker elaborates as follows:

I think that metaphor really is a key to explaining thought and language.... Our powers of analogy allow us to apply ancient neural structures to newfound subject matter, to discover hidden laws and systems in nature, and not least, to amplify the expressive power of language itself.⁴

Metaphors are not mere stylistic flourishes; they're fundamental to how we think, communicate, and shape meaning in public thought and discourse. And they're everywhere.

As Lakoff and Johnson argue, “Metaphor is pervasive in everyday life, not just in language but in thought and action.”⁵

METAPHOR AS A TOOL IN EVERYDAY LANGUAGE

The mechanisms that support metaphor—such as recognizing shared context, inferring meaning, and conceiving new usages—are foundational to human communication. This allows for the expression of meanings that could not be reached through direct or literal language alone, greatly expanding the communicative capacity of humans.

Consider the difference between the statements “he seemed down” and “her spirits were up.” The meaning conveyed by these simple prepositions is not merely grammatical; it is metaphorical. The preposition “down” is not only directional, it’s situational, invoking connotations of sadness, whereas “up” suggests positivity or happiness.

More traditionally structured metaphors that connect an abstract notion to a concrete, lived concept, such as, “time is money,” create a host of related metaphorical expressions that help us make sense of the abstract notion of time by comparing it to the concrete experience of money.

- Save time (“It will save us a huge amount of time if we prepare in advance.”)
- Invest time (“We’ve invested a lot of time in building this relationship.”)
- Waste time (“That meeting was a complete waste of time.”)

This reframing feels linguistic, but it’s first cognitive, shaping thought and language patterns that orient someone’s decision-making around how they use—or “spend”—their time.

METAPHOR IN HEALTH AND MEDICINE: ROLES AND RISKS

Because language is rich in metaphor, its presence in health and medicine is inevitable and influential. However, because the stakes are high in this context, we see how metaphor can shape not only understanding but also emotional responses, treatment decisions, and public attitudes, including how overuse or misuse of certain metaphors can lead to clichés, imprecision, or even harm.

In cancer care, for example, the metaphors of “battle” and “journey” are especially prevalent. The battle metaphor frames cancer as an enemy, providing language and thought patterns that can instill hope and agency. Patients and families often speak of “fighting cancer,” “winning the battle,” or “losing the fight.” For some, this framing offers empowerment and a sense of control. However, it can also impose undue pressure, suggesting that unfavorable out-

comes reflect a lack of willpower, and may stigmatize those who do not “win.” The implication that a patient might “lose” a battle they didn’t choose to fight can be deeply distressing. Battle and fight metaphors may also inculcate a fatalistic perspective on cancer diagnosis, negatively impacting others’ willingness to adopt healthy lifestyle practices to prevent cancer.⁶

The journey metaphor, often preferred for its less combative and more accepting tone, emphasizes the individualized and ongoing nature of illness. Expressions such as, “cancer journey,” “navigating treatment,” or “reaching milestones” frame illness as a path with challenges. This metaphor can reduce the pressure to “win” or “lose,” acknowledge a person’s agency, encourage acceptance and reflection, and acknowledge that a person’s “path” with illness is unique, with perhaps an unknown ending. Amid its strengths against the battle metaphor, the journey metaphor is not universally accepted. It may feel passive or disconnected from the urgency of acute illness and may inadvertently evoke feelings of isolation if the experience is seen as a solitary trek. Some may find the journey metaphor vague or sentimental, preferring more concrete or action-oriented language.

These challenges underscore the compulsion for metaphor but also that no single metaphor will resonate with all audiences or fit all situations. The effectiveness of a metaphor, especially in health communication, depends on cultural context, addressing the connotations and denotations of language choices, and the specific circumstances of illness and care.

METAPHOR IN PUBLIC HEALTH: COVID-19 AND VACCINE MESSAGING

The COVID-19 pandemic highlighted both the necessity and the risks of metaphor in public health messaging. As scientists and communicators sought to explain novel technologies like messenger RNA (mRNA) vaccines, a variety of metaphors emerged, each strategically chosen to address specific public concerns or misconceptions.

- Instruction manual and/or blueprint: This metaphor framed mRNA as a set of instructions. It was widely used by organizations such as the World Health Organization⁷ when explaining how certain vaccines “contain the blueprint” for the body to produce an antigen and was also used by health care institutions, such as Yale Medicine⁸ and Children’s Hospital of Philadelphia,⁹ and science news publications.¹⁰
- Snapchat message: By likening mRNA to the popular social media application Snapchat, which uses image- or video-based messages that time out or “disappear,” communicators aimed to counter fears about

permanence or DNA alteration. This metaphor appeared in Yale Medicine's outreach⁸ and was popularized after a tweet on February 11, 2021, from the Centers for Disease Control and Prevention former director Dr Tom Frieden that said, "mRNA vaccines don't contain any genetic material of Covid. They're like a Snapchat message containing a most wanted poster of the virus that disappears after it's delivered."

- **Cheat sheet:** This metaphor depicted the vaccine as a reference tool for the immune system, although it risked implying that vaccination is unnatural or a shortcut. The metaphor gained attention after Vlad Mixich, a Romanian public health expert, used it on Facebook to explain why the vaccine cannot modify human DNA. Although vivid and relatable, the term "cheat sheet" risked carrying negative connotations, suggesting dishonesty or artificiality.¹¹
- **Wanted poster:** Outlets such as PBS News¹² and The Washington Post¹³ described the vaccine as a "wanted poster," training immune cells to recognize the virus as a threat. This metaphor also appears in the aforementioned tweet by Dr Frieden.

It's reasonable to assume these metaphors were not chosen at random. Each responded to specific misunderstandings or concerns. For instance, the "Snapchat message" metaphor addressed fears about the impermanence of mRNA, countering misinformation about DNA alteration, whereas the "wanted poster" appealed to a visual approach to shape how others understood how immune recognition functions. However, as Lakoff and Johnson caution, metaphors both highlight and hide; they shape what is visible—and what is invisible—in our understanding.⁵ A metaphor that clarifies one aspect may obscure another or carry unintended implications.

The war metaphor, also frequently invoked during the pandemic,¹⁴ emphasized the urgency, rigors of care, and communal solidarity. Yet, it also risked provoking division, casting vaccine-hesitant individuals as adversaries rather than citizens in a shared struggle. Other metaphors, such as likening vaccines to seat belts, fell flat with audiences skeptical of mandates.

These metaphors, and those listed above, found success and failure, with some like the "blueprint" metaphor being more widely adopted, likely due to the concepts implied in "blueprint" being more accessible to wider audiences. This highlights the strategic use of metaphor and the importance of testing metaphors for clarity, resonance, and unintended effect.

CULTURAL AND POLITICAL DIMENSIONS OF METAPHOR

Metaphors do not operate in a vacuum; they are embedded in cultural and political contexts that shape their meaning and impact. During the COVID-19 pandemic, metaphors became key mechanisms of communication for hastening public action and public health and also contributed to competing narratives about risk, responsibility, and collective action. The war metaphor, for example, mobilized public support for emergency measures but also contributed to polarization and fatigue as the crisis dragged on.

Similarly, metaphors of protection (eg, "shielding the vulnerable") were used to encourage compliance with public health guidelines. However, these metaphors could also obscure structural inequalities, implying that everyone faced the same risks and had the same resources to cope. Critics argued that such language glossed over disparities in exposure, access to care, and economic security.

THE SCIENCE OF METAPHOR EFFECTIVENESS

Recent research in psychology and communication studies has sought to empirically test the effectiveness of different metaphors in health messaging. Studies have found that metaphors can increase comprehension, recall, and persuasion, especially when they align with the audience's values and experiences. However, metaphors can also backfire if they are perceived as manipulative, patronizing, or irrelevant.

For example, the "cheat sheet" metaphor sought to help create understanding around the mechanism of mRNA vaccines, but it also may have contributed to polarization and unintended negative associations.¹¹ Similarly, as previously discussed, research on cancer metaphors has shown that patients' preferences vary widely, with some finding the battle metaphor empowering and others finding it distressing.¹⁵

These findings underscore the importance of audience testing and refinement in metaphor use. Health communicators should not assume that a metaphor that works for one group will work for all. Instead, they should seek feedback from diverse audiences and be willing to adapt their language as needed.

PRACTICAL STRATEGIES FOR HEALTH COMMUNICATORS

To use metaphors responsibly and effectively, health communicators should

- **Consult subject matter experts:** Ask other clinicians and researchers about the metaphors they use or have heard used in teaching or patient care. These experts often have valuable insights into which metaphors resonate with patients and which may cause confusion.

- Test with nonexperts: Share metaphors with individuals unfamiliar with the topic to gauge clarity and unintended implications. Audience feedback can reveal whether a metaphor is helpful or misleading.
- Provide context first: Introduce novel metaphors with plain language, using metaphor as scaffolding rather than a substitute for explanation. Clear definitions and explanations help prevent misinterpretation.
- Be sensitive to tone and implications: Consider whether the metaphor frames the issue with compassion, fear, blame, or empowerment. The emotional impact of a metaphor can shape attitudes and behaviors.
- Study past campaigns: Analyze metaphor use in previous public health initiatives, especially those addressing fear, stigma, or uncertainty. Learning from past successes and failures can inform future messaging.

Additionally, communicators should be aware of the potential for metaphors to become outdated or lose their effectiveness over time. Regularly updating language and seeking input from target audiences can help ensure that metaphors remain relevant and impactful.

THE FUTURE OF METAPHOR IN HEALTH COMMUNICATION

As health communication continues to evolve and adapt to the pace, challenges, and connectedness of our digitally integrated world, the role of metaphor will become more important. New technologies, emerging diseases, and shifting cultural norms will require innovative approaches to explaining complex concepts and motivating public action.

Digital platforms offer new opportunities for using metaphor in health communication, from visual metaphors in infographics and videos to interactive simulations and games. At the same time, the rapid spread of information—and misinformation—on social media underscores the need for careful, evidence-based messaging.

Future research should continue to explore the cognitive, emotional, and social effects of metaphor in health communication. Interdisciplinary collaboration among linguists, psychologists, health professionals, and communication experts will be essential for developing best practices and guidelines.

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THEME ARTICLE

Trust, Artificial Intelligence–Generated Images, and Health Communication Policy

Finding a Way Forward to Build Policies That Support Public Trust and Scientific Accuracy

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THE INTERFACE OF ARTIFICIAL INTELLIGENCE, IMAGES, AND COMMUNICATION

Artificial intelligence (AI)–influenced images are everywhere. AI is affecting what people see and how they see it. It supports edits in commonly used software, including Adobe products, Google Photos, and Canva. It also enables users to translate text to images through standalone apps such as Midjourney and DALL-E. AI is not only appearing everywhere but is rapidly evolving. As a result, AI-generated photorealistic images are becoming more difficult to tell from “organic” photos.

These technologies create opportunities for health care communicators to improve the availability and quality of visuals to support health communication. However, limitations exist. Understanding opportunities and limitations enables health communicators to influence and craft policies that help their teams and organizations optimize communication that is vitally needed for public and individual health.

WHAT DOES TRUST HAVE TO DO WITH AI IN HEALTH COMMUNICATION?

Communication, especially health communication, is grounded in trust. If audiences do not trust the organization, the organization is in danger of failing to achieve its mission.

In the past, trusted communication has been based on telling the truth.¹ Although truth-telling is still vital in health and medicine, the concept of “truth” in relationship to trust has become more complicated.

“Post-truth” is a term used in contemporary politics. It was the 2016 Oxford word of the year² and is often used by social scientists to describe the shifting dynamics of fact, fiction, and trusted sources. However, post-truth does not necessarily mean “post-trust.” Audiences are still making decisions based on information gathered from sources they trust—but where they put that trust is shifting.³

The Edelman Trust Barometer is a massive public interest survey conducted by one of the world’s largest public relations firms. The survey tracks the details of public trust.

In 2024, the survey included 28 countries and more than 32,000 respondents.⁴

The most recent survey shows an ongoing trend of declining trust, and where individuals place their trust continues its shift to the private sector. Government and media sources were viewed as less competent and less ethical than nongovernment organizations and businesses. Respondents still viewed health care as trustworthy (73% report trust). This trust may apply more to direct clinical care because health care innovations, such as AI and gene-based medicine, scored neutrally at 50%.⁴

So, what does this mean in the context of AI-generated images and health communication?

As more communicators incorporate AI tools into their strategies and tactics, policies for guiding the ethical use of AI become increasingly important. Guidance about the use of generative AI has largely centered on generating text-based content, leaving out important conversations about how communicators use AI to create and edit images and the effect of those images on public trust.

HOW ARE SCIENTISTS AND PHYSICIANS USING AI IN THEIR COMMUNICATIONS?

Scientists are innovators, and when it comes to AI-generated images, medical scientists have not shied away from exploring the possibilities. A 2023 editorial in *ATS Scholar* describes potential uses for AI-generated art in medical education. Applications discussed include using AI-generated art to reflect on patient encounters and experiences with medical students, creating images related to patient cases that do not violate Health Insurance Portability and Accountability Act but accurately convey a similar patient or disease, creating illustrations for lectures and presentations that are free of copyright restrictions, and creating visual aids for illness education and management.⁵

The illustrations created by the authors to “demonstrate AI’s use and value” were all artistic and conceptual in nature, but none were the medically or scientifically accurate types of

illustrations that would support presenting a case or educating a patient.

Another 2023 study, published in *Anatomical Sciences Education*, evaluated 3 different AI image generators. The researchers used DALL-E, Stable Diffusion, and Craiyon V3 to generate detailed and accurate anatomy illustrations of the human heart, skull, and brain. They reported in their publication that “none of the three generators was able to produce illustrations that met the criteria of being both detailed and accurate.”⁶

Less than a year later in 2024, a letter in *JMIR Medical Education* summarized a team’s work to test ChatGPT-generated prompts for DALL-E 2 and Midjourney to create images for hypothyroidism and Horner syndrome. For hypothyroidism, 120 images were generated, 52 were removed using preset exclusion criteria, and 17 of the

remaining 67 met some criteria for adequate representation of facial features of hypothyroidism. For Horner syndrome, none of the 120 images generated met inclusion criteria, even after using alternative prompts. The team selected the best image and was able to achieve an “adequate” image after performing secondary editing.⁷

These examples highlight the potential for creating engaging images that convey a feeling or concept, potentially useful in presentations or as teaching aids, but use was limited when applied to projects requiring clinical detail and scientific accuracy. See Figure 1 for examples of AI-generated illustrations. Note these illustrations were created using ChatGPT for the purpose of this article. The quality of the prompts and the resulting images are intended for general education only. A tutorial on writing prompts and best practices for generating AI images is outside the scope of this paper.

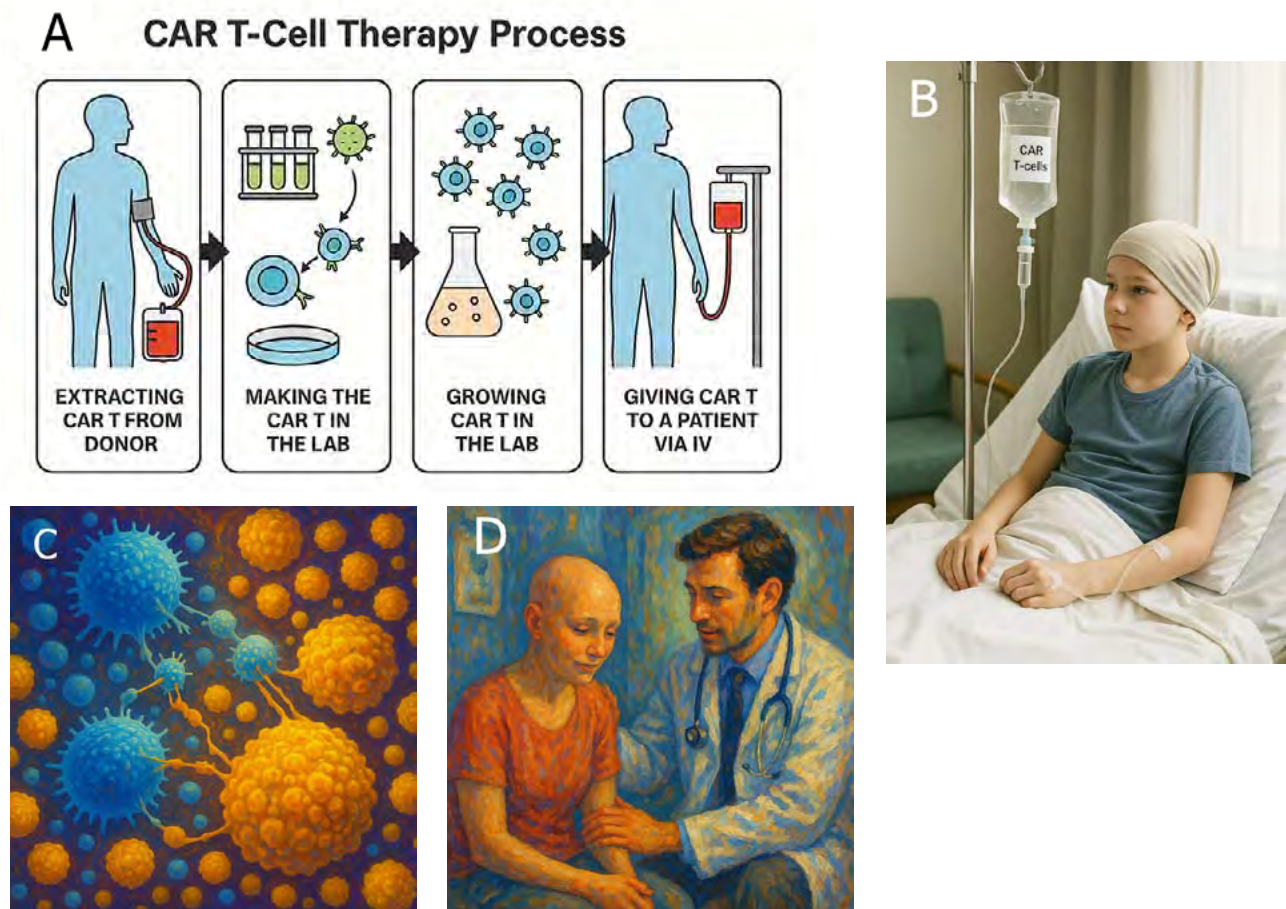


Figure 1. (A) CAR-T manufacturing process illustration created by ChatGPT/OpenAI. This illustration used an example from the Cancer.gov website as reference. The prompt used for this image is as follows: Using the image at this site as a reference (<https://visualsonline.cancer.gov/details.cfm?imageid=11776>), create an image showing the process of making a CAR-T cell. Steps should include (1) collecting cells from a donor, (2) making the CAR-T in the lab, (3) growing CAR-T in the lab, and (4) giving them to a patient via intravenous (IV) infusion. (B) Photorealistic illustration of a child with cancer receiving an infusion of CAR-T cells by ChatGPT/OpenAI. This image highlights common problems of “realistic” AI images, including the IV pole coming out of the bed instead of standing beside it, wrong placement of the IV tubing, and waxy skin. The prompt used for this image was to create a realistic-style illustration that respectfully depicts a generalized hospital setting with a child receiving a CAR-T-cell infusion. (C) Artistic illustration of CAR-T cells and cancer cells interacting by ChatGPT/OpenAI. The prompt used for this image was to create an artistic image of CAR-T cells and cancer cells interacting. Make the cancer cells yellow and the CAR-T cells blue. (D) Artistic illustration of a doctor with a patient who has cancer. The prompt used for this image was to create an image in an artistic style that shows a doctor interacting with a patient who has cancer.

WHAT COMMUNICATORS NEED TO KNOW ABOUT AI-GENERATED STOCK IMAGES: ADOBE STOCK AS AN EXAMPLE

Even if a communicator does not use an AI tool to generate new images as described in the cases above, AI-generated images are becoming more commonplace on stock image sites. Health communicators and health care organizations commonly use these sites to provide easy access to a variety of images.

Adobe Stock sources images from individual artists, photographers, and other contributors.⁸ Increasingly, Adobe Stock and other stock image sites accept submissions of AI-generated images. Adobe Stock says that the organization reviews all submitted content, including AI generated, for “quality, technical aspects, legal compliance and adherence to contributor guidelines.”⁹ It is important to note that subject matter expert review and scientific accuracy is not part of the review process—regardless of the use of AI.

Policy Considerations for AI-Generated Stock Images

AI images in Adobe Stock are tagged as AI generated, and it is possible to exclude AI-generated images from search results. Communicators using stock image sites should be aware and intentional about selecting and using AI-generated images. Additionally, the AI-generated tag may not travel with the image to a local storage system. If an organization is using a digital asset management system, how AI-generated images are labeled and stored is an important consideration.

AI TOOLS EMBEDDED IN ILLUSTRATION AND PHOTO EDITING SOFTWARE

Generative AI also can be introduced in the editing process. AI tools are embedded in common technologies that health communicators use every day, such as Adobe Photoshop, Adobe Illustrator, Google Photos, Canva, and many other tools. With AI, users can easily adjust a photograph’s exposure or color, retouch images with skin smoothing or remove background objects, and complete even more complex tasks.¹⁰ Illustration software, including Adobe Illustrator, also have embedded AI tools that can handle simple tasks, such as filling in a background pattern based on a text description, generating simple icons or line art, recoloring art, or generating scenes or subjects.¹¹

Policy Considerations for Using AI Tools in Illustrating and Photo Editing Software

The benefits and pitfalls of using embedded AI editing or generation tools in these platforms require careful consideration. Benefits include increased efficiency and potentially reduced costs. For example, a novice user can adjust a photo without needing to engage an expert editor or create a unique icon for a presentation without worry of licensing or copyright. For

freelancers or small organizations, this could be an important gain in efficiency and cost savings.

Unintended consequences of AI editing of photos could do significant damage to audience trust. For example, some filters may lighten skin color. Facial characteristics that are clinically relevant could be removed if the AI sees them as “blemishes.” Close attention to detail and proofing the altered image against the original is essential to ensuring that only the intended changes were made.

LEARNING FROM OTHERS: JOURNALISM AND PROFESSIONAL ORGANIZATIONS

Understanding the policies and approaches to AI images in adjacent fields and from professional organizations can help health communicators produce guidelines and policies that are well researched and informed. Additionally, having the support of outside professional organizations and experts in similar fields can bolster recommendations to leadership.

Journalism

The Society of Professional Journalists describes ethical journalism as “accurate and fair. Journalists should be honest and courageous in gathering, reporting and interpreting information.”¹²

Many journalism organizations around the world have publicly shared their AI guidelines. A select group was reviewed in a 2024 publication¹³ and are summarized in Table 1.

Table 1. Selected AI Image Recommendations from News Organizations

Organization	Recommendation
WIRED	OK to use AI tools to spark ideas and publish AI-generated images or video with disclosure but not to use AI images instead of stock photography (2023).
Associated Press	OK to use AI-generated images if they were the subject of the news story and clearly identified. Otherwise, do not use AI audio, video, or photography in news stories.
Deutsche Welle	OK to use AI images to create or improve illustrations and/or data visualizations. Do not use photorealistic AI images.
Thomson Reuters	Use of data and AI are informed by “Trust Principles.” Will implement practices that make the use of data and AI in their products and services understandable (disclosure) (Data and AI ethics principles n.d.).
The Guardian	Use of AI should focus on what can improve quality of work: interrogating large data sets, assisting with corrections or suggestions, creating ideas for marketing campaigns, or reducing bureaucracy. Protect what is valued by the Guardian: “serious reporting that takes time and effort, carefully uncovers facts, holds the powerful to account, and interrogates ideas and arguments.”

AI, artificial intelligence.

Many health communicators work closely with journalists, and these fields share similar values. Because journalists and health communicators share a commitment to accuracy, truthfulness, and trust, understanding how journalists view and use AI images can help guide policy formation.

Professional Organizations

The AMWA highlights the importance of aligning AI usage with the organization's Code of Ethics and highlights the principle that states, "Medical communicators should apply objectivity, scientific accuracy and rigor, and fair balance while conveying pertinent information in all media."¹⁴

The Public Relations Society of America released official recommendations regarding generative AI in November 2023.¹⁵ The guidelines highlight the need for subject matter expert verification for any generative AI product, the importance of deliberate choices in the ethical use of AI, and the need for transparency regarding the use of AI. Specifically, "humans shouldn't claim ownership of work generated solely through AI."

Evaluating existing policies from communications and health care organizations provides a foundation for developing a personalized policy. Showing how a policy aligns with industry leaders can help to sway reluctant leaders who may not understand the importance of the policy or the nuances that should be considered.

DEVELOPING AN AUDIENCE-FOCUSED POLICY FOR AI IMAGE USE

An effective policy will support effective communication with the target audience. Audience and consumer attitudes and opinions about AI-generated images should influence how health communicators use them. This information can be gathered by conducting market research among a target audience or looking for secondary research that has been shared online.

A survey conducted by iStock/Getty reports that AI-generated images contribute to distrust on social media platforms. Most respondents (98%) say that authentic images and videos are crucial for building trust; 90% of respondents say they want to know if an image has been created with AI.¹⁶

An effective AI image policy will consider the following:

- Does this recommendation support organizational communication goals?
- Does this recommendation align with the tools and capabilities of the organization?
- Does this recommendation account for situational uses of images (ie, inspiration, education, patient care, etc)?
- Does this recommendation reflect the attitudes and preferences of the organization's intended audience(s)?

- Does this recommendation support accuracy and accountability?
- Does this recommendation support transparency and build trust with the organization's audiences and stakeholders?

As the technology and cultural attitudes about AI shift in the coming years, health communicators will be required to adapt.

Organizational leaders need the expertise of health communicators to guide policy making and implementation. Health communicators understand there is no "one-size-fits-all" approach to communication in today's complex world. It follows that no one policy or set of recommendations will fit every organization. As the technology and cultural attitudes about AI shift in the coming years, health communicators will be required to adapt. However, the key principles outlined above remain guideposts for policy development and evolution.

Acknowledgments

Mention of specific tools, such as Adobe products and services, is not an endorsement. These examples were selected for their widespread use and the author's familiarity with their functions. No AI tools were used in the writing of this article, excluding the creation of images in Figure 1.

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THEME ARTICLE

Rethinking Readability Metrics in Medical Communication: Are Common Readability Formulas Still Useful?

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ABSTRACT

Readability is an important quality for medical communicators to consider in crafting information that is clear, easily understood, and enjoyable for any reader to read. Although readability formulas have been developed to help communicators craft readable information, common readability formulas have fundamental limitations that constrain their value. Also, with rapidly advancing technology, common readability formulas may be outdated. This article summarizes what readability really means, why readability is important for all readers, and the benefits and limitations of common readability formulas. This article also discusses how readability metrics might be advanced in the future and how humans will continue to be crucial in filling readability gaps.

INTRODUCTION

The concept of readability was originally defined in the 1920s and progressed in the 1950s.¹ However, over the past 25 years, publications on readability have grown exponentially (Figure 1).² This growth suggests a greater recognition of the value of readability, the desire to better understand readability qualities, and the motivation to optimize readability to ensure information meaningfully impacts readers. Yet, commonly used readability formulas have remained the same for decades, raising questions about the usefulness of these metrics for medical communication.

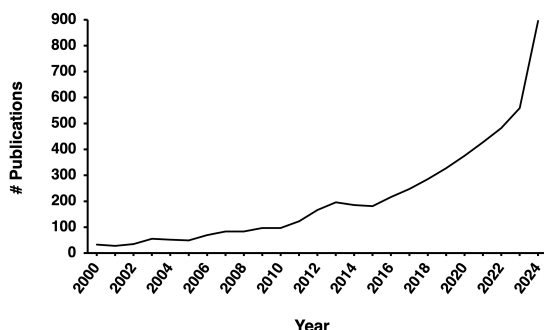


Figure 1. Publications on readability indexed in PubMed have increased between 1999 and 2024. The query was (“readability” [Title/Abstract]), completed on July 15, 2025.

In this article, I describe what readability really means and why readability is important for all readers. I also share the benefits and limitations of common readability formulas that medical communicators must consider in crafting readable content. I also share how readability formulas could advance in the future and why I believe that medical communicators will continue to be crucial in filling readability gaps.

THE ELEMENTS OF READABILITY

By definition, readability is the quality of being easy and enjoyable to read.³ However, when considering readability, medical communicators may focus their attention on language, legibility (how easily writing can be read based on the visual clarity of the text),⁴ or a combination of these 2 characteristics. But readability is much more complex. According to early work, readability comprises 228 elements. These elements can be combined into 4 overarching components: content, style, format, and the organization of ideas.⁵ Content refers to the information presented in the text, such as the difficulty of concepts or density of ideas. Style refers to the linguistic elements, such as vocabulary and sentence structure. Format refers to the visual and physical aspects of text presentation (eg, legibility), such as typeface and layout. Finally, the organization of ideas includes the structure of chapters, sections, headings, and paragraphs. These components have different levels of importance, with content being the most important, followed closely by style, then format, and then the organization of ideas.⁵

THE VALUE OF READABILITY

Readability has many notable benefits. For example, readability has been associated with better comprehension and retention.^{6,7} Also, better readability implies greater ease of reading for the intended audience and accessibility to a broader audience. This ease of reading can also reduce the time needed to comprehend information and even ask and/or answer clarifying questions. In certain scenarios (eg, clinic visits), these time savings could result in cost savings. For example, when patients clearly understand

health information, health care professionals might spend less time answering patients' questions or manage fewer follow-up visits or re-hospitalizations due to patients who do not fully understand their condition or treatment plan. Readability can also improve quality of life. Indeed, readability was associated with task performance,⁸ meeting information needs,⁹ and building confidence¹⁰ in different populations. Most importantly, readability encourages clear communication that supports trust in science, which has been challenged in recent years.^{11,12}

Many medical communicators associate readability with health literacy for patients or the general public. Indeed, health literacy is correlated with patient outcomes.¹³ Yet, the readability of patient materials is a global problem. In an umbrella review of readability assessment studies, the readability of most patient materials exceeded the recommended reading level by up to 11 grade levels.¹⁴ Also, most peer-reviewed patient education materials published in high-impact medical journals were written at reading levels far above the national recommendations.¹⁵ This finding similarly occurred in studies of patient education materials written for populations in Canada,^{16,17} Hungary,¹⁸ and Turkey.¹⁹ Even popular online encyclopedias for health-related information were written at a reading level that is difficult or very difficult to read.²⁰ This reading difficulty has been linked to several factors, including jargon,²¹ that affect a patient's ability to process information. Also, this difficulty can be exacerbated when patients experience stress.²²

Although readability is an important factor to consider when writing for patients and the public, readability is important for everyone, even scientific and medical experts. On the one hand, experts may have a higher level of education, more specialized experience, and more familiarity with the technical language of a specific field than the general public. On the other hand, experts also juggle stress, busy schedules, and information overload that can all impede their ability to quickly read and make meaning of the information they read.²³ Also, experts may prefer documents that are easier to read, which is supported by studies correlating factors of readability with the number of times a paper was cited.²⁴ And in my experience, I've noticed that when given the choice, experts—and most people—will choose the easiest way or the path of least resistance. Yet, the readability of scientific texts has been decreasing over time. In 2015, 22% of abstracts in scientific papers were written beyond college graduate level. In 1960, this percentage was 14%.²⁵ The decline in readability of scientific texts may be related to a number of factors, including jargon,²⁵ acronyms,²⁶ or possibly the incentive to inflate the complexity of writing to increase the likelihood of the work being cited.²⁷ Nonetheless, readability is an important factor to consider for everyone, including scientific and medical experts.

COMMON READABILITY FORMULAS

Over the past century, many formulas have been developed to capture readability levels. Some of the most commonly used formulas include the Flesch-Kincaid Grade Level, Flesch Reading Ease, Automated Readability Index, Coleman-Liau, Gunning Fog Index, Laesbarhedsindex (LIX) Formula, and Simple Measure of Gobbledygook (SMOG) Index. In my experience, I have noticed that many medical communicators use the Flesch-Kincaid Grade Level and Flesch Reading Ease, which are built into Microsoft Word. This built-in feature can give a quick estimate of readability without risking exposure of confidential or proprietary information to an external source. However, the SMOG Index has shown the greatest consistency with written health information.²⁸

BENEFITS AND LIMITATIONS OF COMMON READABILITY FORMULAS

Common readability formulas have a number of benefits. For example, these formulas include measurable qualities that give a concrete numerical metric. This metric allows writers to easily estimate the reading level of text to ensure information meets recommended guidelines. Also, common readability formulas are actionable. They can give instant feedback to writers in real time. This instant feedback has also been incorporated into specialized electronic tools that highlight characteristics that contribute to complex writing and even suggest improvements to support real-time editing.

Despite these benefits, common readability formulas have important limitations that medical communicators must consider. First, common readability formulas are inconsistent and can give variable results that differ by 5 or even nearly 13 grade levels.^{28,29} In fact, this very sentence returns readability scores that range from a grade level of 11 and 15, depending on the formula used to measure readability (<https://storytoolz.com/readability>). Second, common readability formulas are not comprehensive and therefore not accurate. These formulas are largely based on only 2 easily measurable contributors to readability: word length and sentence length.^{1,30-34} Although these factors are an important part of the style component of readability, they exclude other important components of readability related to style (eg, jargon, prepositions), content, format, and organization of ideas.⁵ Third, common readability formulas are based on calculations of textual characteristics that do not factor in reader attributes or directly measure comprehension. For example, they do not factor in logic or "understand-ability." For instance, the sentence, "The patient completed the treatment" has a Flesch-Kincaid Grade Level of 5.2 (for the sake of this argument, only one score is provided). However, the sentence, "The treatment

completed the patient” has the same Flesch-Kincaid Grade Level of 5.2, but the sentence does not logically make sense. Also, common readability formulas do not measure reader’s familiarity with a topic, so they do not factor in whether certain technical terms (that may have long, polysyllabic words) are familiar to readers. Further, they do not consider the difficulty of concepts or reader’s emotionality, interest level, or engagement in the text. These factors are important for writing readable text that readers can comprehend.⁶ Thus, medical communicators must keep in mind the limitations of common readability formulas and not over-rely on them when crafting readable content.

THE FUTURE OF READABILITY FORMULAS

The readability tools that many medical writers have come to rely on were originally developed approximately 50 to 75 years ago—and may be outdated. The Gunning Fog Index was originally developed in the 1950s¹; the Automated Readability Index, LIX Formula, and SMOG Index were originally developed in the late 1960s^{1,32,34}, and the Flesch-Kincaid Grade Level, Flesch Reading Ease, and Coleman-Liau were originally developed in the 1970s.^{31,33} This timing was before computers and the internet were widely available, which has shifted the common reading format from print to digital. Indeed, most people seek health-related content on the internet.³⁵ However, reading digital text has been linked to lower comprehension than paper text, although the results have been inconsistent.^{35,36} Even still, the shift from print to digital reading supports that the elements of readability may have also shifted from those outlined in the early readability studies that informed the formulas that medical writers still use today.

Computers have also led to advanced technology that can perform complex calculations in seconds. Thus, the approach of estimating readability based on 2 easily measurable characteristics (word and sentence length^{1,30–34}) may be outdated. Several new readability formulas have been proposed (summarized elsewhere^{1,37,38}). However, none have been widely adopted, possibly due to the proprietary features of algorithms, the tools not being openly available, or the costs associated with using these tools. As a result, medical writers must consider the limitations and true usefulness of common readability tools and stay informed of advancing technology in this field.

In the past few years, advancements in technology have exploded with the use of artificial intelligence (AI). This technology might be used to develop cost-effective tools that factor in more elements of readability to provide a rapid, more accurate estimate of readability. Indeed, AI has effectively improved the readability of patient-facing materials and enhanced user satisfaction with the material.^{39–41}

However, the effectiveness of AI in generating accurate, comprehensive, and reliable content was mixed, especially related to complex medical topics.^{39,40,42,43} Also, AI showed mixed effectiveness in improving the readability and accuracy of text with different models^{41,43,44} and in different languages.⁴⁵ Further, AI generated patient education materials with lower readability than that of materials created by humans.⁴⁶ These limitations might be addressed in future work with more advanced models and careful engineering of prompts that might even include patient-specific characteristics (eg, primary language, education level, knowledge of the topic).

THE NEED FOR THE HUMAN TOUCH

Readability formulas can provide insightful estimates of the quantitative elements of readability. Also, advances in AI technology may begin to incorporate more qualitative elements, such as format and idea organization, to further refine readability metrics. However, I believe that both readability formulas and AI tools will continue to have limitations that constrain their usefulness and do not renounce the value of humans in crafting readable content.

Most notably, readability formulas and AI tools are calculations and predictability models that lack human consciousness. This consciousness is crucial for crafting information in a way that meets readers where they are and connects with them physically, mentally, emotionally, and intellectually. This connection requires the human touch of medical communicators at both the delivering and receiving ends of communication. At the delivering end, medical communicators can use their expertise to consider the needs of readers, show empathy for them, and help ensure the writing is readable. At the receiving end, medical communicators can enlist support from their intended readers to ensure the information is clear and easy to read and understand.

CONCLUSIONS

Readability is an important factor to consider in ensuring that information is clear, easily understood, and enjoyable for any reader to read. Readability formulas can be helpful in the initial stages of developing communication materials. However, the current formulas are outdated, not readily accessible, and have important limitations that constrain their usefulness. Although future work with advancing technology may improve methods of measuring readability, these tools lack the consciousness needed to overcome the limitations of readability formulas and fully address all the elements that contribute to readability. As a result, the human touch of medical communicators will continue to be needed to consider the limitations of

readability tools and to craft information that meaningfully impacts readers.

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AROUND THE CAREER BLOCK

Medical Writing Academy: Fostering Cross-Functional Expertise and Professional Growth

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ABSTRACT

Medical writing is a complex multidisciplinary field that requires scientific knowledge, writing skills, and regulatory understanding. Recognizing the transferable skills that exist among diverse medical writing roles, a leading clinical research organization developed an internal training academy. The goal of the initiative was to enhance skills, support career development, and build flexible organizational capacity by providing robust interdisciplinary training and learning for medical writers, capitalizing on transferable skills, and fostering cross-functional networking.

The Medical Writing Academy was established in 2024, offering programs across 4 departments specializing in medical communication, regulatory affairs, medical writing, and safety medical writing. The flagship intermediate-level program was rolled out to in-house medical writers with 3 to 5 years of experience.

The training curriculum combined self-paced learning, offering participants flexibility with study, and periodic meetings led by program leads, ensuring ongoing support and guidance. The program blended 3 key developmental principles: education, exposure, and experience. Spanning 6 to 8 weeks, the curriculum covered key workstreams, featuring customized assignments to enhance writing skills and understanding of industry regulations and guidelines.

Providing medical writers insight into different aspects of medical writing and typical workdays across functions, the inaugural program broadened expertise and supported cross-functional understanding. All 34 participants successfully completed the training, reporting enhanced skills, knowledge, and confidence in their roles. The Academy helped writers identify transferable skills across different writing functions, building a versatile talent pool and improving career prospects.

INTRODUCTION

In the rapidly evolving landscape of health care and pharmaceuticals, medical writing stands as a cornerstone of effective scientific communication. This multifaceted discipline demands a unique synthesis of scientific acumen, writing expertise, and regulatory comprehension. As the vital link between complex scientific data and diverse stakeholders—including health care professionals, regulatory bodies, and patients—medical writers play a pivotal role in translating and disseminating accurate, accessible medical information. The exponential growth in demand for skilled medical writers reflects the growing complexity of the health care and pharmaceutical industries.¹ However, the increasingly intricate nature and range in the scope of medical writing roles pose significant challenges for both newcomers and experienced professionals in the field.²

Cross-functional training enables medical writers to hone their abilities in conveying scientifically precise, well-structured, and regulatory-compliant information.³ This skillset contributes to the advancement of health care knowledge and, thereby, improves patient outcomes.⁴

Consequently, fostering a multidisciplinary approach to writing expertise empowers writers to transition between functions, ensuring adaptability to shifting industry demands and effective communication across contexts and audiences.

As a leading clinical research organization with robust training programs and over 3 decades of experience in medical writing, Parexel recognized an opportunity to enhance medical writer training across diverse functions. This stemmed from 2 key observations. First, medical writers were increasingly expressing interest in broader learning and development opportunities. Second, although medical writers possess transferable skills, there was no formal structured program to apply these skills to different well-established medical writing disciplines within the

organization. To address this need to nurture talent, the 4 departments specializing in medical communication, regulatory affairs, medical writing, and safety medical writing collaborated to design and formalize the Medical Writing Academy.

The primary goals of initiating the Medical Writing Academy were 3-fold:

1. Broaden medical writing skills: provide medical writers with the knowledge and skills to competently support medical writing functions.
2. Strengthen career development: provide new avenues for professional growth and diversify networking opportunities.
3. Build up organizational capacity: develop a versatile workforce capable of meeting diverse client and regulatory needs.

The inception of this initiative was not just a response to internal needs but also a recognition of larger industry-wide challenges. By addressing this gap, the Academy aimed to set a new standard for medical writing training, potentially supporting the broader medical writing community.

THE MEDICAL WRITING ACADEMY

The Medical Writing Academy launch involved extensive preparatory work. A cross-functional global team from the United States, the United Kingdom, Ireland, and India was formed across 4 medical writing departments. This team collaborated to review and update existing curricula and engage with the organization's training experts. The thorough groundwork included structuring discussions, creating a dedicated Academy webpage, and producing informative videos on the Academy's mission and a day in the life of a medical writer from each discipline. The team carefully designed the program framework and developed an outreach strategy to ensure it met the diverse needs of medical writers across the organization.

The launch of the global Medical Writing Academy in 2024 marked a significant milestone in the organization's commitment to professional development in the field of medical writing. The training program focused on 3 key principles for effective learning: education, exposure, and experience.⁵ Within the curriculum, writers were provided with foundational knowledge, exposure to industry best practices, and opportunities to apply their skills in real-world settings. This structure ensured that participants would be exposed to the full spectrum of medical writing functions, fostering a holistic understanding of the field.

The Program Framework

The Medical Writing Academy's inaugural program was at

the intermediate level, designed for in-house medical writers with 3 to 5 years of experience. Spanning 6 to 8 weeks, the part-time curriculum blended self-paced learning with professional guidance. Participants dedicated approximately 10 to 15 hours to the coursework hosted on the Learning Management System and an average of 8 to 10 hours to online discussions with line managers, program leads, and administrative tasks. This duration was carefully chosen to allow for in-depth exploration of topics while accommodating ongoing work responsibilities.

The program was meticulously crafted to cover key workstreams across 4 medical writing functions. Its structure comprised 4 main steps, each designed to provide a holistic understanding of the medical writing landscape while developing specific skills relevant to each function.

Step 1: The Medical Writing Academy Overview

A precourse briefing was provided to interested medical writers through newsletters and a Medical Writing Academy webpage offering a detailed overview of the course and each medical writing specialty. This session outlined the course objectives, structure, and expectations.

A unique feature of this step was the video series, *A Day in the Life of a Medical Writer*. These role-specific videos were available on the Academy webpage. They offered participants a glimpse into the daily responsibilities and challenges faced by medical writers in different functions, helping them identify areas of interest and potential career paths. Along with the videos, participants were also given a topline overview of each medical writing function (Figure 1).

Step 2: Invitation and Selection Process

Managers and team leaders were asked to nominate medical writers who demonstrated potential for growth and cross-functional development. The potential candidates were introduced to the Medical Writing Academy via the webpage and given the opportunity to select their preferred top functions for further development. This approach ensured that the program would benefit those most likely to apply the learning and benefit from the knowledge gained, maximizing the impact of the training investment. Shortlisted candidates were then given orientation by program leads. This briefing covered an overview of the respective functions, the scheduled curriculum, and program expectations, preparing participants for the training ahead.

Step 3: Fundamentals of Drug Development and Clinical Research

Before specific functional training, the participants were provided with a brief 2-hour refresher on a few topics such as concepts of drug development, drug development process,

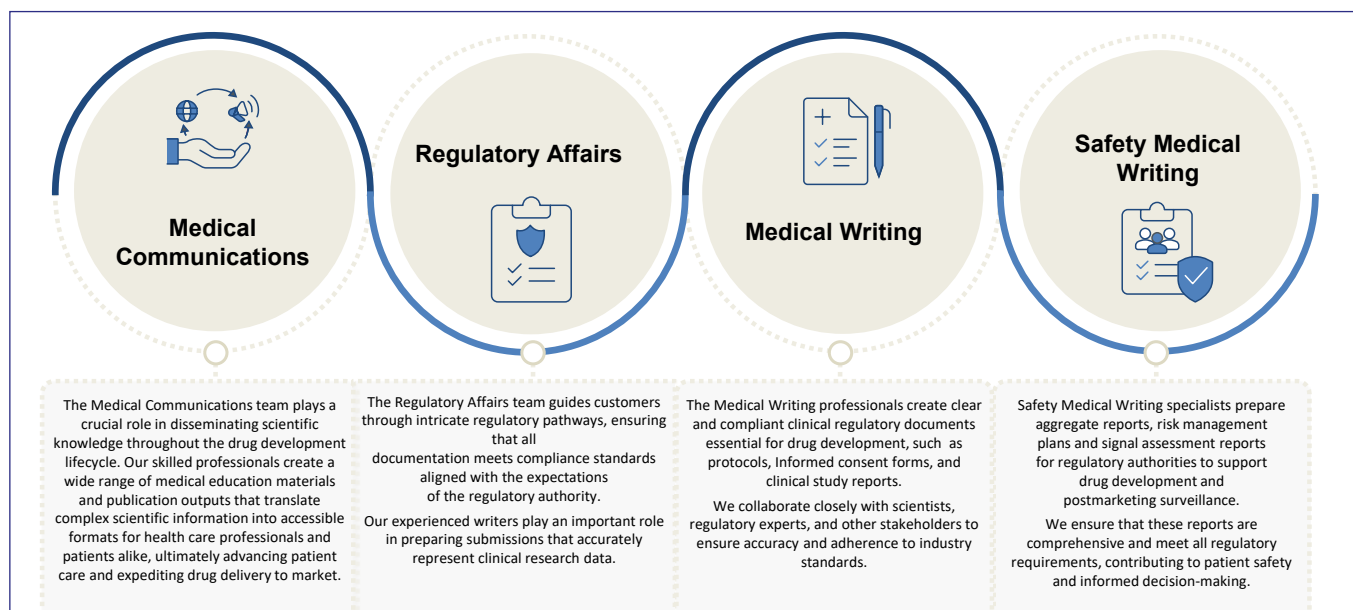


Figure 1. Overview of the Medical Writing Functions. *ICF, informed consent form.*

clinical research, and fundamentals of regulatory writing.

Step 4: Medical Writing Functional Trainings

This step involved enrollment in a course curriculum for the selected medical writing discipline (Table 1). In each curriculum, the Academy employed a blended learning approach, leveraging multiple instructional strategies.

- Self-paced online modules: hosted on the Learning Management System, these allowed participants to acquire foundational knowledge at their own pace. This format provided flexibility for participants to complete the training at their convenience, accommodating various time zones and work schedules.
- Expert-led sessions: prerecorded training sessions by subject matter experts (SMEs) provided in-depth insights into specialized topics.
- Interactive learning materials: self-reading materials supported by interactive PowerPoint slides enhanced engagement and comprehension.
- Regular check-ins: program leads hosted periodic online meetings throughout the program, providing participants with opportunities to ask questions and discuss their progress.
- Final assessment and certification: upon

Table 1. Training Curriculum Across Medical Writing Functions

Medical Communications	Regulatory Affairs	Medical Writing	Safety Medical Writing
• Publication Programs: Regulations and GPP • Practical Guide to Writing Congress Abstracts • Practical Guide to Writing Congress Posters • Practical Guide to Writing Congress Oral Presentations • How to Successfully Publish a Medical Paper • Medical Education 101 • Statistical Training for Medical Writers	• Overview of Key Deliverables in Regulatory • FDA/EMA Templates • Basics of Literature Search • Clinical Writing: Telling the Story • CTD • General Investigational Plan • FDA Diversity Plans • Biostatistics for Medical Writing • Assessor's Viewpoint • Clinical Writing—Considerations for Oncology Drugs	• Overview of Project Management & Good Medical Writing Practices • Overview of Clinical Trial Disclosure • Overview of Patient Narratives • Overview of ICFs • Overview of Protocols • Overview of CSRs • Overview of CSR Appendices	• Introduction to Aggregates and Ad Hoc Reports • Periodic Safety Update Report • ICH E2C R2-PBRER • ICH E2F: Development Safety Update Report • Overview of Signal Detection • Overview of Signal Management • Signal Management • Literature: Triage for Signal Detection, Management, and PBRER • Case Analysis • Risk Management Systems

CSR, clinical study report; CTD, common technical documents; EMA, European Medicines Agency; FDA, Food and Drug Administration; GPP, Good Publications Practice; ICF, informed consent form; ICH, International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use; PBRER, Periodic Benefit-Risk Evaluation Report.

completion of the training modules, participants underwent a multiple-choice assessment encompassing 15 to 20 questions with a requirement of 80% correct answers to successfully pass the training. Successful candidates were awarded a certification recognizing their achievement in cross-specialty medical writing expertise.

Overall, the program offered learning exposure through an overview of different functions, insights into various types of deliverables within the domain, and the necessary skills required. It also included networking opportunities with diverse functional teams. The learning experience was provided through an instruction design-led curriculum featuring relevant case studies and practical opportunities. The training assignments focused on various document types such as clinical study reports, protocols, safety narratives, case assessments, Periodic Benefit-Risk Evaluation Reports, and clinical trial publications, culminating in an overall assessment. These assignments and the training material allowed participants to apply their skills in supporting different functions as needed.

This holistic approach ensured a thorough understanding of each function's specific requirements while maintaining flexibility for participants' schedules.

THE PROGRAM OUTCOME

From a pool of 82 candidates nominated by their line managers, 34 medical writers with 3 to 5 years of experience in their discipline were selected for the intermediate-level program. Others were not selected due to group size limitations, experience level requirements, and relevance of current experience in role to the curriculum. These participants from different locations (China, India, Germany, South Africa, Spain, the United Kingdom, and the United States) were distributed across 4 medical writing functions based on their top preferences and seat availability. The inaugural run of the Medical Writing Academy's intermediate-level program saw all 34 participants achieve an average score of 91% and successfully complete the assigned training.

Participant Benefits

The program's success was evident in the positive feedback

from participants (Figure 2). Key benefits reported included

- **Enhanced medical writing skills:** participants noted significant improvements in their writing proficiency, particularly in areas outside their primary specialties.
- **Broadened knowledge base:** the cross-specialty approach provided participants with a comprehensive understanding of the medical writing landscape. This broader perspective enabled them to see connections between different areas of medical writing, fostering valuable insights into their work.
- **Increased confidence:** armed with new knowledge and skills, participants reported feeling more confident in their roles. This self-assurance paved the path for their professional development with the willingness to take on more challenging projects. Many reported feeling more confident in tackling diverse writing tasks, from regulatory documents to patient education materials.
- **Career development:** several participants noted that the program opened up their awareness of new career possibilities within medical writing. Some even initiated transitions to different specialties based on their newfound interests and skills.
- **Networking opportunities:** the program facilitated connections between medical writers from different departments, fostering a sense of community and encouraging knowledge-sharing across functions.

The practical benefits of this cross-functional training were demonstrated when 5 participants from the Medical Writing department, who had undergone training in safety

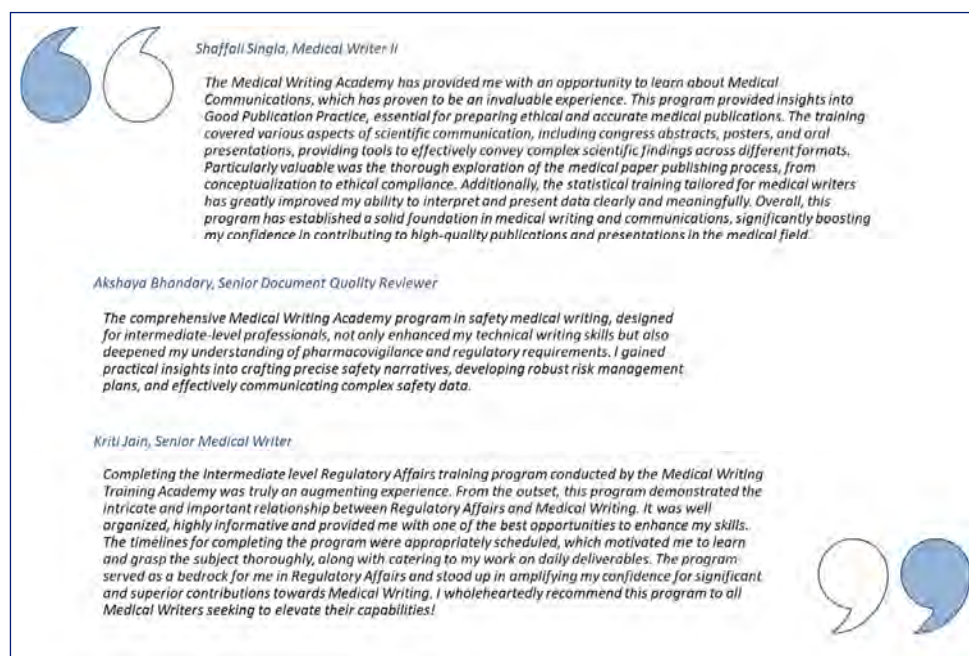


Figure 2. Participants' Testimonials.

medical writing, were able to provide crucial ad hoc support for an urgent Food and Drug Administration request involving high case volumes. They efficiently assessed nearly 800 cases with satisfactory quality showcasing the program's immediate value in meeting critical business needs and enhancing operational flexibility.

To improve on the inaugural intermediate-level program, feedback was solicited on the course curriculum and overall experience (Table 2). Building on the success and valuable suggestions received from participants, the Medical Writing Academy will be evolved over time. There are currently plans to expand into an additional curriculum appropriate for basic-level and advanced-level participants, as well as enriching the curricula at the intermediate-level for future participants. The Academy will update the program based on participants' feedback by including instructor-led sessions, more case studies, advanced writing techniques, query-response sessions with SMEs, detailed safety documents, and so on. The iterative approach is designed to ensure that the program remains relevant, effective, and aligned with the evolving needs of medical writing professionals.

Table 2. Participants' Feedback

Feedback Category	Summary
Overall Experience	Positive; improved skills and confidence in medical writing reported by participants
Confidence Enhancement	Significant boost in confidence from hands-on experience and feedback sessions
Course Structure and Materials	Structured courses with comprehensive materials; desire for more interactivity and real-world examples
Content Relevance	Highly relevant for roles, especially in understanding complex documents
Valuable Aspects	Practical exercises, flexibility in timing, and one-on-one feedback sessions highly valued by participants
Areas for Improvement	More instructor-led sessions, case studies, and regular check-ins suggested
Future Topics	Interest in advanced writing techniques, communication strategies, and detailed safety documents
Recommendation Likelihood	High likelihood of recommending the Academy to colleagues

CONCLUSIONS

The Medical Writing Academy made a significant positive contribution to the professional development of participants by exposing them to other disciplines of medical writing and using their transferable skills, thereby improving their professional versatility. This approach will help to address the evolving needs of the medical writing profession by broadening the knowledge and skills of individuals. As reflected in the feedback from the participants, the initiative demonstrated the value of comprehensive, cross-functional training and

could redefine best practice in future medical writing education. Notably, participants' ability to apply newly acquired skills to urgent interdepartmental requests highlights the program's effectiveness in developing adaptable, multiskilled professionals, thereby building organizational capacity.

Building on this achievement, the Medical Writing Academy initiative will explore ways to improve and evolve the program, identifying where further innovation may be appropriate. Plans are underway to expand the curriculum to cater to basic-level, intermediate-level, and advanced-level participants, ensuring comprehensive coverage across all career stages. The existing intermediate-level curricula will be enriched to provide even more value to future participants. This model of cross-functional expertise, practical application, and continuous learning can inspire and guide similar initiatives across the industry.

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CONSCIOUS WRITING

Strategies for Turning Fruitless Feedback Lectures into “Giftful” Discussions

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ABSTRACT

Feedback is a valuable tool that can identify strengths and weaknesses for personal and professional growth. Among medical communication teams, feedback is important not only for collaborating with colleagues but also for constructively navigating the writing process. As a result, medical communicators need strategies for giving and receiving effective feedback in a variety of professional areas. With “giftful” strategies, medical communicators can give feedback effectively, receive feedback gracefully, and collaborate on the path forward.

INTRODUCTION

Feedback is a valuable tool for personal and professional growth. This tool helps us recognize our habits and behaviors so that we can harness our strengths and improve our weaknesses. Feedback is also not limited to a career stage, especially among medical communication teams. These teams need to not only collaborate as colleagues but also constructively navigate the cooperative, iterative writing process involved in producing a document. As a result, medical communicators need strategies for giving and receiving feedback on a variety of matters, including behaviors, perceptions, beliefs, and writing styles.

Although feedback is a valuable tool, many people have negative perceptions of the feedback process. These perceptions are often rooted in feelings of anxiety, fear, and dread from receiving bad feedback or feedback “lectures” in the past. But when feedback is done well, it is a gift—a gift of knowledge and understanding to support growth and advancement.

Over the years, I have picked up personal and professional guidance from mentors, advisors, coaches, therapists, books, courses, experience, and even trial and error. In this article, I share several strategies that I use to encourage “giftful” feedback related to writing, the writing process, and working with clients and colleagues. These strategies can help you to give feedback effectively, receive feedback gracefully, and collaborate on the path forward.

GIVING FEEDBACK

Ask for Permission

Before delivering feedback, ask the receiver for permission to share feedback. This approach lets the receiver know that feedback is coming so that they can mentally prepare for the discussion. Also, when asking for permission, ask with a yes or no question. This approach creates buy-in because the receiver can say “yes” or “no,” which gives them a sense of autonomy. However, you may want to avoid the most dreaded question: “Can I give you some feedback?” This question contains the word “feedback,” which can stir up emotions of anxiety, fear, and even panic. Instead, ask a question that avoids this word. For example, you might ask, “I have some ideas for how we might improve the draft. Can I share them with you?” Or “Do you have 10 minutes to discuss how that project went?” This question also gives a time limit, which may put the receiver at ease for how long they may have to endure a potentially difficult discussion.

Give Credit

People tend to be quick to give negative feedback and slow to give positive feedback (if they give positive feedback at all). This tendency may be due to the association of feedback with *constructive criticism*. But positive feedback is just as constructive as negative feedback. Knowing *what to do* is just as important as knowing *what not to do*. So when giving *constructive criticism*, be sure to give *constructive credit* as well. This credit will help to encourage good behaviors or writing habits. If giving positive feedback does not come naturally to you (yet), you might take an extra pass through a draft to focus on highlighting the positive characteristics. Or before a discussion, you might brainstorm the positive and negative aspects of the situation so that you can touch on the positive aspects as well.

Be Specific

Great feedback goes beyond vague or general statements, which can seem more like opinions than feedback. Great feedback is thoughtful, intentional, and specific. When giving feedback, be sure to give data for what you noticed.

For example, avoid general statements like “You’re writing isn’t very good.” Instead, be specific with a statement like, “I noticed that you used a lot of long sentences in that draft.” Also, avoid absolutes like “always” and “never,” which can divert focus from the topic at hand and even trigger defensiveness and a search for exceptions. For example, avoid the absolute statement, “You never meet deadlines.” Instead, use data with a statement like, “You said that you would give me your draft by Monday, but I don’t have it yet.” Specificity is also important for positive feedback because it encourages what to keep doing. For example, avoid sharing a simple, “Great job on those revisions!” Instead, get specific with a statement like, “I really like how you logically guided readers through that concept.”

Highlight Impact

To help the receiver understand the reason for the feedback, be sure to highlight the impact of their behavior. Share how that behavior impacted you, the team, or the organization. Or share how the writing in that draft impacted the project or the potential reader. By highlighting the impact, you give logic, meaning, and purpose to the feedback. For example, avoid simple statements like, “I didn’t get the draft on Monday.” Instead, highlight the impact: “Because I didn’t get the draft on Monday, I had to shift my schedule around and delay other projects.” Or avoid giving an opinion with a statement like, “I really like how you used a variety of sentence lengths.” Instead, expand on that opinion with logic and meaning: “I really like how you used a variety of shorter and longer sentences. They helped to add rhythm to the writing to keep me engaged while reading.”

Get Personal

Feedback is very personal and can be affected by many factors, including personal styles, cultural influences, generational differences, and environmental attributes. Get to know as much as you can about a person and their communication style. Also, be sure to consider how you deliver feedback and tailor your feedback to the receiver. For instance, some people prefer indirect feedback that has a “softer landing,” whereas other people may find indirect feedback unclear and confusing. For example, consider the feedback, “You might consider reversing the second and third sentences to smooth the flow in this paragraph.” This feedback might be received as encouraging guidance by one person and as an optional suggestion by another. Conversely, some people prefer direct feedback that is straight to the point, and others may react with defensiveness or withdrawal. These reactions can also trigger the giver to justify or backpedal their feedback, heightening emotions in the discussion. For example, consider the

direct feedback, “This paragraph is disjointed.” This feedback might lead to the receiver reacting with explanations, such as that they were rushed to meet a tight deadline. This reaction could then lead to the giver justifying the deadline with pressure they’re getting from the organization.

Confirm Understanding

Like all communication, feedback requires 2 important considerations: how the message is given and how the message is received. And how your feedback is received can help you understand whether you gave that feedback effectively. When giving feedback, notice how your feedback was received. Pay attention to the receiver’s facial expressions and body language to understand whether your words are resonating with them. You might even ask them to repeat back your feedback in their own words so that you know your message was received the way you intended. However, be careful to not make this request in a patronizing way. To avoid this scenario, you might explain that you are asking because you want to understand how your message was received so you can clarify or refine your message if needed.

Offer Support

Feedback can seem like a lecture or sharing of opinions without clear direction on how to move forward. To avoid this scenario, when giving feedback, consider not just what happened but also what’s next. When possible, share resources to help the receiver improve. For example, you can offer regular check-ins to help track progress. Or you can share articles, books, and trainings to help the receiver learn new skills. Or you can encourage work with coaches and consultants who can give the receiver one-on-one support in learning new skills and tracking progress. Although these resources may require time and financial investments, the return on these investments will support not only the receiver but also the giver, the team, the project, and the organization.

RECEIVING FEEDBACK

Be Open-Minded

Feedback is an essential part of the learning process and can be a powerful tool for growth. But it can also be hard to receive, especially if it feels like criticism or a personal attack. To see feedback as an opportunity to improve, keep an open and calm mind. Be willing to listen and consider other perspectives and experiences. Remind yourself that no one is perfect and that mistakes are opportunities to improve. If you need time to process, ask for some time before continuing the discussion.

Review Objectively

Your work and your writing are extensions of yourself. You invest considerable time and energy collaborating on projects and pouring words onto the page that precisely, accurately, and even creatively reflect your thinking. As a result, you may struggle to not take feedback personally. But rather than take feedback *personally*, take feedback *objectively*.

Treat the feedback like data. Explore it. Analyze it without judgment. Look for patterns and outliers. This process helps you identify what you understand, what the meaning is, and what you want to learn from it. For example, if a coauthor shared that they did not like how you reworded a sentence, consider that feedback objectively and ask questions to understand the feedback better. What did the coauthor not like about the rewording? Did the change conflict with their typical writing style? What was your reasoning for rewording the text the way you did? Did you need to follow a certain style guide? Or did you think that the sentence was clearer with the rewording?

Get Curious

When you explore feedback like data, you also have to consider confounding factors that might introduce bias. So you need to ask questions about the feedback and get curious about the situation. Who is giving you the feedback, and do you value their perspective? Is their feedback a reflection of them or you? For example, if you got feedback from someone who does not have as much writing experience as you, you might not agree with their feedback. On the other hand, if they have more experience than you and you admire their writing approach, you might appreciate their feedback. You also might ask, what was their state of mind during the situation or when they were giving you feedback? What was your state of mind during the situation or when they were giving you feedback? Did something significant happen beforehand that may have affected their or your perception? For example, did you just have a disagreement with a family member before starting your work day, which might make you feel more sensitive than usual? Did the person giving you feedback just finish leading an intense meeting with leadership about budget cuts at the organization? When you ask these questions and get curious about the situation, you can uncover the roots of the feedback so that you can clarify the best next steps.

Extract Truths

Feedback is a gift that can help you uncover blind spots. Although not everyone gives gifts that you want, you can usually uncover at least a hint of truth or nugget of wisdom in the feedback. No matter the situation, or whether the feedback is positive or negative, you can reflect on the

feedback and situation, find the hint of truth, and keep it. Then let the rest go. For example, someone might suggest that you expand the discussion about a certain topic you mention in the document that you wrote. You might recognize that the topic is important and would be interesting to expand on (hint of truth). However, you also acknowledge that a discussion about that topic would be tangential to the central message or beyond the scope of the document, so you let the feedback go. As another example, someone might suggest that you use passive voice because that is the style they see in most of the literature. Although you agree that passive voice has been a historical convention in medical writing (hint of truth), you also know that this convention is shifting to support more active voice. So, depending on the circumstance, you might choose to let go of their suggestion and prioritize active voice. Or you might discuss your rationale with the giver to establish your credibility, get their buy-in, and strengthen your working relationship.

Develop Strategy

When you receive feedback, that is only the first step in addressing the feedback. The next step is to take action. Consider the feedback and choose what to stop, start, and continue doing. Create a plan to take advantage of any resources you received or can find. Read articles and books, sign up for courses and workshops, enlist the help of a coach or consultant, and schedule time to follow up with the person who gave you feedback. Only through action can you change and improve.

COLLABORATIVE FEEDBACK

Consider Environment

When discussing feedback, people often consider what they are saying or how they are saying it. But they do not always consider where they are saying it. The environment and how you place yourself in it can affect how feedback is given and received. When discussing feedback, especially about a negative or sensitive topic, find somewhere private to talk. Make sure that everyone in the conversation is either standing or sitting to foster connection and avoid feelings of dominance or hierarchy. If you are discussing a problem, avoid sitting across from one another, especially in a supervisor's office, which can feel intimidating for an employee. If you can, have everyone sit on the same side of a desk or table. With this approach, you can avoid seeing the issue as a problem "between you" and instead see the issue as a problem "in front of you." This perception can help you discuss the problem as though you are on the same side and working together to fix the problem. Be sure to consider any other aspects of the environment to ensure you set the discussion up for success. For example, if you work remotely and

are discussing feedback virtually, consider how you appear on the screen. If you are the giver, avoid sitting close to the camera, which can feel intimidating to the receiver. Be sure that you are far enough back that the other person can see your torso and even your hands, which can make the conversation feel less threatening. Be extra mindful of your tone, words, facial expressions, and body language because these factors will be more pronounced in a virtual setting.

Reciprocate Feedback

Traditionally, feedback was unidirectional (supervisor to employee, client to freelancer). This unidirectional approach can put the giver in a position of dominance and the receiver in a position of vulnerability. But opening the feedback conversation both ways can transform an information-delivering lecture into a problem-solving discussion and, when appropriate, support a mutual feeling of vulnerability. For example, after sharing feedback, you might ask, “How do you see it?” or “What do you think?” This approach helps to create connection, collaboration, and commitment rather than compliance. However, when opening the conversation, be careful that the discussion does not become a retaliatory or competitive exchange that can degrade the feedback or even damage the relationship. Focus on fostering an open, honest dialogue that will strengthen the relationship.

Practice Continually

Feedback is often episodic (infrequent and isolated), which may contribute to anxiety around feedback discussions. To reduce this anxiety, have a consistent flow of continual feedback. Take advantage of opportunities to practice giving and getting feedback. Offer feedback regularly. Avoid waiting for

feedback and ask for it. For example, you might ask for feedback during weekly check-ins with your supervisor rather than waiting for annual performance reviews. Or you might ask a client for feedback a few weeks after sending a deliverable rather than just waiting to see if they respond. When you ask for feedback, you hold the power and show that you are a continual learner.

Be Kind

The process of giving and receiving feedback can be fraught with emotion. During the process, be mindful of your tone and emotions. Avoid language that is demeaning or disrespectful, and choose words that are encouraging and considerate. Avoid reacting, and respond with consideration and positive intention. Lead every interaction with kindness that shows your motivation to strengthen one another, the project, the team, and the organization.

SUMMARY

Feedback can be challenging to give and receive, especially when negative perceptions and emotions are involved. But when done well, feedback is a gift. With effective feedback strategies, you can have constructive and “giftful” discussions that not only develop working relationships and professional skills but also benefit documents, readers, medical communicators, writing teams, and organizations.

Author declaration and disclosures: *The author does not have any commercial associations that may pose a conflict of interest related to this article.*

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FREELANCE FOCUS



Brian Bass



Melissa L. Bogen



Cathryn D. Evans

Q1: How do you handle unexpected expenses or income fluctuations in your freelance business? What financial strategies do you employ to maintain stability?

A freelance business should never have unexpected expenses. As the business owner, it's your responsibility to know what your expenses are and to plan for them. This includes everything from federal and state taxes, insurance, memberships in professional organizations, and professional development to equipment, software, paper, and toner. In my opinion, before you pay yourself, you must put away the money that you'll need to meet these expenses. It's also your responsibility to expect the unexpected. I recommend putting away some extra money because you know other expenses will arise. They always do.

As for income fluctuations, welcome to freelancing. The only thing we can be certain of is the uncertainty of how much we'll make and when we'll make it. It changes week to week, month to month, and year to year. I'll take that uncertainty over the uncertainty of whether I might be downsized to please investors or let go because my employer lost a client despite my doing a great job. Freelancers have more responsibility, but also more control over their destiny. Besides, freelancers can make more money than a company would ever pay them to work on staff. To manage your personal income despite the inevitable fluctuations, I recommend the following

- Create a household budget including just the necessities.
- Pay yourself the same amount every week based on that budget.
 - This leaves money in the bank when you're flush with cash, so it's there to take when money is tight.
 - It also makes it easier to anticipate and meet your tax obligations.
- Make a list of your wants beyond the necessities (note, not extravagances).
 - When there's consistently enough money in the bank for you to always meet your necessities

budget, you can start adding items from this list to your weekly budget (and adjusting your tax payments accordingly).

- Make a list of the extravagances you dream about.
 - You'll know when you have enough extra money in the bank to make one of them happen without jeopardizing your budget.

—Brian Bass

Income fluctuations are a normal part of a freelance business. Plan for them by setting money aside for expected expenses, such as taxes, insurance, professional memberships, equipment, and software. Unexpected expenses or fluctuations can be stressful or derail a business that's not prepared.

The best strategy for me to maintain financial stability has been to maintain a high-yield savings account with an emergency balance of at least 3 months' worth of income. Financial advisors might suggest more than 3 months' worth, but I find keeping more in my savings difficult because I am already setting aside money for taxes, a simplified employee pension individual retirement account (SEP-IRA; a retirement plan designed for self-employed individuals and small business owners), and vacations.

My emergency fund came in handy in August 2024 when I was in a car accident. I was fine, but my car was totaled. I was unexpectedly thrust into the position of buying a new car. Fortunately, I had enough money in my emergency fund for a decent down payment on a new car. Now I need to build the emergency fund back up.

Tip: Set up automatic transfers from a checking account into your high-yield savings account. After my car accident, I changed automatic transfers from twice a month to every week. The amount transferred should be small enough that you don't feel pinched financially. The savings account will increase without you noticing.

—Melissa L. Bogen

Q2: How do you handle conflicts of interest when working with multiple clients in the same therapeutic area or with competing companies?

I draw a hard line about not working on competing products in the same therapeutic area at the same time. Although I would never use confidential information from one client to benefit another, I don't even want the appearance of it. I want to work with everyone, but it's not worth the potential harm to my reputation.

Fortunately, because I work in a lot of different therapeutic areas instead of specializing in just one or a few areas, potential conflicts rarely arise. When they do, I simply thank the person who reached out to me and tell them that although I can't help them now, I'm very interested in working with them in the future. I also tell them that when I'm working on a project for them, they can rest confidently knowing that I'll similarly protect their interest. It doesn't hurt to add that I'd be happy to work with them now in a different therapeutic area if they have a need. Then I reach out to them after my current commitment is finished to let them know that I'm now available.

There are gray areas, however, and there are different kinds of conflicts. For example, I once received a call from a client who wanted me to work on a sales training program for a product I was already working on an advisory board meeting for with another client. I explained the situation and then reached out to the client I was already working with to see whether they thought it would be a conflict. Because that client doesn't ever work in the advisory board arena, they were fine with my working with the other client. The other client didn't see a conflict with it, either. Both clients benefitted from my involvement.

Most conflicts of interest are obvious. And when they're not obvious, ask. If you wouldn't ask, it's obvious. And if you wouldn't want both clients to know about each other, it's obvious.

—Brian Bass

Because freelance medical writers generally sign a confidential disclosure agreement (CDA)—particularly when working for the pharmaceutical or biotechnology industry—you should not expect to encounter this problem. A CDA is a legally binding document that states that you may not divulge any confidential information learned while working for that client, nor may you divulge to the client any confidential information you learn while working for a different client. Thus, no conflict of interest is likely to exist.

There are some exceptions. For example, if you are an advertisement, marketing, or communication agency, it is possible the client will have you on a (quite sizeable) annual retainer along with separate payment for specific projects. In such cases, in addition to executing a CDA, the clients often require that you not work for a competitor while working for them, as well as for a specified period of years thereafter. This is reasonable.

Another exception is when you are actually a W4/W2 employee, and not a freelance consultant (either incorporated or on a W9/1099 basis). If you are being paid as an employee—whether part-time, full-time, temporary or transient, or a contract employee or writer—then you have agreed to be under your employer's rule and control. You are no longer an independent freelancer and thus must agree to their terms that may well include saying you cannot work for another client in the same therapeutic area.

For me, this has come up only twice. Otherwise, my signed CDA has been sufficient. It is important to remember that you have control over the contract(s) you sign; if a client asks for something you cannot agree to, do not sign. Find another client.

—Cathryn D. Evans

Q3: What are the most common financial mistakes you've made as a freelancer, and what lessons have you learned from them?

Several mistakes I have made over the years include the following

1. I did not save or invest wisely.
2. When I was earning a very good income, with several subcontractors working for me to handle projects in my absence, I took about 3 months off each year for expensive vacations, going to health spas, Europe, England, Ireland, Australia, India, Hawaii, and so on. Although vacations and time off are very important for everyone, I took more than was truly necessary for physical and mental health.
3. I bought a fair amount of designer clothes and accessories, donated more than was prudent, ate in expensive restaurants, and generally was injudicious in spending over many years.
4. I overpaid trainees and subcontractors in early years and thus lost money on some projects because I had to redo them.

Lessons learned from these mistakes, and advice I offer to others include the following

1. Put 20% from each check you receive into a savings or money-market account (separate from retirement account contributions at the end of the year). Make sure it is easily accessible, so you have enough available cash flow during slower periods. (Although I usually have cash available like this, I have not always put aside a full 20% from each check.)
2. Contribute the maximum possible to your retirement account.
3. Do not spend excessively on things or high-end travel and vacations without serious consideration of your overall financial status. (Once in a while, a splurge is okay, but do not do this frequently.)
4. Do not pay trainees more than is appropriate.

—Cathryn D. Evans

I pay off my credit card balance each month. But because of high credit card balances around Christmas, vacations, and attendance at work conferences, I have sometimes neglected to keep setting aside money for taxes or my SEP-IRA. Then I am forced to use my emergency fund to pay quarterly taxes or contribute to my SEP-IRA.

The lesson I have learned is to transfer 50% of my income into my high-yield savings account without fail. I need to do this transfer as soon as client payments are posted in my checking account.

—Melissa L. Bogen

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My Like-Hate Relationship With Word's Grammar Checker

Laurie Endicott Thomas, MA, ELS / Independent Medical Writer, Madison, NJ

ABSTRACT

Microsoft Word has a built-in grammar checker that can help you spot common grammatical errors, such as noun-verb disagreements, that you need to correct. However, Word's grammar checker also makes many suggestions that you should ignore. For example, it systematically flags all uses of the passive voice, even when the passive voice is the right choice. Word also tells you that some sentence adverbs or conjunctive adverbial elements are expressing uncertainty, even when no uncertainty is being expressed. Word often flags short, common words of Anglo-Saxon origin—suggesting instead a big, fancy word that is harder to read or has a different meaning. I put up with this nonsense because Word occasionally makes a good suggestion that keeps me from looking stupid. In this article, I explain why I ignore most of Word's grammatical advice. I also explain how I use other features of Word (the Read Aloud feature and some custom macros) to spot problems that no grammar checker can find.

INTRODUCTION

Can machines really think? That's a hard question to answer. In 1950, Alan Turing asked a different question: can a machine exhibit intelligent behavior that is equivalent to, or indistinguishable from, that of a human being?¹ Turing called such an assessment the imitation game, but it is now called the Turing test. The current version of Microsoft Word's grammar checking function fails the Turing test. It is good at flagging some grammatical errors (eg, noun-verb disagreements). However, it does not understand the meaning of English words. If you are a good writer, Word's grammar checker will give you far more bad suggestions than good ones. Nevertheless, Word's occasional good suggestion will help you avoid looking stupid. In this article, I explain why I ignore much of Word's advice and how I try to find the problems that Word overlooks.

FALSE ALARMS AND BAD ADVICE

The following are, at least in my experience, the most common false alarms that Word's grammar checker makes. Fortunately, if you are a dedicated reader of this column, you will know when to ignore Word's bad advice.

Anglo-Saxon Words and Plain Language

Word's grammar checker often suggests that I substitute some highfalutin word for a simple, powerful word of Anglo-Saxon origin. For example, it flagged *hard work* and suggested that I replace *hard* with *challenging*, *arduous*, or *demanding*. Thus, Word's advice goes against the principles of plain language, which is a legal requirement for some kinds of writing.² Use the simple, readable word of Anglo-Saxon origin (see the box: Anglo-Saxon Words) whenever its meaning is clear. Whenever Word suggests a highfalutin Latinate word for a simple, Anglo-Saxon word, I'm tempted to choose the option of "don't check for this issue." I resist that temptation because Word occasionally makes a good suggestion.

ANGLO-SAXON WORDS

In 1066, William of Normandy (also known as William the Bastard) became William the Conqueror, as he invaded Great Britain and claimed the English throne. In the aftermath, his Norman French nobles replaced the aristocracy of England. For centuries afterward, the aristocracy in England spoke the Norman dialect of French and used Latin for legal purposes, whereas the common people continued to speak their Germanic Anglo-Saxon tongue (Old English, the language of *Beowulf*). The eventual blending of those languages gave rise to Middle English (the language of Chaucer), which later evolved into Early Modern English (the language of Shakespeare) and then the English that we speak today. About a quarter of the words in today's English dictionaries are of Anglo-Saxon origin. Yet those words form the backbone of our language. They are the strong, hard-working words of the common people. (Most English obscenities are Anglo-Saxon in origin.) When Winston Churchill wanted to rally the British people in their darkest hour, he spoke words of Anglo-Saxon origin: "We shall fight on the beaches, we shall fight on the landing grounds, we shall fight in the fields and in the streets, we shall fight in the hills; we shall never surrender." All of those words came from Anglo-Saxon, except for *surrender*, which came from French.

Passive Voice

When a verb is used in the active voice, the subject is the agent of the verb (eg, I eat). If the verb is transitive, there

will also be a direct object (eg, I eat pie). The passive voice allows you to express the same idea, but with the pie as the subject of the sentence (ie, the pie was eaten by me). As I explained in [Passive Voice and Expletive Constructions](#),³ George Orwell's essay *Politics and the English Language* gives us a confusing lesson about the passive voice. First, he tells us to avoid using the passive voice; then, he gives us a passage that contains the most powerful uses of the passive voice in English letters.⁴ Feel free to use the passive voice under the following circumstances:

- When the agent of the action is unknown, unspecified, or of lesser importance than the act itself.
- When you must give a list of agents or a complicated description of an agent. (Why make the reader wade through all that before they get to the verb?)

When Word's grammar checker finds an instance of the passive voice, it gives you the options "Ignore once" and "Don't check for this issue." I'm tempted to choose the latter; but once in a while, Word spots an instance where the active voice really would be better.

Sentence Adverbs

Word's grammar checker often flags sentence adverbs, saying "Words expressing uncertainty lessen your impact." This is irritating for 2 reasons:

- A sentence adverb doesn't always express uncertainty.
- Sometimes, the purpose of the sentence is to express uncertainty.

As I explained in [Editorialize with Sentence Adverbs](#),⁵ a sentence adverb is a disjunct: it doesn't modify a particular word in the sentence. Rather, the sentence adverb concisely expresses the speaker or writer's opinion about whether something is true or likely or how they feel about something. Thus, it is a sneaky way to editorialize. Both of the following examples are expressions of opinion; however, the second sentence (which uses a sentence adverb) is less obviously an opinion:

- 😊 **I think it is probable that** the infection is due to *Streptococcus pneumoniae*.
- 😐 The infection is **probably** due to *Streptococcus pneumoniae*.

Sentence adverbs can also be used to express how you feel about a possibility or a fact:

- 😊 **Hopefully**, this antibiotic will work.
- 😊 **Fortunately**, the bacteria are sensitive to penicillin.

A sentence adverb can also be used to acknowledge what other people might think. For example, the word

actually can be used to point out that the information is contrary to what the reader might expect.

Word's grammar checker flags *literally*—again saying "Words expressing uncertainty lessen your impact." Yet *literally* does not express uncertainty. It came from a Latin root meaning "according to the letter." *Literally* can be used to point out that you are using the original or real meaning of a word. Of course, some people use *literally* to emphasize a metaphor, which means that they are using the word *literally* unliterally (eg, she was literally over the moon when she heard this). Sometimes, people use the word *literally* to mean simply or just (eg, then you literally cut the sausage in half). So, you need to think about how you use this word.

Word's grammar checker flagged *after all* as an expression of uncertainty. Yet *after all* does not express uncertainty. Quite the contrary—English speakers put *after all* in the predicate to serve as a sentence adverb meaning "despite early problems or doubts."

Conjunctive Adverbs

English speakers also put *after all* in front of a clause to introduce evidence to support what they have just said. Thus, *after all* can serve as a conjunctive adverbial phrase. Conjunctive adverbial elements help you achieve coherence in your writing. (To cohere means to stick together as a unit.) Conjunctive adverbial elements tell your reader how your ideas are interconnected.

In [Meanwhile, Back at the Ranch...](#),⁶ I provided a list of common conjunctive adverbs and adverbial phrases, along with their meanings. Several readers have told me how much they appreciated this list. I suggest that you build your own list. Whenever Word flags a conjunctive adverb or adverbial phrase, look it up, think about its meaning, and add it to your own list.

Contractions

Some grammar checkers flag all contractions (eg, *don't* for *do not*). I actually prefer to use the contractions that involve the word *not* (eg, *don't*, *couldn't*, *shouldn't*, *wouldn't*). Even someone with minimal English proficiency knows what these contractions mean. Yet even native English speakers can skip over the word *not*, thus misreading the sentence. A negation that is built into the verb by the contraction is nearly impossible to overlook. Nevertheless, I avoid most other contractions (eg, *I've*, *would've*, *I'd*) because they don't improve clarity. Fortunately, Word ignores the *not* contractions. Thus, I decline Word's offer to ignore contractions.

HOW WORD CAN HELP YOU SPOT WHAT ITS GRAMMAR CHECKER MISSES

Word's grammar checker is surprisingly good at parsing

sentences and at looking words up in lists. Thus, it can usually identify the subject and the finite verb of a clause and check whether they agree in number. Likewise, it is good at flagging words that are commonly misused. However, Word has no way of knowing what you meant to say, whether you said what you meant, or whether a reader can figure out what you meant. In particular, Word cannot spot unclear pronoun referents (see *Who Are We? When Is Now? Where Is Here?*⁷) and misplaced or dangling participial phrases (see *Watch Out for -ing!*⁸).

To catch what the spell checkers and grammar checkers miss, I use some of Word's other features. In particular, I wrote 2 useful macros that I added to my Quick Access toolbar. One highlights all numerals and words that represent numbers (eg, *two* and *million*) in green. I can then remove the highlighting from each number after I check it for accuracy and style (eg, using 2 vs *two*). The other highlights all personal pronouns (eg, *I*, *you*, *he*, *she*, *it*, *we*, *they*), relative pronouns (eg, *that*, *which*), and possessive adjectives (eg, *my*, *our*), as well as the word endings of participles (eg, *-ing* and *-ed*) in turquoise. Then, I check to see whether the pronouns have clear referents and whether the participles and participial phrases are misplaced or dangling.

You can write your own version of these macros by clicking on View, Macros, Record Macro, and then searching for characters or character strings, replacing them with highlighting applied, and selecting replace all. To add a macro to the Quick Access toolbar, click on the dropdown arrow at the right-hand edge of the toolbar and select More Commands, Macros. After you have added a macro to the Quick Access toolbar, click on Modify to adjust its display name and give it a special icon.

Word does not know what you meant to say. Its spell checker will ignore most instances where you used the wrong word—as long as the word you wrote is in its dictionary. Likewise, its grammar checker will ignore most

instances where you used the wrong word or said something that you did not mean—as long as the sentence is grammatical. To spot those problems, I use Word's Read Aloud feature, which I also added to my Quick Access toolbar. As you listen, the wrong word (eg, *pubic* when you meant *public*) may just grate on your ear.

CONCLUSION

Word's grammar checking feature is often irritating, but its occasional good catch is invaluable. The same goes for other grammar checkers that I have used. To make proper use of them, you need to know enough about grammar to evaluate their advice. Meanwhile, Word has some other features that can help you spot problems that no grammar checker can spot.

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SCIENCE SERIES

Section Editor's Note

Naomi Bishop, MD / Independent Medical Writer and Editor, New York, NY

As far back as the Ancient Egyptians, healers have sought medicinals to alleviate human suffering and restore well-being. Today that pursuit is stronger than ever. Propelled by the drive to be first, a deeper understanding of pharmacology, advances in manufacturing technology, and super-sized research and development budgets, pharmaceutical companies and their scientists have repurposed existing drugs and introduced new ones to an ever-expanding and welcoming consumer audience; some—like the messenger RNA vaccines—at breakneck speeds. Parallel advances in communication, most notably social media, have added jet fuel to this booming enterprise. Although the benefits cannot be overstated, the unprecedented pace and fanfare with which “miracle drugs” burst onto the scene highlights a widening gap between scientific evidence and public perception and raises concerns in the skeptics among us about the commercializing of science at the public’s expense. Therefore, I’ve chosen to curate a series of articles for the Science Series that demonstrate the increasingly blurred lines separating science reporting from sponsor-generated marketing in the public eye and to explore a theme highly relevant to medical communicators: separating the hope from the hype surrounding the current revolution in drug development. The first 2 articles are presented here, with additional ones to appear in subsequent issues. Each piece sets out to reflect on the science communicator’s imperative to help readers distinguish genuine therapeutic advances from inflated promises.

The idea for this collection came to me during the peak of the Ozempic media campaign. The meteoric rise in popularity of the glucagon-like peptide-1 receptor agonist drugs convinced me that the scientific information landscape had radically changed and our responsibility as medical communicators would have to respond in turn. Heralded as the magic bullets that would decisively end the metabolic disease epidemic, the antiobesity drugs epitomized the promise and pitfalls of modern pharmaceutical development. Overnight, the classical approach to weight loss of diet and exercise was

dismissed; the American dream of an instant fix for our most vexing chronic disease had come true. Or had it?

As the groundswell of demand rapidly overwhelmed existing supply chains, a black market of non-Food and Drug Administration-approved alternatives of variable quality and with limited clinical support quickly materialized to accommodate new consumers. Reports of muscle loss increasing the fall risk in older people; severe gastrointestinal distress, vomiting, and dehydration; intestinal obstruction; and loss of interest in food and other pleasures began to surface, although muffled by the clamor of the converted.

Still, beneath all the hype, a newfound appreciation of obesity as a chronic disease affecting more than 40% of the US population emerged, along with a class of drugs that offered hope to the more than 120 million people at risk for obesity-related comorbidities—provided they can afford the astronomical out-of-pocket costs.

Since their introduction, new indications and unanticipated risks and benefits of the incretin-based drugs continue to emerge. But, as readers will see in the second article on the origins of the opiate crisis, the balance between beneficence and corporate greed is dictated by who is holding the scale.

As we enter an era in which pharmaceutical companies, technology giants, political ideologies, and financial interests are bound to shape the discourse, our role as educators and purveyors of trustworthy scientific information will be even more central. We will need to stay vigilant and informed, rail against an ethical climate in which facts are subject to interpretation, and tread cautiously within an information landscape lean on evidence and dominated by hallucinating artificial intelligence models. Fasten your seatbelts.

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SCIENCE SERIES

Incretin Drug Revolution: The Challenges of Hope

Alicia Racelis, PhD / Contract Health Editor at WebMD, Fayetteville, GA

ABSTRACT

Over 800 million people worldwide meet the criteria for obesity, highlighting the need for safe and effective treatments. Recent advances reshaped the paradigm of adipose as an organ that regulates hunger, satiety, insulin sensitivity, and inflammation. Clinical obesity is a chronic condition linked to excess visceral adipose in which the health risk has already manifested. This definition reflects our understanding of obesity, rather than relating it to body size, weight-based conditions, or elevated body mass index. Clinical guidelines recommend pharmacotherapy for children and adults meeting the criteria for obesity. Because few independent diverse trials compare obesity drugs, doctors must resort to trial-and-error to predict usefulness. And the lack of diversity may impact drug safety for at-risk populations. For example, Black and Hispanic adults are at the highest risk for obesity, but few participated in drug trials. The discovery of incretins led to incretin-based hormone drugs that bind glucagon-like peptide-1 or glucose-dependent insulinotropic polypeptide receptors. The media attention around these repurposed type 2 diabetes drugs brings hope for obesity treatment in clinical practice. Manufacturers market incretin drugs as a panacea for neurological, metabolic, and cardiovascular conditions. Filling a unique therapeutic gap between lifestyle modification and bariatric surgery, incretin drugs may help some people. Yet, with any medication, balancing benefits and risks optimizes health. Thus, long-term safety studies comparing incretin drugs in a diverse population are needed for the development of safe and effective treatments. Understanding the health benefits after bariatric surgery, drug therapy, and combination therapy may help guide future clinical practice.

A magical remedy to control human metabolism has evaded scientists for over 130 years. Since the nineteenth century, manufacturers have sold various weight-lowering tonics, banned from sale because of safety issues. As the philosopher Santayana said, “Those who cannot remember the past are condemned to repeat it.” And predictably, without understanding the underlying cause for adipose dysfunction or correcting past clinical trial design flaws, manufacturers continue to develop risky treatments for obesity—a controversial word defined by the Centers for Disease Control and Prevention (CDC) as a body mass index (BMI) of 30 or more. Since the US Food and Drug Administration (FDA) began regulating drugs in 1938, manufacturers have failed to produce safe and effective medicines to regulate metabolism.¹ Amphetamines and sympathomimetic drugs led to abuse, cardiac damage, suicidality, cancer, and even death (Figure 1).² With over 800 million people worldwide meeting criteria for obesity, the need for safe treatments led to the discovery of incretins.

Incretin drugs include glucagon-like peptide-1 (GLP-1) receptor agonists (RAs) and dual-acting therapies that bind GLP-1 and glucose-dependent insulinotropic polypeptide (GIP) receptors. Recent media campaigns focus attention on these repurposed therapies, bringing hope for clinical obesity treatment. These incretin drugs improve glycemic control and lower total body weight up to 20%,

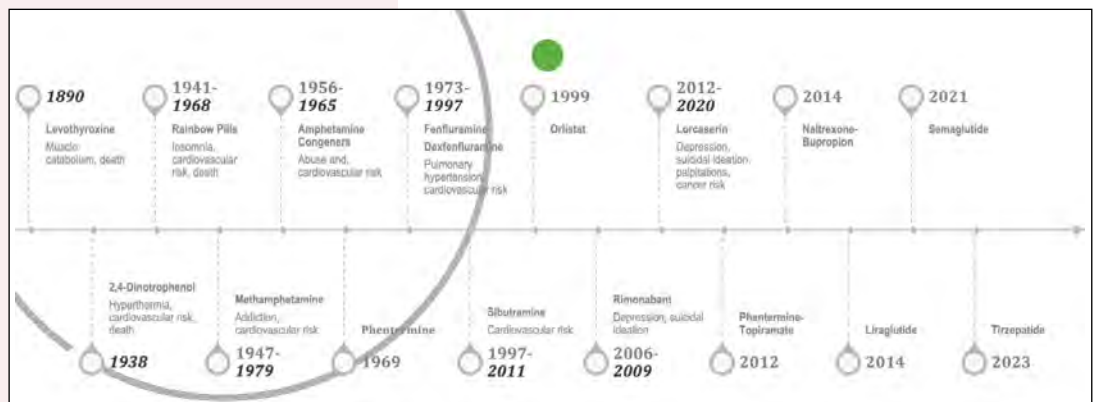


Figure 1. Timeline for FDA regulation of drugs treating clinical obesity.² Bold italicized dates signify the year of removal. FDA, US Food and Drug Administration.

but questions remain.³ As medical writers, sorting fact from misinformation preserves data integrity and conveys related health risks. Although one must acknowledge the role that incretin therapies play in balancing human metabolism, conclusions must be drawn with caution. Contrary to news reports, this article points out some critical issues regarding obesity clinical trials and raises concerns about the side effects and long-term safety of incretin drugs.

DEFINING DISEASE: CLINICAL TRIALS FOR OBESITY

The World Health Organization defines obesity as uncontrolled adipose accumulation that impairs health. About 42% of US adults meet criteria for obesity, and the child and adolescent rate has almost quadrupled since 1990.^{4,5} Despite a century of continued investigation, our understanding of obesity as a chronic disease is not shared across scientific, public health, or political fields. Without common symptoms or diagnostic biomarkers, identifying the underlying cause for adipose dysfunction remains difficult. The controversy about obesity influences social stigma, clinical practice, public health policy, and more. Evidence demonstrating that individuals with elevated BMI can be metabolically healthy contributes to the confusion.⁶

Defining clinical obesity as a higher visceral mass associated with an existing metabolic dysfunction reflects our current understanding of the adipose organ.^{7,8} This definition links visceral adipose mass to metabolic health rather than body size, weight-based conditions, or elevated BMI. Intra-abdominal distribution of visceral adipose causes chronic low-grade inflammation, hypertrophy, and fibrosis with increased health risks (Figure 2).⁴

In 2023, the American Medical Association (AMA) recognized that using BMI as the only defining characteristic for obesity can racially exclude and harm certain individuals.⁹ Although imaging modalities more precisely calculate adipose distribution, the low cost and ease of application keeps BMI in use. Variations in body shape, bone mass, genetics, and waist circumference can alter the risk estimate.⁸ For example, BMI fails to identify sarcopenic obesity, a loss of muscle mass in the presence of clinical obesity. To resolve this, the AMA recommends combining BMI with other indices.⁹ However, obesity clinical trials and population studies continue to use BMI.

In the past 40 years, the obesity pandemic patterns have changed. Interestingly, recent urbanization has shifted the obesity prevalence to least-developed countries. The influx of unprocessed, high-calorie foods and other common drivers may contribute to the rising rates.¹⁰ In children, developmental factors affecting weight can disrupt the balance of energy intake and expenditure. These broad environmental, preconception, and prenatal exposures are risk factors for obesity with consequences into adulthood.⁵ In adults, complex interconnected risk factors influence weight:¹⁰

- Biological
- Social
- Food industry influences
- Physical safety
- Lived experiences

Evidence shows a higher risk of developing obesity for youth living in lower social strata or exposed to inequalities.⁵ Similarly, racial and ethnic disparities exist in the prevalence

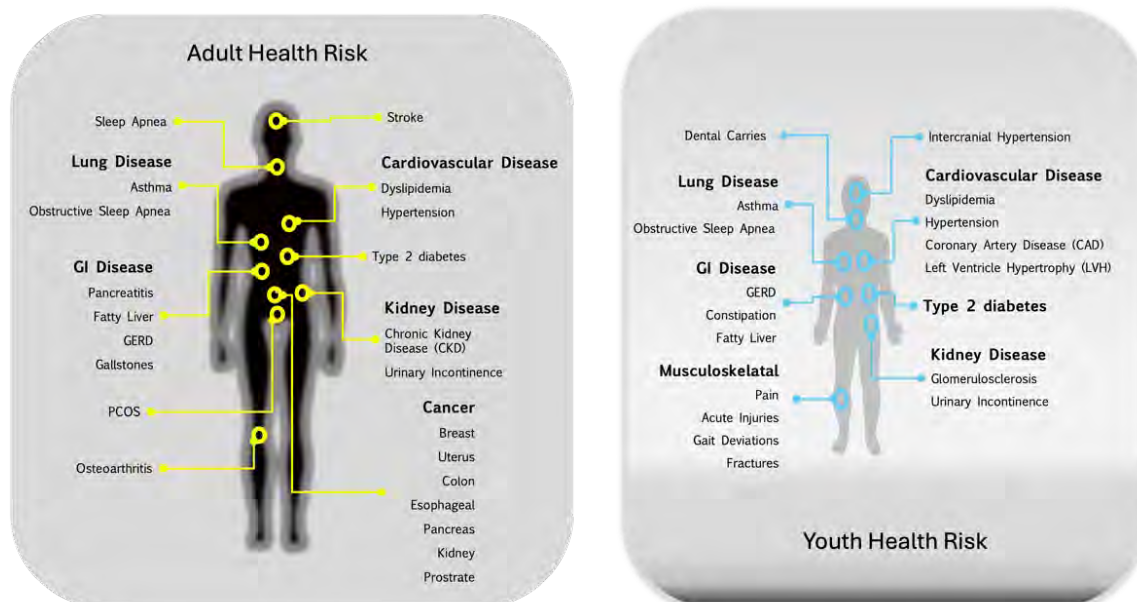


Figure 2. Health risks related to clinical obesity.^{4,5} Adult is defined as age ≥ 20 years, and youth is defined as age 2-19 years. GERD, gastroesophageal reflux disease; GI, gastrointestinal; PCOS, polycystic ovarian syndrome.

for obesity in the United States (Figure 3). The increased prevalence of obesity in Black and Hispanic adults underscores the need for diversity in obesity clinical trials.

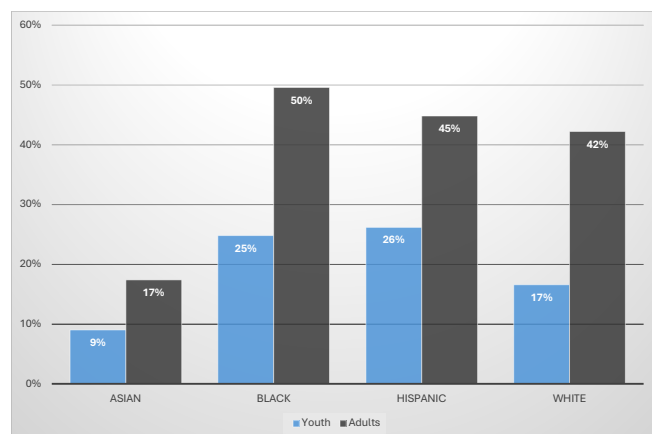


Figure 3. US racial and ethnic differences in the prevalence of adults with BMI ≥ 30 and youth greater than the ninety-fifth percentile.^{11,12} Adults are defined as age ≥ 20 years, and youth are defined as age 2-19 years. BMI, body mass index.

Lack of Diversity in Clinical Trials for Obesity

Clinical trials for obesity should accurately reflect the characteristics of the disease population.¹³ But a recent meta-analysis revealed that obesity clinical trial participants comprised of 74% White adults, mainly women (Table 1).¹³ In the United States, the CDC reports the highest risk for obesity in Black (50%) and Hispanic (45%) adults, but only 18% Black and 19% Hispanic adults participated in the drug trials.¹³ This lack of diversity during obesity drug testing creates a gap in understanding the risks and benefits of obesity therapies for diverse populations. Future studies aim to increase diversity by decentralizing clinical trial centers. But some of the difficulty surrounding diversity in testing is the need for clear guidance in clinical obesity care.

GUIDING CLINICAL CARE FOR OBESITY

Evidence suggests that lifestyle modification and physical activity remain cornerstones for optimizing health but only provide minimal reductions in weight. Using these data, all guidelines suggest pharmacotherapy for adults who are not pregnant and have a BMI ≥ 27 in the presence of a weight-related condition or a BMI of ≥ 30 .¹⁴ Similarly, the American Academy of Pediatrics recommends pharmacotherapy for children 8 years and older who meet criteria for obesity.¹¹

The latest clinical guidelines for individuals with obesity tether lifestyle modification to all pharmacotherapy treatment, tailoring therapy to each individual.¹⁴ Thus, for treatment optimization, clinicians need a wide range of effective and safe medications for obesity.¹⁵ Because a large body of evidence suggests that weight reductions between 10%

and 15% improves cardiometabolic health, guidelines aim for reductions of $\geq 10\%$.⁴ Yet before 2021, most clinical trial participants reported obesity drug inefficacy rates ranging from 59% to 80% (Figure 5). As an alternative, bariatric surgery became a standard obesity option as part of a flexible care approach. For some patients, bariatric surgery remains a viable long-term solution, improving glucose and lipid levels.⁴ However, postsurgical complications combined with facility and specialist requirements limit widespread use.

The success of individualized obesity care plans depends on identifying individuals for treatment and applying the correct therapy at the right time. Health care providers remember the past and remain vigilant when prescribing new obesity drugs. However, media attention drives the demand for incretin drugs, highlighting drug claims of lowered glycemic index, cardiovascular risk, and weight loss of 20% or more.¹⁶ Although incretin therapies may fill the therapeutic gap between lifestyle modification and surgery, balancing health benefits with risks remains important when choosing drug treatment.

Approved Long-Term Pharmacotherapies for Clinical Obesity

In the United States, 6 long-term drugs treat clinical obesity, mainly targeting weight loss (Table 1). Like any treatment, balancing health benefits with risk helps optimize care. Yet without robust, independent clinical trials comparing treatments, doctors typically use trial-and-error when prescribing obesity drugs. Another common practice is off-label use of low-cost therapies. For example, phentermine and topiramate are 2 of the most used drugs in pediatrics. Although phentermine is approved for short-term weight loss in children, topiramate is not. But phentermine with topiramate (Phen/Top) is approved for long-term weight loss in patients 12 years and older. Topiramate, an antiepileptic drug, can affect cognition, sleep, and memory; because of carbonic anhydrase inhibition, the compound also increases risk of taste alteration, metabolic acidosis, and nephrolithiasis. Topiramate has teratogenic effects and can cause fetal harm. As an alternative, the FDA approved naloxone with bupropion (Nal/Bu) for use in adults. Nal/Bu may elevate blood pressure and increase risk of hepatotoxicity or suicidal ideation.

Comparing Long-Term Therapies for Weight Loss

One review of 28 random controlled trials included orlistat, Phen/Top, Nal/Bu, and liraglutide. Interestingly, the study showed that clinical trial participants reported the most success using Phen/Top (75% efficacy) compared with orlistat (44%), Nal/Bu (55%), or liraglutide (63%).¹⁸ More recently, a systematic review and meta-analysis was

Table 1. FDA-Approved Drugs for Clinical Obesity Treatment^{11,16,17}

Drug Name	Brand Name	Usage, y	Dosage	Clinical Trial Demographics
Orlistat	Alli (OTC); Xenical	≥12	Capsule: Alli, 60 mg; Xenical, 120 mg	XENDOS 55% women; mean age, 43 y; average BMI, 37; 71% White adults
Phentermine with topiramate	Qsymia	≥12	Phentermine/topiramate: 3.75 mg/23 mg; 7.5 mg/46 mg; 11.25 mg/69 mg; 15 mg/92 mg	EQUIP 83% women; mean age, 43 y; average BMI, 42; 80% White adults CONQUER 70% women; mean age, 51 y; average BMI, 36; 85% White adults
Naltrexone with bupropion	Contrave (US); Mysimba (EU)	≥18	Naltrexone/bupropion: 8mg/90mg	COR-I 85% women; mean age, 44 y; average BMI 36; 82% White adults COR-II 85% women; mean age, 44 y; average BMI, 36; 83% White adults
Liraglutide	Saxenda	≥12	18 mg dial-a-dose pen delivering customizable doses: 30 at 0.6 mg; 15 at 1.2 mg; 10 at 1.8 mg; 7 at 2.4 mg; 6 at 3 mg	SCALE 78% women; mean age, 45 y; average BMI, 38; 85% White adults
Semaglutide	Wegovy	≥12	Single-use, color-coded pens: teal, 0.25 mg; pink, 0.5 mg; brown, 1mg; blue, 1.7mg; black, 2.4 mg	STEP 1 73% women; mean age, 46 y; average BMI, 38; 75% White adults
Tirzepatide	Zepbound	≥18	Single-use 0.5 mL pen or vial, comes in doses: 2.5 mg; 5 mg; 7.5 mg; 10 mg; 12.5 mg; 15 mg	SURMOUNT-1 67.5% women; mean age, 45 y; average BMI, 38; 70% White adults

BMI, body mass index; COR-I, Contrave Obesity Research I; COR-II, Contrave Obesity Research II; EU, European Union; FDA, US Food and Drug Administration; OTC, over the counter; SCALE, Satiety and Clinical Adiposity Liraglutide Evidence; STEP 1, Semaglutide Treatment Effect in People with Obesity; XENDOS, Xenical in the Prevention of Diabetes in Obese Subjects.

performed using 53 clinical trials for obesity drugs. The findings showed that tirzepatide effectively reduced waist circumference by 6.77 cm compared with semaglutide (3.74 cm) and liraglutide (2.30 cm).¹⁹ In a subanalysis, semaglutide was the only incretin drug to effectively reduce low-density lipoprotein and total cholesterol yet showed the highest discontinuation rate because of gastrointestinal (GI) events. In fact, safety concerns for the incretin drugs are warranted at higher doses. Except for orlistat, a local-acting lipase inhibitor, all obesity therapies act by increasing norepinephrine to decrease appetite. Understanding neuroendocrine signals that regulate hunger helps elucidate related health risks for these drugs.

Pharmacotherapies: Balancing Appetite

Two opposing types of neurons in the hypothalamus balance energy intake to control appetite. The agouti-related peptide/neuropeptide Y (AgRP/NPY) neurons constantly co-release γ -aminobutyric acid (GABA) and NPY peptides to lower sympathetic activity, turning on appetite (Figure 4). Once food enters the stomach, the gut releases incretins and adipose releases leptin, slowing intestinal motility to prolong satiety.²⁰ The opposing pro-opiomelanocortin/cocaine-

amphetamine-related transcript (POMC/CART) neurons receive these gut signals to enhance sympathetic release of norepinephrine, turning off appetite. Many pharmacotherapies for weight loss increase sympathetic activity and norepinephrine to turn off appetite.

GABA-modulating drugs like topiramate increase the brain's sympathetic activity to lower appetite. But sympathomimetic drugs like phentermine stimulate sympathetic release of norepinephrine to lower appetite.¹⁶ Bupropion and naltrexone also stimulate sympathetic activity but directly activate POMC/CART neurons to diminish hunger. Interestingly, naltrexone acts as a long-acting opioid antagonist to change the brain's response to food by altering the dopamine-reward system.¹⁶ Incretin drugs mimic the actions of GLP-1 and GIP that stimulate glucose-dependent increases in insulin, slow gastric emptying, and extend satiety to lower appetite. Although GLP-1 RAs suppress pancreatic-glucose-dependent release of glucagon, GIP receptor agonists stimulate it.¹⁵ But the low permeability of incretin drugs likely prevent access through the blood-brain barrier. Supporting this, studies indicate that incretin drugs signal the hypothalamus via the dorsal vagal complex, which may explain the negative side effects like nausea and vomiting.¹⁵

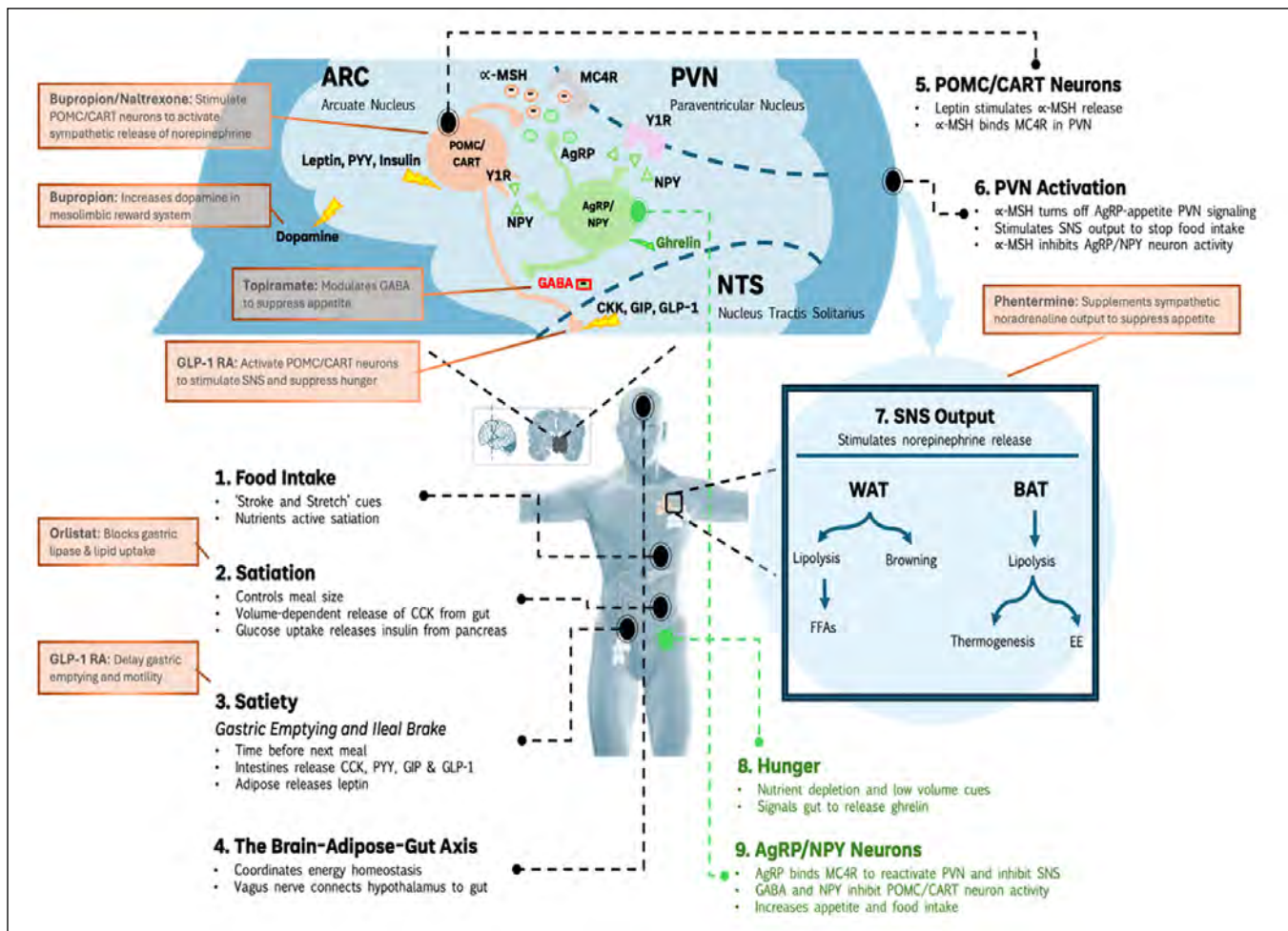


Figure 4. Pharmaceutical action to extend satiety for energy homeostasis.²⁰ α -MSH, α -melanocortin stimulating hormone; AgRP/NPY, agouti-related peptide/neuropeptide Y; ARC, arcuate nucleus; BAT, brown adipose tissue; CCK, cholecystokinin; EE, energy expenditure; FFAs, free fatty acids; GABA, γ -aminobutyric acid; GLP-1 RA, glucagon-like peptide-1 receptor agonist drugs including tirzepatide; MC4R, melanocortin 4 receptor; POMC/CART, pro-opiomelanocortin/cocaine-amphetamine-related transcript; PYY, peptide YY; SNS, sympathetic nervous system; WAT, white adipose tissue; Y1R, NPY 1 receptor.

The Incretin Drug Revolution

Incretin drugs are not new. Liraglutide debuted a decade ago, but the drug was not as effective compared with the more recent incretin drugs. The dose required to treat obesity is almost twice that for glucose management in type 2 diabetes. During the Satiety and Clinical Adiposity Liraglutide Evidence trials, liraglutide reduced total body weight by 6.1%.²¹ Liraglutide did not receive much publicity with high discontinuation rates, GI side effects, and cancer risk. To improve safety and effectiveness, the manufacturer of liraglutide set out to find a compound with a longer half-life.

Researchers discovered semaglutide, extending the half-life to 168 hours. During the Semaglutide Treatment Effect in People with Obesity trials, this compound improved cardiometabolic health and reduced weight by 12.6% (Figure 5).²¹ But similar to

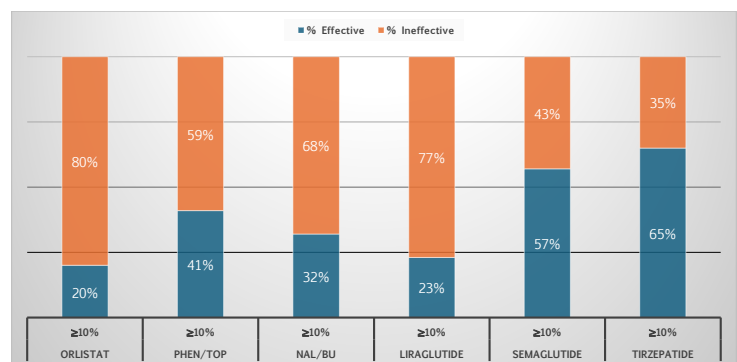


Figure 5. Percent of individuals experiencing $\geq 10\%$ weight reduction from drug treatment during clinical trial testing.^{17,21} Nal/Bu, naltrexone with bupropion.

other incretin therapies, almost 40% of trial participants reported nausea, 70% experienced GI disorders, and almost 10% discontinued the drug.¹⁵

The newest incretin drug, tirzepatide, binds GLP-1 and GIP receptors in the gut.¹⁶ This dual-acting drug has been the most

successful incretin therapy thus far, with 62% of participants having $\geq 15\%$ weight reduction, and more than half having $\geq 20\%$ weight reduction (Figure 6). However, about a quarter of participants discontinue treatment because of GI symptoms.²² It has been shown that incretin therapies remain ineffective for about 20% of individuals.²³ Some patients require dose adjustments, therapy changes, or surgery to reach weight goals. Although there are several known benefits for incretin therapies, several challenges remain.

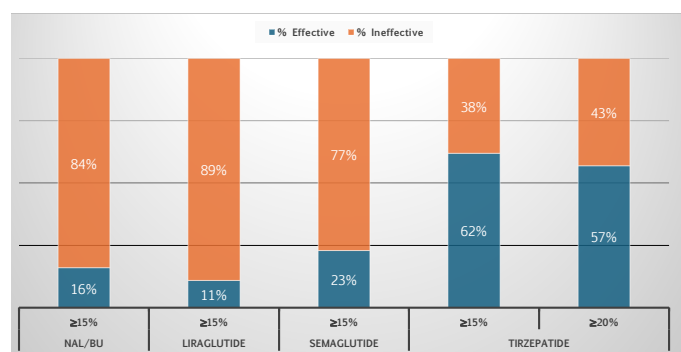


Figure 6. Percent of individuals experiencing $\geq 15\%$ or $\geq 20\%$ weight reduction from drug treatment during clinical trial testing.^{17,21} Nal/Bu, naltrexone with bupropion.

Challenges of Incretin Therapy: Shifting Satiety

The incretin drug revolution brings hope for treating obesity and many weight-related conditions. However, sympathetic-extension of satiety may increase long-term risks for chronic disease, including risk for renal disorders and thyroid cancer.¹⁶ The brain's default hunger state may support long-term health, fueling cellular activity through fatty acid metabolism. In contrast, incretin drugs shift the metabolic state to satiety, forcing the brain and other tissues to rely on glucose.²⁴ Although the consequences of this shift are unclear, sympathomimetic and incretin drugs increase risk for hypertension, glaucoma, and heart rate (Table 2).^{25,26}

Incretin drugs may also come with increased risk for anxiety. One study linked chronic activation of AgRP/NPY neurons with increased anxiety and colitis.²⁷ Supporting this, some individuals taking incretin drugs report increased anhedonia and suicidality.¹⁵ Other challenges of incretin drugs are linked to gastric emptying and include ileus, gastroparesis, and decreased drug absorption.^{28,29}

Another complicating issue includes the plateau effect. Over time, increased incretin drug dosing

Table 2. Comparison of Mean Heart Rate Increases for Obesity Drugs^{25,26}

Drug	Beats Per Minute
Phen/Top	0.6-1.6
Semaglutide	1-2
Liraglutide	3-8
Tirzepatide	3-6
Nal/Bu	0.9-1.2

Nal/Bu, naltrexone with bupropion; Phen/Top, phentermine with topiramate.

may no longer decrease net body mass. This effect has been reported by individuals taking semaglutide and highlights lifestyle modifications as an important part of overall treatment.¹⁵ Using incretin therapies requires a life-long commitment because health gains disappear with discontinuation. Some studies report up to two-thirds of the original weight returns after discontinuation.²⁹

LOOKING AHEAD

In summary, incretin therapies bring a dynamic phase in drug development for treating obesity. These drugs lower glycemic index, reduce cardiovascular risk, and may benefit liver and neurodegenerative conditions. However, the health risks of prolonged satiety states to cardiac, renal, and other tissues remain unclear. Incretin drugs have been linked to increased risk for thyroid cancer, suicidality, and elevated heart rate. These medication side effects must be balanced with health benefits and cost, which factor heavily into optimizing individualized clinical obesity treatment plans. Given the limited number of high-quality randomized trials comparing obesity drugs, doctors must resort to trial-and-error to predict usefulness. In addition, long-term safety studies in diverse populations are needed to better understand incretin drug effects on growth and development. By 2030, more than 8.5 billion people are estimated to meet criteria for obesity worldwide.¹⁰ Now more than ever, learning from past mistakes can help improve the quality of clinical obesity care. It is crucial to determine the risks and long-term health benefits of bariatric surgery, drug therapy, and combination treatments to help guide future clinical practice.

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SCIENCE SERIES

Treating Pain: The Unintended Journey From Relief to Desperation

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ABSTRACT

Opioids have been integral to pain management since ancient times. The isolation of morphine marked a significant medical advancement in pain treatment but also revealed its addictive properties. Despite regulatory efforts, synthetic opioids like heroin emerged, leading to increased addiction. In the late twentieth century, the US Food and Drug Administration (FDA) approval of opioid painkillers gave hope to many patients with chronic non-cancer pain. However, aggressive marketing practices of pharmaceutical companies that downplayed addiction risks, coupled with increased medical prescriptions, drove widespread misuse and the opioid epidemic, impacting both patients with legitimate medical needs and those who turned to illicit sources as prescriptions ended. Synthetic opioids like fentanyl, far more potent and fast-acting than heroin, became major contributors to overdose fatalities, underscoring the need for comprehensive pain management that minimizes addiction risks while providing adequate analgesia for those suffering from chronic pain. To address the opioid epidemic and save lives, we must reinforce policies on preventing opioid misuse, introduce comprehensive educational programs for both health care providers and the public, and support those affected by addiction.

EARLY USES OF OPIOIDS

Opioids are a class of drugs whose origins can be traced back more than 3,000 years. The use of opioids began in ancient civilizations, where the opium poppy (*Papaver somniferum*, from Latin *papāver* meaning poppy; *somni* meaning sleep and *ferre* meaning to bring) was used for its medicinal and psychoactive properties. Ancient Egyptian medical texts reference the use of opium for pain relief and to induce sleep. Similarly, the Minoans of Crete recognized the euphoric effects of opium, as evidenced by artifacts depicting the opium poppy. Greeks and Romans employed it for various ailments, including headaches and coughs.¹ In these early societies, opium was highly valued for its dual ability to alleviate pain and induce pleasure, a combination that ensured its continued use across millennia.

DEVELOPMENT OF OPIATES AND SYNTHETICS

In the early 1800s, there was a significantly expanded use of opioids with the isolation of morphine, a potent analgesic derived from opium. Morphine quickly became a staple in medical practice, particularly for pain management during the American Civil War. In this period, heroin, the acetylated form of morphine, marked the era of synthetic opioids.² It soon became evident that these opium derivatives have addictive properties, leading the United States to restrict opium imports for medical purposes only. In 1912, the United States and other nations signed the International Opium Convention, which regulated the import, manufacture, and sale of morphine.³ By the 1920s, the Heroin Act prohibited heroin's manufacture, importation, and even medical use.⁴ However, these measures did not stop opioids from being produced by design or serendipitously (Table 1). The 1970s saw the development and marketing of additional opioids, such as oxycodone and hydrocodone, intended for acute and cancer pain relief.

Table 1. Classification of Opioids by Synthetic Process⁵

Natural Compounds	Semisynthetic Compounds	Synthetic Compounds
Morphine	Diamorphine (heroin)	Pethidine
Codeine	Dihydromorphone	Fentanyl
Thebaine	Buprenorphine	Methadone
Papaverine	Oxycodone	Alfentanil
		Remifentanil
		Tapentadol

Hope for Treating Pain

At first, opioid medications were prescribed strictly for acute pain due to injury or surgery or severe pain related to cancer or terminal illnesses. Physicians were reluctant to prescribe opioids for other conditions because there was a concern for addiction. Additionally, physicians were legally constrained from prescribing opioids more liberally because of the imminent risk of investigation and potential disciplinary action by state medical boards.⁷ However, in 1986, Portenoy et al⁶ reported in their study that comprised only 38 patients

that opioid pain relievers could be safely prescribed for chronic pain on a long-term basis. The medical community ignored potential misleading study design flaws, such as the incredibly small sample size, a lack of clearly stated selection criteria, or a control group of patients on nonopioid drugs. Although some patients needed an increase in the treatment dose, the implications of developing tolerance were not fully addressed during the study. Nevertheless, this case series provided a stepping stone to the gradual expansion of opioid use in the 1980s, culminating in a 1996 consensus statement by the American Academy of Pain Medicine and the American Pain Society, which endorsed opioids for chronic noncancer pain.⁷ Somehow, thousands of years of human knowledge related to opioids and their side effects were underestimated. Many states passed Intractable Pain Acts, removing physician restrictions on prescribing opioids,⁸ bringing hope to many patients seeking relief from chronic pain.

OPIOID HYPE

The aggressive marketing of opioid painkillers to health care providers and patients began with the US FDA approval of oxycontin produced by Purdue Pharma LP in 1995.^{9,10} The company downplayed the addictive nature of opioids, promoting them as safe and effective for chronic pain management, repetitively citing 2 reputable medical journals. Porter et al¹¹ in the *New England Journal of Medicine* revealed minimal addiction in 11,882 opioid-treated patients, and Perry et al¹² in *Pain* showed no addiction among 10,000 burn patients experiencing acute pain but failed to address the addiction risk when opioids were used long-term for chronic pain.

Purdue Pharma LP executed a well-planned, aggressive campaign strategy, funding over 20,000 pain-related educational programs and providing financial support for organizations like the American Pain Society, the American Academy of Pain Medicine, the Federation of State Medical Boards, the Joint Commission, pain patient groups, and other organizations,¹³ which subsequently advocated for more aggressive pain management. In 1995, the president of the American Pain Society introduced pain as “the fifth vital sign,” urging health care professionals to assess pain with the same importance as other vital signs and to use opioids for chronic pain.¹⁴ Shortly after, the Veterans Affairs health system and the Joint Commission (the entity that accredits hospitals and health care organizations) adopted the concept of chronic pain opioid relievers. The American Pain Society and the American Academy of Pain Medicine issued a consensus statement endorsing opioid use for chronic pain,⁷ claiming that addiction risk was low, respiratory depression was brief, and concerns about drug abuse should not limit

prescribing. These combined efforts significantly influenced the widespread acceptance of opioids, causing the rate of opioid use to accelerate rapidly.¹⁵

In the years that followed, pharmaceutical companies adopted Purdue Pharma LP's strategy, investing heavily in influencing prescribing practices through extensive marketing efforts to clinicians and patients, with annual spending exceeding \$25 billion in recent years.¹⁶ Over the past 2 decades, nearly all major pharmaceutical companies have faced settlements for off-label promotions, largely because of violations of the False Claims Act (Table 2). In particular, aggressive downplaying of drug risks and the promotion of unapproved uses have been well documented in opioid-related settlements.¹⁷ Despite public scrutiny and legal actions, pharmaceutical companies continued to market heavily to clinicians, totaling nearly \$2 billion annually.¹⁸ Recent court cases have questioned the enforcement of the Food, Drug, and Cosmetic Act's requirements for demonstrating safety and efficacy in off-label promotions.

Opioid Crisis

Labeling pain as the “fifth vital sign”¹⁴ led to a substantial increase in pain surveillance during hospital stays. Consequently, the use of opioids rose rapidly. Despite later revisions and the eventual removal of these guidelines in 2009 because of the evident concerns about excessive treatment,²⁰ the crisis has continued to escalate. The result was a dramatic increase in opioid painkiller prescriptions at unprecedented rates, from 76 million in 1991 to 217 million in 2012 and a decrease to 207 million in 2013.²¹ This surge in prescribing led to widespread misuse and addiction. Although approximately 10% of individuals prescribed opioids develop an addiction, the significant rise in opioid prescriptions has led to greater exposure.²² Patients who initially received opioids for legitimate medical reasons often found themselves dependent on the drugs. When their prescriptions ran out, many turned to illicit sources with more potent and cheaper agents, such as heroin and fentanyl. Although prescription opioids initially drove the crisis, by 2015, deaths from prescribed opioids had plateaued, yet fatalities from illicit synthetics continued to escalate.²³

In recent years, fentanyl and its potent synthetic analogs have become major contributors to the opioid crisis. From 2010 to 2016, fatalities linked to fentanyl and other synthetic opioids increased nearly 6-fold, climbing from 3,007 to over 19,413 deaths.²⁴ Currently, synthetic opioids contribute to twice as many overdose fatalities as prescription opioids. Fentanyl is 50 times stronger than heroin because of its high affinity for opioid receptors and rapid onset of action. Its low production costs make it an attractive option for mixing with heroin, methamphetamine, cocaine, and illegally man-

Table 2. Pharmaceutical Companies Marketing Opioid Products in the United States, 2004-2020

Company Name	Opioids, Brand Name (Generic)	Named in Opioid Litigation
BioDelivery Sciences International	Belbuca (buprenorphine) Bunavail (buprenorphine/naloxone) Onsolis (fentanyl)	2018
Collegium Pharmaceuticals	Xtampza (oxycodone) Nucynta (tapentadol)	2018
Daiichi Sankyo	Roxybond (oxycodone)	2015
Depomed	Roxybond (oxycodone) Lazanda (fentanyl) Nucynta (tapentadol)	2017
Egalet US	Oxaydo (oxycodone) Arymo (morphine)	2019
Endo Pharmaceuticals	Belbuca (buprenorphine) Percocet (oxycodone/acetaminophen) Opana (oxycodone)	2014
Galena Biopharma	Belbuca (buprenorphine) Percocet (oxycodone/acetaminophen) Opana (oxycodone)	2017
Insys Therapeutics	Subsys (fentanyl)	2013
Johnson & Johnson	Duragesic (fentanyl) Nucynta (tapentadol)	2014
Mallinckrodt Pharmaceuticals	Exalgo (hydromorphone) Roxicodone (oxycodone) products	2017
Mylan	Ultiva (remifentanyl)	2017
Pernix Therapeutics Holdings	Zutripo (hydrocodone/chlorpheniramine pseudoephedrine) Rezira (hydrocodone/pseudoephedrine) Vituz (hydrocodone/chlorpheniramine) Zohydro (hydrocodone)	2018
Pfizer	Troxyca (oxycodone/naltrexone)	2018
Purdue Pharma	Oxycontin (oxycodone)	2004
Teva Pharmaceuticals	Actiq (fentanyl) Fentora (fentanyl) Vantrela (hydrocodone)	2014
The Medicines Company	Ionsys (fentanyl)	2019
Zogenix	Zohydro (hydrocodone)	2018

Adapted from Uppal et al.¹⁹

ufactured prescription opioids to increase their potency. Importantly, many heroin users unknowingly consume fentanyl, increasing the likelihood of a fatal interaction. Two milligrams of illicit fentanyl can be lethal, depending on a person's body size, tolerance, and past usage. Analysis has found that 42% of counterfeit pills contain from 0.02 mg to 5.1 mg of fentanyl per tablet.²⁵ Fentanyl enters the brain very rapidly and causes a “rush” of euphoria, pain relief, and sedation, along with lasting respiratory depression and combined effects when mixed with other drugs.²⁶

As if fentanyl was not enough, xylazine appears to be the next emerging threat.^{27,28} Its nonopioid compound is used as a sedative, anesthetic, muscle relaxant, and tranquilizer

for animals, but it is not FDA approved for use in humans. As a strong synthetic $\alpha 2$ -adrenergic agonist, xylazine causes severe central nervous system depressant effects. It has increasingly been found mixed with fentanyl to extend its effects. However, in many cases, users are not aware that xylazine is in their drugs. Although xylazine has long been in the street opioid supply in the US territory of Puerto Rico, it only emerged in Philadelphia in the late 2000s.²⁹ Alarming, overdose deaths involving xylazine rose nearly 20-fold between 2015 and 2020 in all major US regions.³⁰

Mechanism of Addiction

To comprehend the high addictive potential of opioids, it is essential to examine their effects on the human body. Although each opioid has a unique chemical structure, they all function by binding to native opioid receptors in the brain. Normally, the body's endorphins mitigate pain signals. Opioids, however, bind much more robustly and decrease the ability of pain-transmitting neurons to excite for a longer period.³¹ Additionally, when opioids bind to these receptors, they indirectly trigger the release of dopamine, a neurotransmitter associated with pleasure and euphoria. Concurrently, opioids suppress the release of noradrenaline, which normally promotes wakefulness, respiration, digestion, and blood pressure.³² At therapeutic levels, the reduction in noradrenaline caused by opioids can lead to constipation.³³ Higher doses can dangerously lower heart and breathing rates, potentially causing loss of consciousness or even death.³⁴

Over time, the body builds tolerance to opioids by reducing the number of opioid receptors or making the receptors less responsive. To achieve the same dopamine release and mood effects, individuals need to consume progressively larger doses, leading to physical dependence – addiction.³⁵ When a person who is physically dependent on opioids abruptly stops taking them, withdrawal symptoms such as muscle aches, stomach pains, fever, and vomiting occur. Although temporary, opioid withdrawal can cause severe illness for days or even weeks.³⁶ Individuals addicted to opioids often continue using the drugs not to experience a high but to avoid withdrawal sickness. Withdrawal can result in lost wages or an inability to care for oneself. If individuals relapse after a period of abstinence, they are at high risk for overdose because the previously tolerated dose can now be lethal.³⁷

ONGOING IMPACT OF THE OPIOID CRISIS ON COMMUNITIES AND VICTIMS

In June 2024, the Supreme Court overturned an \$8 billion controversial bankruptcy settlement with Purdue Pharma, intended to fund addiction treatment and public health ini-

tatives related to the opioid epidemic all over the country. A key issue was a provision that would have protected the Sackler family, Purdue Pharma's owners, from future lawsuits without fully disclosing all their assets. The court ruled that this legal strategy exceeded the boundaries of the bankruptcy code. Sadly, the decision followed Purdue Pharma's 2007 legal troubles, in which the company paid a \$600 million fine for misleading marketing practices. The settlement proposed \$6 billion from the Sacklers in exchange for protection from future civil liability. Critics argued this would allow the Sacklers to avoid past and future accountability, especially after transferring \$11 billion in profits into private accounts, shielding their wealth from creditors and victims. In addition, they had planned to dissolve and reform the company as Knoa Pharma, a new entity that would focus on producing opioid addiction treatments and overdose reversal medications while continuing to manufacture opioids.

As Purdue Pharma's legal battles unfold, broader efforts to address the opioid crisis have also been advancing, with other major pharmaceutical companies reaching significant settlements to resolve their roles in the epidemic. The 3 largest pharmaceutical distributors, McKesson, Cardinal Health, and AmerisourceBergen, and manufacturer Janssen Pharmaceuticals, Inc., and its parent company Johnson & Johnson (collectively, "J&J") reached nationwide settlements to resolve all opioid litigation brought by states and local political subdivisions in 2021. These national settlements have been finalized, and payments have already begun. The distributors started paying \$21 billion over 18 years, and J&J is paying an additional \$5 billion. In 2022, agreements were reached with 3 pharmacy chains: CVS to pay \$4.90 billion over 10 years, Walgreens to pay \$5.52 billion over 15 years, and Walmart to pay \$2.74 billion in 2023, and all payments were to be made within 6 years. Two additional manufacturers settled—Allergan agreed to pay \$2.02 billion over 7 years, and Teva agreed to pay \$3.34 billion over 13 years and to provide cash in lieu of product, as each state may elect.³⁸

Although funds to states and local governments have begun to be distributed, attention is now focused on ensuring that these resources are effectively used to combat the ongoing public health crisis. Investments in addiction treatment, overdose reversal medications, and other public health measures remain critical, with over 100,000 Americans dying annually from opioid overdoses. The opioid crisis has left significant lessons regarding the dangers of overpromoting and overprescribing medications without fully understanding their long-term consequences. As new weight-loss drugs gain popularity, the medical community and the public must remain informed, evaluating these treatments beyond the initial hype. Only time will

reveal whether the lessons from the opioid tragedy will help prevent history from repeating itself.

Author declaration and disclosures: *The authors note no commercial associations that may pose a conflict of interest in relation to this article.*

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AMWA NEWS

FROM THE PRESIDENT

Starting a New Chapter

Roshawn (Shawn) Watson, PharmD, PhD, BCPS / 2024-2025 AMWA President

Health care is rapidly changing, and the AMWA is primed to help medical communicators meet these needs. The AMWA Board of Directors (BOD) has spent this entire year undergoing a strategic planning initiative. Accordingly, we have been thinking about the DNA of this organization and how to best position our medical communicators to face current and future challenges. The considerations have been all-encompassing; these have included the dynamic business needs due to advances in artificial intelligence (AI), differences in funding and prioritization by governments and private institutions, policy and rule changes that affect our business models, internal and external stakeholder and key opinion leader engagement, upleveling our skill sets and knowledge bases, and micro- and macro-economic considerations.

This strategic realignment has also caused us to look at our programs and educational resources. For instance, AMWA's AI Task Force has conducted an educational resource review of all of AMWA's AI offerings and is releasing a survey to help determine our AI programming needs. Chaired by the incomparable Dr Dominic DeBellis (ACRP-CP, Executive Director, Artificial Intelligence Strategy & Operation Lead, Medical Writing & Disclosure at Merck), the Task Force consists of in-house all-star AI professionals and experts in various organizations and freelancers. This forward-looking group is providing an invaluable service for which we're very grateful.

Another major program under review is our chapters. Chapters represent a member benefit that is so important to many. Chapters are part of the very fabric of the AMWA. They are often how we first experience AMWA. They may help develop our leadership experiences. They expand our networks. They expose us to different areas of medical communication and help us acquire new skills. They allow us to expand our businesses and share resources. In short, chapters make us more.

I'm excited to announce that the AMWA BOD has recently approved a brand-new Chapter Reimagining Task Force. The group is charged to solicit general member feedback and perceptions about the AMWA chapter experience, explore selected models for chapter organization, and provide guidance on more engage-

ment-centric key performance indicators. We recognize that sometimes the administrative burden, programming needs, and in-person meeting requirements, among other things, can sometimes leave things to be desired from the chapter experience. AMWA is dedicated to improving this experience over the next few years and ensuring that the experience becomes equitable across a given region, with greater engagement and more prioritized resourcing. We very much hope to hear from you directly regarding your chapter experience (things that you love and perhaps some opportunities to improve).

I am really thrilled about these changes and all the new programs we have in the pipeline, including new offerings in Regulatory, Publications, Health Communication, and some that I cannot even yet announce. I know that we will indeed usher AMWA into a new level of excellence, give our members unprecedented new exposure and greater opportunities to develop incredible careers and build extensive networks, and train the next generation of medical communicators to meet the incredible medical communication needs.



AMWA NEWS

2025 AMWA Fellows

Loretta Bohn, BA, ELS / Chair, 2025 Member Awards Committee



Rona Claire Grunspan, MD, CPI

Rona Claire Grunspan, MD, CPI, has more than 15 years of experience in medical writing and has gained expertise across diverse document types, phases, and therapeutic areas. As a senior director of early phase medical writing at ICON plc, she leads a global scientific medical writing department specializing in early-phase studies. Her team has authored regulatory writing documents for first-in-human, bioavailability, single ascending dose, multiple ascending dose, human abuse potential, and proof-of-concept studies. Additionally, she actively supports department-level process improvement initiatives at ICON plc.

Grunspan joined AMWA in 2007. A member of the Mid-America Chapter, she has been a membership chair, president (for 7 years), and a chapter delegate. She was a member of the Value of Medical Writing Workgroup and Apprenticeship Workgroup. She has contributed roundtables and posters to the annual conference and has written 3 *AMWA Journal* articles. Grunspan says that AMWA has helped her establish meaningful connections within the medical writing community.



Haifa Kassis, MD

Haifa Kassis, MD, is a freelance medical writer with extensive experience with crafting continuing medical education (CME)/continuing education (CE) for health care professionals. Originally trained as a physician and neuroscientist, Kassis transitioned into medical writing in 2017, a few months after joining AMWA. Since then, she has helped many education providers plan, obtain funding for, and execute CME/CE programs in a wide variety of therapeutic areas. She also writes regularly on practice management for *Clinical Practice Today*, a Duke Medicine publication.

At the chapter level, Kassis has served as president, program director, and chapter advisory council representative for the New England Chapter. Nationally, she joined the *AMWA Journal* editorial board in 2019, most recently serving as section editor for the CE Craft Corner and previously as editor-at-large. She is a member of the Nominating Committee and the Education Specialty Area Subcommittee. Kassis has presented educational sessions, a roundtable discussion, and posters related to CME writing at annual conferences. She also recently coauthored a competency model specifically designed for training the next generation of CME writers. Kassis says, "I am eternally grateful to AMWA and its members for welcoming me into the profession. You've truly made the world a better place for me with your kindness and generosity!"



Thomas M. Schindler, PhD

Thomas M. Schindler, PhD, started his journey in medical writing in 1994 after completing doctoral and postdoctoral study in biology (molecular physiology) and the equivalent of a master's degree in linguistics. He first worked as an editor for life science books, on topics from biology to mathematics. Schindler then moved to regulatory medical writing, first for a contract research organization and later for the European headquarters of a Japanese pharmaceutical company, writing scientific publications and developing presentations and writing study reports for clinical trials. Thereafter he moved to Boehringer Ingelheim, where he founded and led the regulatory medical writing group, starting alone and growing the function to about 40 group members over 20 years. Schindler now works for BioNTech SE, best known as a COVID vaccine company, as director of global regulatory affairs, serving as the expert for clinical trial applications in Europe.

Schindler has been a member of both AMWA and the European Medical Writers Association from the very early days of his career. He has led numerous workshops at many AMWA annual meetings. For the *AMWA Journal*, he edited the “Statistically Speaking” section for more than 10 years and now edits the “International Affairs” section. He also was a member of the AMWA Salary Survey group in 2019. He was a key member of the initiatives to develop plain language summaries of both clinical trials (Good Lay Summary Practice, available on EudraLex version 10) and scientific publications (Plain Language Summaries of Publications recommendations of the Patient Focused Medicines Development group). In addition, he was a member of the international working group to develop an International Organization for Standardization (ISO) standard for use of plain language (ISO 24495). Schindler has published over 50 articles on a variety of topics related to medical writing. He says, “Medical writing needs a solid foundation, some of which I acquired through AMWA; I am very grateful for that.”

Author declaration and disclosures: *The author notes no commercial association that may pose a conflict of interest in relation to this article*

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AMWA NEWS

2025 Walter C. Alvarez Award Recipient: Jen Gunter, MD

Mary Ellen Shepard, PhD, MWC / 2025 Annual Conference Committee Chair

The Walter C. Alvarez Award is bestowed on a member or nonmember of AMWA to recognize excellence in communicating health care developments and concepts to the public.

As cochairs of the 2025 Annual Conference Committee, Heather Gorby and I have the honor of bestowing this year's Walter C. Alvarez Award upon Jen Gunter, MD, FRCS(C), FACOG, DABPM, ABPMR (pain).

Dr Gunter is an internationally renowned obstetrician-gynecologist (OB/GYN). Dr Gunter, originally from Winnipeg, Canada, graduated from The University of Manitoba School of Medicine and is a board-certified OB/GYN in both Canada and the United States. She is also board certified in pain medicine by the American Board of Pain Medicine and by the American Board of Physical Medicine and Rehabilitation.

Dr Gunter started as a writer when her sons were born prematurely, and she sought information to support their health. She realized there was an overwhelming amount of mis- and disinformation on the Internet, which is a threat to public health and safety. Since then, she has become one of the fiercest advocates for women's health. Her mission is to build a better medical Internet because to be empowered about health, one must have accurate information.

Dr Gunter has been called the Internet's OB/GYN. She runs a blog called *The Vajenda*. She is the host of the CBC docuseries *Jensplaining*, and her TED Talk on menstruation was the third most viewed TED Talk of 2020. In addition to her academic publications, her writing has appeared in various publications, including the *New York Times*, *Dame*, *The New Republic*, and *The Guardian*. She has a medical practice in San Francisco, California.

I really enjoy Dr Gunter's style of presenting evidence-based health information, as well as her debunking of dubious health information. As I was reading her most recent book, *Blood: The Science, Medicine, and Mythology of Menstruation*, I was struck by how detailed yet digestible the information was presented. She is also the author of the 2 *New York Times* bestsellers *The Vagina Bible* and *The Menopause Manifesto*.

Please join me in congratulating Dr Gunter, our Walter C. Alvarez award winner, and listening to her talk on Friday, November 7, at AMWA's 2025 Medical Writing & Communication Conference in Phoenix, Arizona.

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AMWA NEWS

2025 Golden Apple Award Recipient: Andrea Gwosdow, PhD

Loretta Bohn, ELS / Chair, 2025 Member Awards Committee

The 2025 Member Awards Committee selected Andrea Gwosdow, PhD, as this year's recipient of the Golden Apple Award for her consistent outstanding workshop leadership. Since 1999, she has led 4 popular workshops a total of 20 times, consistently earning high satisfaction ratings from participants. She has also presented education sessions, jam sessions, and roundtables for AMWA and actively mentors new medical writers.

Gwosdow earned her bachelor's degree in biology/environmental science from Antioch College and a master's and doctorate in systems physiology/endocrinology from the University of Florida in Gainesville. She completed her postdoctoral training in environmental physiology at the John B. Pierce Foundation and Department of Epidemiology at Yale University. Her first research position was in thermal physiology at the Shriners Burns Institute in Boston. After receiving her first grant, she continued her own research studying interleukins and the relationship between stress and the immune system in the Department of Endocrinology at Massachusetts General Hospital.

Education is woven throughout Gwosdow's career. After 13 years of conducting basic bench research and teaching physiology to first-year medical students at Harvard Medical School, she transitioned into medical writing and began her freelance career. In 1997, the same year she joined AMWA, she created Gwosdow Associates Science Consultants, a science and medical communication company that provides medical and science writing services and training, works with schools on science education, interprets science for nonscientists, and provides professional development for fellow writers. Gwosdow's expertise is in scientific publications, and she is known for her clear explanations of complex scientific principles to a variety of audiences at all levels. She has worked with a wide variety of institutions and organizations around the world to improve the scientific communication skills of students, scientists, and health care workers. Her workshops highlighting the specifics of writing and publishing in the medical and scientific literature led to the publication of her book, *The Complete Guide to Scientific Manuscript Writing*.

Since the start of her freelance career, Gwosdow has served AMWA at the New England Chapter as secretary, program coordinator, president, and board member. She has received the top awards from the New England Chapter and runs a local networking group for the chapter. At the national level, Gwosdow has served on the Education Committee, Nominating Committee, Awards Committee, and Chapter Advisory Council. Her significant contributions were recognized with an AMWA fellowship in 2018.

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AMWA NEWS

2025 John P. McGovern Award Recipient: Scott Ratzan, MD, MPA

Roshawn (Shawn) Watson, PharmD, PhD, BCPS / 2024-2025 AMWA President

It is our pleasure to honor this year's recipient of the John P McGovern Award, Dr Scott Ratzan, MD, MPA. The McGovern Award recognizes preeminent contributions to any field of medical communication and is presented at AMWA's annual Medical Writing & Communication Conference.

Dr Ratzan is a pioneer in the health communication, health literacy, and public health spaces. After earning a Bachelor of Arts degree in Rhetoric from Occidental College, he pursued a Master of Arts in Communication from Emerson College, a Master of Public Administration from Harvard Kennedy School, and a Doctor of Medicine from the Keck School of Medicine of the University of Southern California.

His career has spanned 3 decades and includes stints in academia, governance, the pharmaceutical industry, and nonprofits. His career highlights are numerous and reflect a deep commitment to health communication and global health, including

- founding Editor-in-Chief of the Journal of Health Communication
- co-chairing the Nature Medicine Commission on Quality Health Information for All
- founding the Emerson-Tufts Masters Program in Health Communication
- developing the global health communication strategy for the United States as a member of the Board of Global Health of the National Academies of Science, Engineering, and Medicine
- co-chairing Every Woman Every Child, a United Nations initiative aimed at improving health outcomes for women and children
- co-chairing the Council for Quality Health Communication
- serving on the Centers for Disease Control and Prevention Board of Scientific Counselors of Office of Infectious Disease



- serving as a Senior Fellow at the Mossavar-Rahmani Center for Business and Government at Harvard Kennedy School, where he contributed to the development of the Guiding Principles for Multisectoral Engagement for Sustainable Health
- serving as executive director of Business Partners for Sustainable Development, an initiative of the United States Council for International Business (USCIB) focused on advancing the Sustainable Development Goals
- serving as executive director of Business Partners to CONVINCe, a global initiative of USCIB promoting vaccine confidence and uptake
- launching and co-chairing Nature Medicine Commission on Quality Health Information for All, which aims to advance the credibility, accessibility, and governance of health information worldwide

He has also published extensively in the field of health communication and policy, including peer-reviewed articles in prestige journals, such as *New England Journal of Medicine*, *Lancet*, *JAMA*, *Nature Medicine*, *Annals of Internal Medicine*, and *National Academies of Medicine Perspectives*.

He has authored the following books: *Vaccine Communication in a Pandemic: Strengthening Vaccine Literacy, Restoring Trust and Engaging Communities to Foster Vaccine Confidence and Uptake*, *The Mad Cow Crisis: Health and the Public Good*, and *Attaining Global Health: Challenges and Opportunities*.

Please join AMWA in congratulating Dr Ratzan and celebrating his lifelong commitment to medical communication. We're thrilled that he will deliver the McGovern Award Address at the 2025 Medical Writing & Communication conference this November in Phoenix.

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AMWA NEWS

2025 AMWA President's Award Recipient: Theresa Singleton, PhD

Roshawn (Shawn) Watson, PharmD, PhD, BCPS / 2024-2025 AMWA President

This year, I'm excited to announce that Theresa Singleton, PhD, will receive AMWA's President's Award. The President's Award is given by the AMWA president to a member of AMWA who has made distinctive contributions to the association at the chapter or national level.

When I first met Dr Singleton at a New England chapter meeting, she was the program director and president-elect. She was effusive, helpful, engaged, and very gracious. This was so wonderful to me as a new member of the chapter. I began to understand all the chapter offerings and how to contribute instantly, and she wouldn't take no for an answer. Over the last 12 years, she has been incredibly supportive both professionally and personally. I'm indeed better from her influence and am profoundly grateful to have her in my life.

Dr Singleton has done so much during her career and for AMWA. After obtaining her Bachelor of Science from Cornell University, Doctor of Philosophy (microbiology, immunology) from Boston University, and completing the Ruth Kirschstein Postdoctoral Fellowship, she began her career as a freelancer. As the founder of Singleton Science, she provides research manuscripts, literature searches, advisory board meeting summaries, continuing education, lay patient summaries, and research grant support. She continues to diversify her offerings to clients, and it's been great to watch her build this business.

She also continues to give back to AMWA, both at the chapter and the national level. She became president of the New England chapter, joined AMWA's national board of directors (as a director at large), served on the nominating committee, and served as a peer reviewer for the *AMWA Journal*. For all her numerous contributions, she has also received an AMWA Fellowship. Under her leadership, many people develop their skills and find their voice in the profession. She's usually one of the first to volunteer to mentor others, share in your excitement, and provide thoughtful counsel when needed.

Her welcoming approach and graciousness to serve has created so many educational, networking, and development opportunities for AMWA members. She is a beacon of light, is never self-promotional, and has a profound impact on others.

I am honored to bestow this much deserved award to her.

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AMWA NEWS

AMWA's Health Communication Certificate Program is Coming!

Emily Viles-Monari, CAE¹; and Genevieve Walker, PhD² / ¹Director of Education Programs, AMWA, Madison, WI;
²Bridge Health Communications, Hood River, OR

With health communication taking center stage in this special journal issue, we want to share an exciting update on one of AMWA's major upcoming initiatives: our Health Communication Certificate Program.

BUILDING ON LORI ALEXANDER'S LEGACY

This program builds on the comprehensive AMWA Health Communication Curriculum for Medical Communicators¹ that our task force developed throughout 2024. The curriculum addresses the practical challenges medical communicators face when creating content that connects with diverse audiences.

The initiative honors Lori Alexander's enduring passion for health literacy and plain language principles. Throughout her remarkable AMWA journey—as member, leader, faculty, journal editor, presenter, president, and director of education—Alexander championed health communication at every turn. Her posthumous Swanberg Award² in 2021 recognized her transformative impact on our field.

When the AMWA Board launched the Lori Alexander Legacy Recognition Initiative in April 2023, they knew exactly what Alexander would want: practical tools that help medical communicators create clearer, more accessible health content.

WHAT THE CURRICULUM INCLUDES

The curriculum covers 7 essential areas:

- Basic principles of health communication, centered on audience awareness and health literacy.
- Planning for the ideal user experience with all types of health communication.
- Understanding the importance of, and strategies for, creating consistent content.
- Prioritizing when developing health communication: identifying priorities and managing them within content lifecycles.
- Copyediting and proofreading text, data, and images in health communication.
- Using health literacy tools and strategies in the workplace.

Box 1. AMWA Health Communication Education Subcommittee (2025)

Genevieve Walker, PhD, Independent Writer, Patient Education, Bridge Health Communications (Board Liaison)

Eva Stabenow, MA, MPH, Patient Education Writer, Wordplay Lab, LLC

Bill Koslosky, MD, Managing Member, Heartland Narrative LLC

Kelly Crowley, MWC, Director, Patient Education Content, Wolters Kluwer

Benjamin Riggs, BS, Senior Communication Specialist, Kettering Health

Toni Willis, MFA, Editor, RTI Health Solutions

Damiana Chiavolini, MS, PhD, Co-owner, Evergreen Biomedical Communications Group, LLC

Camille DeSantis, BS, MT, Executive Vice President, Edelman

Box 2. AMWA Health Curriculum Task Force (2024)

Larissa Biggers, MA, Senior Communication Specialist, Duke Health

Amber Boehm, PhD, Director of Editorial Services, Palladian Partners, Inc

Kelly Crowley, MWC, Director, Patient Education Content, Wolters Kluwer

Kimbra Edwards, PhD, Associate Director, CISC RP

Leila Emery, MA, Senior Medical Editor, RTI Health Solutions

Susan Krug, MS, CAE, CEO, AMWA

Geri Metzger, BS, Senior Content Manager, WebMD Ignite

Helen Osborne, MEd, OTR/L, President, Health Literacy Consulting

Kelly Pincus, PharmD, Sr. Director/Head, Medical Communication & Scientific Training, GSK

Liz Proper, MA, Managing Editor, Mayo Clinic Health Education & Content Services (Co-Chair)

Ben Riggs, BS, Senior Communication Specialist, Kettering Health

Sarah Stone, MPH, Freelance Health Writer & Editor, Health Literacy Consultant

Genevieve Walker, PhD, Independent Writer, Patient Education, Bridge Health Communications

Deb Whippen, BA, President, Editorial RX (Co-Chair)

- Considering ethical and legal issues when creating health communication.

YOUR CERTIFICATE PROGRAM TAKES SHAPE

We're now transforming this curriculum into AMWA's Health Communication Certificate Program. A newly formed subcommittee of the Education Committee is developing 7 online modules, which are created by subject matter experts who understand the nuances of effective health communication. We're also expanding our education offerings with new workshops, education sessions, webinars, and other online programs.

Target timeline: We're tentatively planning a Fall 2026 launch via AMWA Online Learning.

STAY TUNED FOR UPDATES

This certificate program represents an important step forward for our profession. We're developing resources that will help medical communicators tackle health communication challenges more effectively. Keep watching for updates on this game-changing initiative—we can't wait to share more details as we get closer to launch!

Author declaration and disclosures: *The authors note no commercial associations that may pose a conflict of interest in relation to this article.*

Author contact: emily@amwa.org

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AMWA NEWS

Officer Candidate Slate for the 2025-2026 Election

Kimberly Korwek, PhD / 2024-2025 AMWA President-Elect

It has been my honor to serve as the AMWA President-Elect and with this role serve as the chair of the nominating committee. This committee is charged by the AMWA Board of Directors (BOD) to evaluate interest forms submitted by members interested in the elected offices of president-elect, secretary, and treasurer. The nominating committee members, who are selected by the president-elect and approved by the BOD for their experience, expertise, and leadership within AMWA, review the qualifications of those seeking to serve in an officer position and collectively provide a slate of candidates to the BOD for consideration.

The 2024-2025 Nominating Committee includes past AMWA presidents and board members as well as members who have served in leadership positions in the medical communication field, all of whom have shown long-standing dedication to AMWA and commitment to ensuring the organization continues to thrive. I sincerely appreciate their service and extend my gratitude to the committee members for their time and dedication to AMWA:

- Brian Bass, MWC
- Lorretta Bohn, ELS
- Gail V. Flores, PhD
- Haifa Kassis, MD
- Cyndy Kryder, MS, MWS
- Leslie Nielstat, ELS
- Michele Sequeria, MS, MBA, MWC
- Susan Krug, MS, CAE (ex officio, nonvoting member)

There were multiple strong applications for the executive committee, and the Nominating Committee's insightful feedback and critical analysis allowed for robust discussion and the presentation of a strong slate of officer candidates to the BOD for consideration. I respectfully present the following candidates who were approved by the AMWA BOD at the June BOD meeting:

- **President-Elect:** Jennifer Minarcik, MS
- **Secretary:** Sarah Dobney, MPH
- **Treasurer:** Julie Phelan, MD, MBA

PRESIDENT-ELECT

Jennifer Minarcik, MS, an AMWA member since 2011, is in her fifth year of serving on the AMWA BOD and is the current secretary. She previously served as board liaison for the AMWA Annual Conference Committee. From 2021 to 2023, she served on the BOD as chapter advisory council chair. As a member of the Delaware Valley Chapter, she served as the chapter advisory council representative (2019-2020), treasurer (2018-2019), and president-elect, president, and immediate past president (2016-2018). Additionally, she has served as the chair of the Chapter Advisory Council Task Force (2016-2017), a member of the National Communication Committee (2013-2017), an Engage Task Force committee member (2016-2017), and an Annual Conference Committee member (2018). In addition to her service on various committees, Minarcik was an editor-at-large for the *AMWA Journal* from 2014 to 2017 and in 2018, joined the editorial board as the social media section coeditor and became editor in 2019. Minarcik also presented sessions at the 2015 and 2016 Medical Writing & Communication Conferences and was awarded an AMWA fellowship in 2020. She is a freelance biomedical writer specializing in pharmaceutical sales training and promotional medical writing projects.



SECRETARY

Sarah Dobney, MPH, an AMWA member since 2013, has been on the AMWA BOD for 5 years as an at-large director and is currently the board liaison for the Education Committee (Regulatory Writing subgroup) and has served as the BOD liaison for the Value of Medical Writing Group (2022-2023). Before her position as an at-large director, Dobney served as President of the Ohio



Valley Chapter (OVC) and the chapter advisory council delegate to the BOD for the OVC (2016-2018). She has also chaired several committees as Awards Committee Chair (2021-2022), Annual Conference Committee Chair (2020-2021), and Chapter Leader Online Community Chair (2019-2020). In addition to these leadership positions, she has authored articles in the *AMWA Journal* (2021-2023) and was a member of the Nominating Committee in 2018. Dobney is the senior director of medical writing at inSection Group and an instructor in the Master of Clinical Research program at Ohio State University.

TREASURER

Julie Phelan, MD, MBA, an

AMWA member since 2009, is in her ninth year as treasurer on the BOD and as chair of the Budget & Finance Committee (2016-2025). She served as a member of the Budget & Finance Committee (2015-2016), the Communication Committee (2014-2015), the 2015 Salary Survey Task Force, and the Online Community and Social Media committees (2012-2014). At the chapter level, she was president of the Greater Chicago Area Chapter (2013-2016), serving previously as president-elect (2012-2013). She also served as membership chair for the chapter (2011-2015) and as a chapter delegate to the BOD (2013-2016). She has authored articles for the *AMWA Journal* and is currently AMWA's registered agent. She was awarded an AMWA fellowship in 2017. Phelan is the founder and president of Biomedisys, Inc, a medical communication and strategy consulting boutique in Chicago, Illinois. She has



more than 20 years of medical communication and business strategy experience including working as a biotechnology equity research associate analyst at Robert W. Baird & Co, medical and strategic advisor for an insurance corporation, and medical communication consultant.

PROCEDURE FOR ADDITIONAL NOMINATIONS

As required by AMWA's bylaws (Article IV.2e-f), these nominations were announced to the AMWA community by email more than 60 days before the annual business meeting. A nominee who is unopposed for any office is declared automatically elected at the annual business meeting. As stated in the bylaws, additional nominations for president-elect, secretary, or treasurer may be made by any member provided the member meets the criteria set forth by the BOD. The criteria and process are the following

- Member dues must be current, and the member must be in good standing.
- The nomination must be submitted in writing to the secretary of AMWA at least 30 days in advance of the annual business meeting. This year's annual business meeting is scheduled for Saturday, November 8, 2025.
- The nomination must clearly state the qualifications of the candidate and be signed by 50 members in good standing as of the date of the receipt of the nomination.
- The nomination must be accompanied by a letter from the candidate stating that she or he is willing to serve if elected.

Officer nominees who are unopposed for office are declared automatically elected at the AMWA annual business meeting.

CALENDAR OF MEETINGS



Trends and Opportunities for Medical Communicators

Society of Clinical Research Associates (SOCRA)

"2025 Annual Conference"

September 26-28, 2025

Chicago, IL

<https://www.socra.org/annual-conference/2025/2025-annual-conference-information/>

Academy of Communication in Healthcare (ACH) and European Association for Communication in Healthcare (EACH)

"ICCH2025: International Conference on Communication in Healthcare"

October 5-8, 2025

Ottawa, Ontario, Canada

<https://achonline.org/icch/icch-2025/>

Council for Programs in Technical & Scientific Communication

"2025 CPTSC Conference"

October 23-25, 2025

Lubbock, TX

<https://conference.cptsc.org/>

American Public Health Association (APHA)

"APHA 2025: Annual Meeting & Expo"

November 2-5, 2025

Washington, D.C.

<https://www.apha.org/events-and-meetings/annual>

European Medical Writers Association

"EMWA 60th Virtual Conference"

November 12-29, 2025

Virtual

<https://emwa.org/conference/>

American Association for the Advancement of Science

"AAAS Annual Meeting"

February 12-14, 2026

Phoenix, AZ

<https://meetings.aaas.org/>

2025
AMWA

Medical Writing &
Communication
Conference

NOVEMBER 5-8, 2025
PHOENIX, AZ

Trends and Opportunities for Medical Communicators

AMWA
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- Excellence in scientific publications
- Effective health communication strategies
- Regulatory writing insights and advances
- Writing for CME and health professionals
- Tips and tricks for freelancers
- Training and mentoring the next generation