How to Write an Effective Lay Abstract

Advocate Working Group
Metastasis Research Network
National Cancer Institute

Learning Objectives

Successful completion of this training will enable you to:

- Understand the purpose, uses and benefits of a Lay Abstract
- List the components of a Lay Abstract
- Achieve an appropriate reader literacy level using available tools
- Use simple tips and tricks to ensure a successful Lay Abstract
- Think like a journalist
- Adapt concepts from a Scientific Abstract to a Lay Abstract
- Articulate the benefit of your research to patients and the public
- Identify and use patient-respectful language
- Access available resources to help you write your Lay Abstract

Importance of Communicating Your Research to a Lay Audience

A lay abstract helps patients, their caregivers and non-scientists understand your cancer research and learn how it can help them.

The benefits of a lay abstract include:

- Unlocks new and diverse collaborations.
- Builds community trust in scientific research.
- Encourages support for research funding by the public.
- Promotes data sharing that benefits everyone.
- Improves medical science literacy in the public sphere.

Uses for a Lay Abstract

- Grant applications
- Journal articles
- Conferences
- Institutional Review Boards
- Press releases and public websites
- Social Media
- Briefs for Policy Makers

Six Key Elements of a Lay Abstract

1. Your research question (hypothesis)
2. Background on the problem: Why you are conducting the research
3. How you will accomplish your goal using your research plan and methods
4. Results of your research (if your research has been completed)
5. Planned next step(s) to move the research further forward
6. How your findings may benefit patients and/or public health (required)

Eight Tips For an Impactful Lay Abstract

1. Understand your audience: Write for those with no medical background

2. Do not merely translate your Technical Abstract

3. Prioritize clarity over detail: Focus on the most important information. Omit technical jargon. Spell out all acronyms.

4. Keep it simple: Use short, simple sentences without multiple clauses.

Eight Tips For an Impactful Lay Abstract

5. Use analogies: Explain scientific concepts using easily understood ideas and examples from everyday life.

6. Explain the impact: Clearly state how your research findings may benefit the health and/or quality of life of patients

7. Think like a journalist: Always keep your reader top of mind. Use story-telling techniques that engage the reader.

8. Get feedback: Ask a non-academic to review your lay abstract for clarity and understanding.

A Deeper Dive:

Writing for a Lay Audience

To communicate your research at the appropriate literacy level for patients, their caregivers and the general public:

- Aim for 8th or 9th grade reading level
- Picture your reader as a cousin who works in retail, fashion, or hospitality or your Uber driver
- Use available online tools to determine the level of readability of your lay abstract
- Some online tools are: Readability Analizer, De-Jargonizer, StoryToolz, and Hemingway Editor, Microsoft Word Readability Tool
- Use tools to help calculate the percentage of difficult words

A Deeper Dive: How to Approach a Lay Abstract
Think Like a Journalist

- Your Lay Abstract should not resemble your Scientific Abstract
- Consider using a unique approach such as asking a question or asking the reader to: “Imagine if we could…”
- Begin with your “take home” message
- Tell a story of discovery: Share your science in a narrative form with a point of view and a first person, active voice (“we agreed” vs “it was agreed”)
- Prioritize essential ideas and omit the rest
- Engage the reader by using drama and conflict in your story
- A good story builds on itself and provides a payoff

Choose the Right Words

To help lay readers learn about your research use words that they already know. Online tools can assist you with this.

Scientific words	Substitutes
Protocol	Method or plan
Algorithm	Set of rules
Heterogeneous	Varied
Sequalae	Consequences
Extrinsic	External
Hypothesis	Idea
Phenomenon	Concept
Elucidate	Explain
Curate	Organize a collection
Cohort	Group

A Deeper Dive:

Use Analogies

An analogy is *like* a bridge that connects the unfamiliar with the familiar, helping to explain complex ideas in a more relatable way.

Here are some simple analogies to consider: The eye as a camera; the cell as a factory; microglia cells as garbage trucks in the brain

In context…
Example # 1:
"We will analyze stored saliva samples to examine DNA methylation patterns, or how cells ***label or tag*** *certain parts of the DNA, which can affect which genes are turned on or off.* ***It's like using sticky notes to mark important sections of a document.*** *This analysis may reveal how environmental factors influence how the breast cancer cells are actively using the information in the genes."*

A Deeper Dive:

Use Analogies (continued)

Example # 2:

*"Think of DNA as a set of **Encyclopedia Britannica** sitting on your shelf; proteins as your **daily news feed** that you check to see what's happening today, and metabolites as your **Twitter feed,** that tells you what's happening right now." Ally Morton-Hayward, Oxford.*

Example #3

*"Just as you'd **store Christmas lights** by wrapping each string of lights around a piece of cardboard so they don't tangle, DNA is not a random bundle of scrunched-up genetic material but is wrapped around certain proteins. This keeps the DNA from getting tangled and broken, allowing it to stay organized so that the cell can access different regions to switch individual genes on or off."* Nessa Carey (2015) *Junk DNA. A journey through the dark matter of the genome. London: Icon Books Ltd.*

A Deeper Dive:

Simplify Ideas and Concepts

To ensure that your Lay Abstract is understandable, explain in very simple terms, each idea and concept that your reader would not know.

- **Melanoma** is an aggressive form of skin cancer, with about 100,000 new cases diagnosed in the United States each year.

- **Metastatic cancer** occurs when cancer **cells in the original tumor spread to other parts of the bod**y such as the lung, liver, bones and brain.

- Did you know that mice share 95% of our human DNA? To study triple negative breast cancer, we use **mouse models** in the laboratory, which are bred to be **representations of human disease**.

- The **blood brain barrier** is a protective layer around the brain's blood vessels that acts like a **gatekeeper** controlling what enters and leaves the brain. Think of it as **a selective filter** protecting the brain from harmful substances while letting in needed nutrients and oxygen.

A Deeper Dive:

Stating the Patient Impact of Your Research

Patients, their caregivers, and the public are eager to know how your research affects them. A key element of a Lay Abstract is the potential benefits of your research to patients in terms of health outcomes and improvements in quality of life.

*Tips:

- Put yourself in the patient's shoes.
- Address patients' goals, preferences and priorities directly.
- Provide the timeframe within which your research may have a patient impact.

A Deeper Dive:
Use Patient-Respectful Language

Researchers may be unaware of how their language affects patients. Always use language that promotes a sense of dignity and respect.

- Always mention “patients” or “generously donated patient samples” or “study participants” in your Lay Abstract. But never call patients “study subjects.”
- Do not blame patients: A patient does not “fail on a drug;” the “drug fails the patient.”
- Patients do not “progress on their disease.” But rather, “the tumor,” “the cancer,” or the “disease” progresses.
- Doctors do not “manage patients.” They ”treat patients” and “manage diseases.”
- Humanize patients: Say: “patient diagnosed with metastatic breast cancer” vs. “metastatic breast cancer patient.” Refer to patients as “having cancer,” rather than as “cancer patients.”
- Avoid using emotional language such as “battle,” ”fight,” or “suffer from” when discussing a patient’s health journey.

Deeper Dive:

Comparison of a Scientific and Lay Abstract (1)

Example #1

Scientific Abstract: Our **investigation** into the **efficacy** of a **novel analgesic agent** for **geriatric chronic pain patients** revealed substantial reductions in pain scores with minimal **adverse events**, indicating **potential therapeutic utility** in this **demographic.**

Lay Abstract: Our **study examined** the **effectiveness** of a **new medication** for **managing chronic pain in older adults. We found that**, compared to a standard treatment, the **new medication** significantly **reduced pain levels** and had minimal **side effects**. This suggests that it could be **a promising option** to **manage the pain of older adults.**

1. Scientific jargon was replaced.
2. The concept was broken up into multiple sentences.
3. The sentences were simplified.
4. Patient respectful language was used.

Deeper Dive:

Comparison of a Scientific and Lay Abstract (2)

Example #2

Scientific Abstract: Leptomeningeal metastases (LM) occur when cancer cells invade **the pia and arachnoid mater** and are typically characterized by a poor prognosis.

Lay Abstract: When cancer cells invade the **fluid-filled space surrounding the brain and spinal cord it** is called leptomeningeal metastasis (LM). When this occurs, patients usually **have a worse outcome** from the disease.

1. Words that have no meaning to the viewer were omitted or substituted.
2. Comprehension was improved by rearranging the order of the words in the sentence.
3. The concept was simplified by breaking it up into two sentences.

Deeper Dive:

Comparison of a Scientific and Lay Abstract (3)

Example #3

Scientific Abstract: Single-cell sequencing has transformed cancer research by enabling the study of **tumor heterogeneity** and the complex interactions within the tumor at an **unprecedented resolution**.

Lay Abstract: A new technology has revolutionized cancer research. It enables scientists to study the complexity of tumors at the **the level of individual cells**. This technology is known as **single-cell sequencing**.

1. Scientific jargon was replaced.
2. Comprehension was improved by rearranging the order of the words..
3. The concept was broken up into three sentences to simplify.

Deeper Dive:

Comparison of a Scientific and Lay Abstract (4)

Example #4

Scientific Abstract: Triple-negative breast cancer (TNBC) is an aggressive form of breast cancer marked by high metastatic rates and significant intra-tumor heterogeneity. In this study, we employed a novel genetic cell tracking tool and single-cell RNA sequencing (SCRNA-seq) to identify and characterize the origins of invasive subpopulations within TNBC.

Lay Abstract: Triple-negative breast cancer (TNBC) is one of the most fatal forms of breast cancer. This is due to its high rate of spread to other organs and the diversity of cell types within the tumor. In this study we used two new techniques to track and label individual cancer cells and then analyze their RNA (a blueprint for the cell's functions). This helped us understand how the different invading cell groups develop in TNBC cells.

1. Told from the patient perspective
2. Sentences were broken up.
3. Scientific jargon was replaced or eliminated.
4. Scientific concepts were explained.

Deeper Dive:

Comparison of a Scientific and Lay Abstract (5)

Example #5

Scientific Abstract: I aim to study how the immune microenvironment in lymph nodes (LN) shapes melanoma genomic and transcriptomic heterogeneity. This will enhance our understanding of how melanoma evolution is shaped by selective immune pressures unique to the LN microenvironment, which may inform on how regional melanoma dissemination promotes disease progression.

Lay Abstract:

My research aims to understand how melanoma spreads to the lymph nodes and how interactions between melanoma and immune cells might support cancer growth.

1. The Aim was simplified and shortened.
2. All words that have no meaning to a lay audience were omitted.

Deeper Dive:

Comparison of a Scientific and Lay Abstract (6)

Example #6

Scientific Abstract: Single cell transcriptomics (scRNAseq) remains the method of choice to quantify and annotate cellular heterogeneity in the tumor and its microenvironment (TME), yet most studies are under-powered to associate changes in tumor heterogeneity with phenotypes such as tumor subtype, grade, and patient age, among others. In this study, we created an integrated atlas of human breast cancer (BC), the largest resource of its kind, totaling > 700,000 cells across 129 patients, and optimized computational methods to benchmark integration performance and robustly perform hierarchical cell type annotation.

Lay Abstract: Breast cancer is a complex disease. Each tumor containing a mix of cell types-- cancer cells and helper cells in and around the tumor. This variety plays a big role in how the cancer behaves and responds to treatment. But no previous study has ever been large enough to show this complexity. And we've never been able to make a connection to patient factors such as tumor type, tumor severity, patient age and others. What if we could finally start to decode this puzzle? Well, we created the largest-ever detailed map of breast cancer. We analyzed and catalogued more than 700,000 individual cells from 129 patients. It suggests how different cell types contribute to the disease and how they might be affected by other factors.

You've Got a Friend: How Advocates Can Help You Create a Successful Lay Abstract

Advocates can:

- Help you determine whether your Lay Abstract is easy to understand and differs enough from your Technical Abstract.
- Assist you in making the abstract compelling for patients.
- Inform you about what matters most to patients in terms of the impact of your research.
- Ensure that you address patients in a respectful manner.
- Connect you to opportunities to present your research results to the community.

*Tip:

You can find advocates through your own institution or nonprofit patient support organizations for the cancer type that you study.

Resources

Tips on writing a lay summary, Accelerating Research in Genomic Oncology.

Tips for writing a good lay summary, MS Society, United Kingdom.

Writing a layperson summary, University of North Carolina, Honors College.

Sedgwick C, Belmonte L, Margolis A, et al., Extending the reach of science—Talk in plain language, *Epilepsy Behav Rep.* 2021 (Oct 25).

De-Jargonizer, Jargon Project.

Reability Analyzer, Data.yze.

StoryToolz, Kydala Publishing, Inc.

Hemingway Editor, .38 Long LLC.

How to write a lay summary, Elsevier. (video)

Goldstein CM, Krukowski RA, The importance of lay summaries for improving science communication, *Annals of Behavioral Medicine*. 57(7):509–510. July 2023.

Writing a good lay summary, Radcliff Department of Medicine, University of Oxford.

Tancock C, In a nutshell: How to write a lay summary, Elsevier, 2018.

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