

# 8 Tips for Clear & Effective Writing



Most readers hate monotony, meandering, and excess in any form of writing. Most readers also hate the kind of bureaucratic jargon we sometimes use at NCEH/ATSDR (e.g., “A comprehensive assessment was conducted prior to implementation of ...”).

But audiences respond well to logically organized, clearly written, and effectively designed information—regardless of their literacy level or aptitude for understanding complex scientific information. PhD-level scientists appreciate clear writing as much as someone who struggles with reading comprehension. **Clear writing is for every audience and every document.**

Use the tips below to create clear, effective documents that your readers can understand and use.

## 1 Write for Your Reader

Good writers always keep their readers in mind. Identify a specific audience, and write directly to that audience. As you write, keep asking yourself what your target audience needs to know (not what you want to say). If you have multiple audiences, you may need to write multiple documents. Use “you” to connect with your reader.

## 2 Change Your Style

Public health writing is about your audience. It’s not about demonstrating your linguistic mastery. Don’t write to impress your reader; write to reach them. It’s ok to be conversational. Use contractions and pronouns. Use easier words (use, not utilize). Be direct (analyzed, not conducted an analysis). Get right to the point, and remove unnecessary content.

## 3 Spell Out the Main Message

An effective document has a clear main message. Don’t put the interpretive burden on your reader to figure out the main message. Spell it out. Put that clear, succinct main message near the top of the page. Bold it and highlight it. Stay focused on it. And don’t include content that detracts from it.

## 4 Be Short

We’re bombarded with thousands of messages a day, and this has changed the way we read. Readers tend to skim and scan documents now.

Include just the essential info. Don’t throw in all the extra “nice to know” info. Remember, the more you write, the less they’ll read.

Keep your materials short and to the point:

- Sentences: 20 words max
- Paragraphs: 5 sentences max.

## 5 Get Back to Basics

The easiest structure to understand in English is subject → verb → object. Don't convolute writing with complicated grammatical patterns. Write in active voice, keep the subject and verb close together, and use a strong clear verb. When a sentence is unclear, the culprit is often a missing or unclear verb.

## 7 Use Meaningful Headings

Chunk content into blocks, and use lots of headings. Skip generic headings like “overview” and “background.” If readers scan your document and just read the headings, what do they learn? Use headings to communicate messages (like short, bolded topic sentences for the text that follows).

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## 6 Carefully Craft Your Title and Subtitle

The first thing your readers encounter is your title. It draws them in. And a subtitle can serve as a primer for what comes next. Carefully craft a title and subtitle using the following guidelines:

- Title—8 words max, grab attention
- Subtitle—15 words max, offer more detail or description

## 8 Pay Attention to Design

Design elements can help readers understand and remember your messages.

- Use images that reinforce your message, and never use an image that demonstrates something readers shouldn't do.
- Lists should have fewer than 7 bullets. And stay away from sub-bulleted lists.
- Use call out boxes or bold for key messages, relevant related info, or content that helps garner your reader's interest.
- Leave ample white space in your document.



**U.S. Department of Health and Human Services**  
Centers for Disease Control and Prevention  
Agency for Toxic Substances and Disease Registry

# Preparing and Writing a Scientific Journal Article



NCEH/ATSDR designed this guide for scientists who haven't published yet or those having trouble getting published in their journal of choice. It offers a direct approach that's easy to follow.

## 12 Steps to Publish a Scientific Journal Article

- 1 Get concept clearance from your supervisor before you invest time in the work.
- 2 Conduct a literature review to identify a gap in knowledge or limitations of previous studies (because journal editors look for new and useful information).
- 3 Conduct the study and analyze the data that you'll present in your article.
- 4 Summarize your results and formulate some key messages.
- 5 Get feedback from coauthors and colleagues to find out if your information is clear, concise, and compelling. This is the prep work that will help you write a strong first draft.
- 6 Find the best journal for your article so you can write with the journal's requirements in mind.
- 7 Write the abstract\*
- 8 Write the first draft of your article (introduction, methods, results, and discussion sections; see pages 2 and 3 of this guide for details).
- 9 Think of a direct and concise title.
- 10 Double-check your citations and edit your reference section.
- 11 Submit your article for scientific clearance (i.e., CDC's eClearance system).
- 12 Submit your article to the journal and work with them to respond to their feedback.

\* Some authors prefer to write the abstract after they've drafted the full article.

Notice that half of the steps listed above should happen **BEFORE** you even begin to write the article. This kind of systematic preparation will help you write a clear, publication-quality article.

# A Line-by-Line Guide to Write a Scientific Journal Article

## Abstract\*

Your abstract highlights key points from the major sections of your article. It's also an opportunity to emphasize what is new and useful about your study. Write a 4 paragraph abstract by using the guide below.

- Paragraph 1** In 3 to 5 sentences, state the main purpose of your study.
- Paragraph 2** In 3 to 5 sentences, summarize the methods of your study.
- Paragraph 3** In 3 to 5 sentences, summarize the results of your study.
- Paragraph 4** In 3 to 5 sentence, summarize the conclusions of your study.

\*Note: Some authors prefer to write the abstract last—after they've drafted the full article.

**TIP:** Journal editors look for information that is new and useful to their readers. Be sure to discuss how your article is new and useful in the abstract, introduction, and discussion sections.



## Introduction

Your introduction convinces readers that this study yields something new and useful. Write a 3 or 4 paragraph intro.

- Paragraph 1** In 3 to 5 sentences, address the current gaps in literature; provide background on previous research and its limitations.
- Paragraph 2** In 4 to 6 sentences, state the purpose of your article. Be sure to emphasize what is new and useful about your work.
- Paragraphs 3 and 4** Use 2 paragraphs (3 to 5 sentences in each paragraph) to explain how your article fills the current gaps or addresses the limitations of previous studies. You may also want to end with a sentence about the results of your study.

## Methods

This is the place to describe your study methods. It's where you'll include information such as study population, lab methods or epi investigation, and statistical analysis. Your methods section should be about 3 paragraphs long.

- Paragraph 1** In 3 to 5 sentences, define your steps. Explain in chronological order how you collected, organized, and analyzed data.
- Paragraphs 2 and 3** Use 2 paragraphs (with 3 to 5 sentences in each paragraph) to define all your research variables. Remember to focus on how you did your work, not what you found.

**TIP:** Get feedback before writing the next sections in your article. Feedback will help strengthen your writing because your colleagues can point out phrases, sentences, or paragraphs that confuse them.



## Results

In this section, describe the results of your data analysis that are relevant to the purpose of the study. You will need to write about 2 to 4 paragraphs to present your results.

**Paragraph 1** In 3 to 5 sentences, describe the results of your analysis. Provide clear explanations of what you found (e.g., “We found several factors that affect ....”)

**Paragraphs 2 thru 4** Use figures or charts to support your content. Explain your tables, charts, or figures in 2 or 3 paragraphs (with 3 to 5 sentences in each paragraph). Use tables to highlight individual values, and use figures to highlight trends or relationships.

## Discussion

Use the discussion section to interpret your results and justify your interpretation. Present your discussion in 4 paragraphs.

**Paragraph 1** In 3 to 5 sentences, restate the main result of your study and explain your conclusion. Be clear about why the results support your conclusion.

**Paragraph 2** In 3 to 5 sentences, compare your study with existing, related studies. Highlight the strengths of your study, and emphasize what is new and useful about it.

**Paragraph 3** In 3 to 5 sentences, state any limitations or caveats about your study.

**Paragraph 4** In 3 to 5 sentences, make recommendations for next steps. This may include changes in policies or suggestions for future research. If you recommend future research, be specific (e.g., study method).

## Title

Now that you’ve finished your first draft, think of a direct and concise title for your article. Include your research topic and a key piece about your work (like methods, results, conclusions, or study name). For example, “Food Worker Handwashing Practices: An Observational Study” includes the topic and methods.

## References

You’ve got one more critical step—making sure your references are in good shape. Most journals indicate their preferred format on the requirements page of their website. Make sure you’ve used their preferred format for references, and proofread them carefully.

## A Note about Clear Writing

The goal of clear writing is simple: your intended audience should be able to understand it the first time they read it. Even though they may be familiar with highly technical concepts, they still expect your writing to be clear. Use these tips to help make your writing clear.

### Use active voice.

Make the subject of your sentence perform the action (e.g., “The Director issued the memo” not “The memo was issued” [by whom?]).

### Use short sentences and short paragraphs.

Shorter sentences (25 words max) break up complex ideas into smaller pieces, which are easier to understand, even for scientific audiences. Short paragraphs (5 sentences max) encourage readers to read and understand more.

### Keep subjects and verbs close together.

Start your sentences with the subject and follow quickly with a strong, clear verb.

## A Note about Active Voice

In the 19th and early 20th centuries, scientists wrote in active voice. But around 1920, scientists started adopting passive voice, possibly because it seemed more objective and impersonal.

Scientific journals have swung back to active voice, especially because all major publication manuals (AMA, APA, Chicago) recommend it. After all, **active voice is clear, concise, and direct.**

In fact, it’s difficult to find any journal requirements that actually advocate the use of passive voice. And prestigious journals such as the *British Medical Journal* and *Science* specifically instruct authors to use active voice.

Use active voice as much as possible in your article. Use passive only when the actor is unknown or is of less importance. For example, you may opt to use some passive voice in parts of the methods section of your article.

Reference: [www.biomedicaleditor.com/active-voice.html](http://www.biomedicaleditor.com/active-voice.html)

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# Clear Writing Checklist

Use the following checklist to create clear, organized, and effective documents.



## In Your Document



- Identify a purpose and stick to it.
- Write for audience and purpose (and not for yourself or the topic).
- Organize content to meet your readers' needs.
- Select and focus on a limited number of key points (ideally 3 to 5).
- Select a limited number of supporting details (ideally 1 to 3) for each key point.
- Use a lot of useful, meaningful headings.
- Use emphasis (bold print or shading, for example) to highlight important concepts.
- Use terms consistently.
- Minimize your use of abbreviations and acronyms.
- Design the layout and structure for easy reading.
- Place one main message at or near the top, and emphasize it with bold and color.
- Add a visual image to support or reinforce the main message (and avoid merely decorative images).

## In Your Paragraphs



- Include only one topic in each paragraph.
- Use a topic sentence at the beginning of each paragraph, where possible.
- Use transitions to get from one paragraph to the next.
- Write short paragraphs (no more than 5 sentences or 7 lines per paragraph).
- Use examples where appropriate.
- Use bulleted and numbered lists to break up dense information and add white space.
- Use tables to make complex material easier to understand.

## In Your Sentences

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- Make each sentence about one thing or serve one purpose.
- Use pronouns like “you” and “we” where appropriate to speak directly to readers.
- Use active voice (not passive voice).
- Make the action of each sentence clear through use of a clear, strong verb.
- Use the simplest form of verbs (e.g., “use” not “utilize”).
- Avoid using hidden verbs (e.g., “analyze” not “conduct an analysis”).
- Use “must” to indicate requirements (not “shall”).
- Use contractions when appropriate.
- Don’t use jargon or unnecessary technical terms.
- Use short, simple words.
- Don’t cluster a bunch of nouns together.
- Omit unnecessary words.
- Don’t use slashes.
- Write short sentences (no more than 20 words per sentence).
- Keep the subject and verb close together.
- Place the main idea before exceptions and conditions.
- Place modifiers next to the words they modify.
- Pay attention to what you placed at the end of each sentence (because readers tend to remember that).



# Supporting Information for Checklist



## In Your Document

### Identify a purpose

A clearly stated purpose helps create a focused document; all the separate pieces (pages, paragraphs, sections, images, etc.) can work together to achieve your specific goal.

### Write for your audience

Use language your audience knows and feels comfortable with. Take your audience's current level of knowledge into account. Address separate audiences separately. Remember to write for audience and purpose and not for topic and author (yourself). In other words, what does your audience need to know, not what do you want to say.

### Organize to meet your readers' needs

Start by stating the document's purpose and its bottom line. Put the most important information at the beginning and include background information (when necessary) toward the end. Eliminate filler and unnecessary content.

### Select key points and details

Short-term memory research demonstrates that, generally, people can process limited bits of information at a time. Mapping methods—such as “Message Mapping”—suggest selecting 1 to 3 main messages and including 1 to 3 supporting details for each of the main messages or key points. This helps ensure that your reader will easily process, understand, and remember your message.

### Use lots of useful headings

The best-organized document will still be difficult for users to follow if they can't see how it's organized. An effective way to reveal your document's organization is to use lots of useful headings. A document with lots of informative headings is easy to follow because the headings break up the material into logical, understandable pieces. Like Goldilocks's porridge, headings should be not too long, not too short, but just right (i.e., informative and meaningful).

### Use emphasis to highlight important concepts

Use **bold** or *italics* to make important concepts stand out. **PUTTING EVERYTHING IN CAPITAL LETTERS IS NOT A GOOD EMPHASIS TECHNIQUE; IT MAKES IT HARDER TO READ. AND IN ELECTRONIC COMMUNICATION, IT'S CONSIDERED SHOUTING.**

Similarly, underlining will draw the user's attention to the section, but it makes it hard to read. Besides, in electronic communication, people expect underlined text to be a link. It's better to use bold or italics for important issues.

### **Use the same term consistently**

You will confuse your audience if you use different terms for the same concept. For example, if you use the term “senior citizens” to refer to a group, continue to use this term throughout your document. Don't substitute another term, such as “the elderly” or “the aged.”

### **Minimize abbreviations and acronyms**

Limit the number of abbreviations and acronyms you use in one document to no more than three. The following tips can help reduce acronyms and abbreviations:

- Use names such as “the committee” or “the report” in place of acronyms.
- If you use the abbreviation or acronym only a couple of times in a document, spell it out instead.

### **Design your document for easy reading**

Here are a couple of brief guidelines for good document design:

- Use lists and tables often but don't overuse them.
- Don't have lists within lists.
- Lists should have no more than about 7 items.
- Rather than fully justifying your text, use ragged right margins.

### **Place a main message at the top**

What is the one thing you want your reader to remember? This is your main message and should be placed at or near the top of your document. Emphasize it by bolding it and making the font larger. Maybe even put it in a shaded text box.

### **Add a visual image to support the main message**

Don't use images just to decorate your document. Carefully choose meaningful images that support or illustrate the main message or key points. And never use an image that shows behavior you want your reader to avoid or change. For example, if you want your reader to stay away from contaminated water, don't choose an image that shows kids playing near water (even if the water in the image looks clean).

# In Your Paragraphs



## Include only one topic in each paragraph

Your readers will understand more readily the point you want to make if you confine each paragraph to only one topic.

## Include a topic sentence in each paragraph

If you tell your readers what they're going to read about, they're less likely to have to read your paragraph again. Headings help, but they're not enough. Establish a context for your audience before you provide them with the details. We often write the way we think—we state our premises first and then our conclusions. It may be the natural way to develop our thoughts, but in so doing we wind up with the topic sentence at the end of the paragraph. Move that topic sentence to the beginning of the paragraph. Let readers know where you're going. Don't make readers hold a lot of information in their heads before they get to your point.

## Use transitions to get from one paragraph to the next

Think of your readers as all driving cars. They need signs and directions to help them get where you want them to go. Make sure they get those directions by linking paragraphs together through transition words and sentences. Transitions needn't be long and tedious. A transition can be as short as starting a succeeding paragraph with "but" or "still."

## Write short paragraphs and vary your sentence length

Long, wall-of-words paragraphs discourage your audience from even trying to understand your material. Short paragraphs are easier to read and understand. Writing experts recommend paragraphs of no more than 150 words or 5 sentences. Vary the lengths of your paragraphs to make them more interesting.

## Use examples

Examples help you clarify complex concepts. In spoken English, when you ask for clarification of something, people often respond by giving you an example. Good examples can substitute for long explanations. The more complex the concept you are writing about, the more you should consider using an example. And it's okay to say, "For example, ...".

## Use lists

Lists highlight a series of requirements or other information in a visually clear way. Use vertical lists to help your user focus on important material. Vertical lists:

- Highlight levels of importance
- Help the user understand the order in which things happen

- Make it easy for the user to identify all necessary steps in a process
- Add blank space for easy reading
- Are an ideal way to present items, conditions, and exceptions

Your lists will be easier to read if you always use a lead-in sentence to explain your lists. Indent your lead-in sentence from the left margin and use left alignment only (never center justification). Keep lists short (no more than 7 bullets).

### **Use tables to make complex material easier to understand**

Tables help your audience see relationships that are often times hidden in dense text. Think about using a standard table or an “if-then” table.

## **In Your Sentences**

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### **Focus on one thing or purpose**

Make sure that your sentence is about one thing. If you overload a sentence with more than one purpose, you are interfering with your readers’ comprehension, and you are asking them to interpret which is the more important message or purpose. They may focus on something different than what you wanted to emphasize.

### **Address one person, not a group**

Your document may affect a thousand people, but you are speaking to the one person who is reading it.

### **Use active voice**

Active voice is clear, concise, and direct. Passive voice can be wordy and awkward; it can also disguise who does what. Use active voice unless you have a specific reason you want to use passive (e.g., you don’t know who the actor was or you want to emphasize the action or object).

### **Make the action clear**

Sometimes when a reader can’t decipher a sentence, it’s because the action is unclear. What’s happening or supposed to happen in the sentence? Make that clear through use of a strong, clear verb.

## **Use the simplest form of a verb**

The simplest and strongest form of a verb is present tense. Using the present tense makes your document more direct and forceful. Also, don't use a more complicated version of the verb. For example, say "use" instead of "utilize."

## **Avoid hidden verbs**

A hidden verb is a verb converted into a noun. It often needs an extra verb to make sense. Instead of "Please make an application for a personal loan," write "Please apply for a personal loan." Hidden verbs come in two forms. Some have endings such as -ment, -tion, -sion, and -ance or link with verbs such as achieve, effect, give, have, make, reach, and take. Often, you will find a hidden verb between the words "the" and "of."

## **Use "must" to indicate requirements**

The word "must" is the clearest way to convey to your audience that they have to do something. "Shall" is one of those officious and obsolete words that has encumbered legal, bureaucratic-like writing for many years. "Shall" is also obsolete. When was the last time you heard it used in everyday speech?

## **Use contractions when appropriate**

Contractions help make your writing less stuffy and more natural. Contractions also make your writing more accessible to the user. Research shows that contractions enhance readability; after all, people use contractions when they talk. So it's okay to use contractions, don't you think?

## **Don't cluster nouns**

Technical writing uses too many noun strings—groups of nouns "sandwiched" together. Readability suffers when three or more words that are ordinarily separate nouns follow in succession. Technically, clustering nouns turns all but the last noun into adjectives. However, many users will think they've found the noun when they're still reading adjectives, and will become confused. Eliminate descriptive words that aren't essential. Or, use prepositions and articles to clarify the relationships among the words.

## **Use pronouns to speak directly to readers**

Pronouns help the audience picture themselves in the text and relate better to your documents. Using "you" pulls users into your document and makes it relevant to them. Using "we" to refer to your agency makes your agency more approachable. It also makes your sentences shorter and your document easier to read.

## **Don't use jargon**

Be concise—leave out unnecessary words. Don't use jargon or technical terms when everyday words have the same meaning. Use words and terms consistently throughout your document.

## **Use short, simple words**

Vocabulary choice is an important part of communicating clearly. Be expressive, but remember that most federal writing has no place for literary flair. It's not going to be someone's fireside reading. In making your word choices, pick the familiar or frequently used word over the unusual or obscure. As George Orwell said, "Never use a long word where a short one will do."

## **Omit unnecessary words**

Don't confuse your readers with long, complex sentences containing multiple phrases and clauses. One place to start working on this problem in your own writing is to watch out for "of," "to," "on," and other prepositions. You can also omit redundant words and avoid doublets and triplets (i.e., when authors repeat the same concept by using different words that say the same thing—such as "knowledge and information"). In other words, if it's possible to cut a word out, always cut it out.

## **Don't use slashes**

Apart from fractions, the slash has almost no good uses. "And/or" is a classic example. In most cases, writers mean either "or" or "and." But they don't want to take the time to decide which they mean, so they push the job off on the audience. That makes their writing ambiguous. As an author, you should decide what you mean. In the few cases—and there do seem to be very few—where you truly mean both, write out "either X, or Y, or both." Often when writers use slashes, a hyphen is more appropriate to join equal or like terms, as in "faculty-student ratio."

## **Write short sentences**

Express only one idea in each sentence. Long, complicated sentences often mean that you aren't sure about what you want to say. No sentence should exceed 25 words. Shorter sentences are also better for conveying complex information; they break the information up into smaller, easier-to-process units. Sentences loaded with dependent clauses and exceptions confuse the audience by losing the main point in a forest of words. Resist the temptation to put everything in one sentence; break up your idea into its parts, and make each one the subject of its own sentence. Vary your sentence length to make your text more interesting to the reader. That's what Hemingway did—no reason why you can't do the same.

## Keep subject, verb, and object close together

The natural word order of an English sentence is subject-verb-object. This is how you first learned to write sentences, and it's still the best way. When you put modifiers, phrases, or clauses between two or all three of these essential parts, you make it harder for your readers to understand you.

## Place the main idea before exceptions and conditions

When you start a sentence with an introductory phrase or clause beginning with “except,” you almost certainly force the reader to re-read your sentence. You are stating an exception to a rule before you have stated the underlying rule. The audience must absorb the exception, then the rule, and then usually has to go back to grasp the relationship between the two. Material is much easier to follow if you start with the main idea and then cover exceptions and conditions.

## Place words carefully

Sloppy word placement can cause ambiguity. To reduce ambiguity, put conditionals such as “only” or “always” and other modifiers next to the words they modify. Write “you are required to provide only the following,” not “you are only required to provide the following.”

## Pay attention to what comes last

Some researchers have found that readers tend to remember or give emphasis to what comes at the end of a sentence (see Gopen reference below). Pay attention to what you place at the end of sentence. Is that what you want readers to remember as they move to next sentence?

## References



The NCEH/ATSDR Office of Communication, Writer-Editor Services, developed this checklist and supporting materials using the following sources:

- Federal Plain Language Guidelines (available at [www.plainlanguage.gov](http://www.plainlanguage.gov))
- Message Mapping, Vincent T. Covello, PhD (available at [http://www.orau.gov/cdcynergy/erc/Content/activeinformation/resources/Covello\\_message\\_mapping.pdf](http://www.orau.gov/cdcynergy/erc/Content/activeinformation/resources/Covello_message_mapping.pdf))
- The Science of Scientific Writing, George Gopen and Judith Swan (available at <http://www.americanscientist.org/issues/feature/the-science-of-scientific-writing/1>)

# CDC's Clear Communication Index



## What is the Index?

The Index is a tool you can use to test fact sheets, web content, and similar materials. It will help you identify the most important factors that increase clarity and aid understanding of the messages you share with the public.

## How Does the Index Work?

Ask one or more of your colleagues to use the Index to score your material. (You may be a bit biased when trying to score your own material.) Open up the Index (a PDF file) and fill out the cover sheet—four short questions about audience and purpose. Ask your colleague(s) to read your document and cover sheet responses. Then, your colleague(s) should answer the 20 easy questions in the PDF.

## How Do I Get My Score from the Index?

The Index PDF file automatically calculates a score based on how your colleague(s) answer the 20 questions. If you score a 90 or higher, great. Your material is very likely clear and effective. If you score less than 90, you can review the 20 questions and see precisely what you need to improve.

## Do I Really Need to Fill Out the Cover Sheet?

Yes. The Index cover sheet has four critical communication questions:

1. Who is your target audience?
2. What is their health literacy level?
3. What is your communication objective (i.e., what do you want your readers to do, think, or feel after they read your material)?
4. What is your main message (i.e., what's the most important thing for your readers to remember)?



Answering these questions will help your colleagues evaluate your document relative to your audience and purpose.



Even if you don't use the Index to score your documents, use these four critical communication questions to help plan and guide your writing. If you aren't certain yet about your audience, communication objective, and main message, you aren't ready to be writing. Your answers to these questions will help you make decisions about what to include, what to exclude, and how to organize.

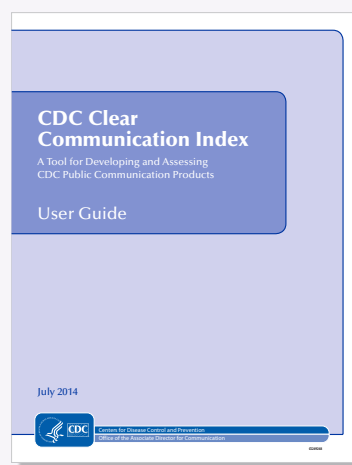
The cover sheet can help you remember that your document should be about audience and purpose, not author and topic. In other words, use the cover sheet as a guide to write about what your target audience needs to know about the topic, not all the details you want to say about it.

## Use the Index Now

The Index, user guide, and other supporting materials are also available to the public at <https://www.cdc.gov/ccindex/>.

## A Note about Including a Main Message

The Index stresses the importance of having a clear, succinct main message in your document. This technique helps your readers quickly and easily understand the most critical information. Without a clear main message, you are placing a heavy burden on them to try to figure out what's important.



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