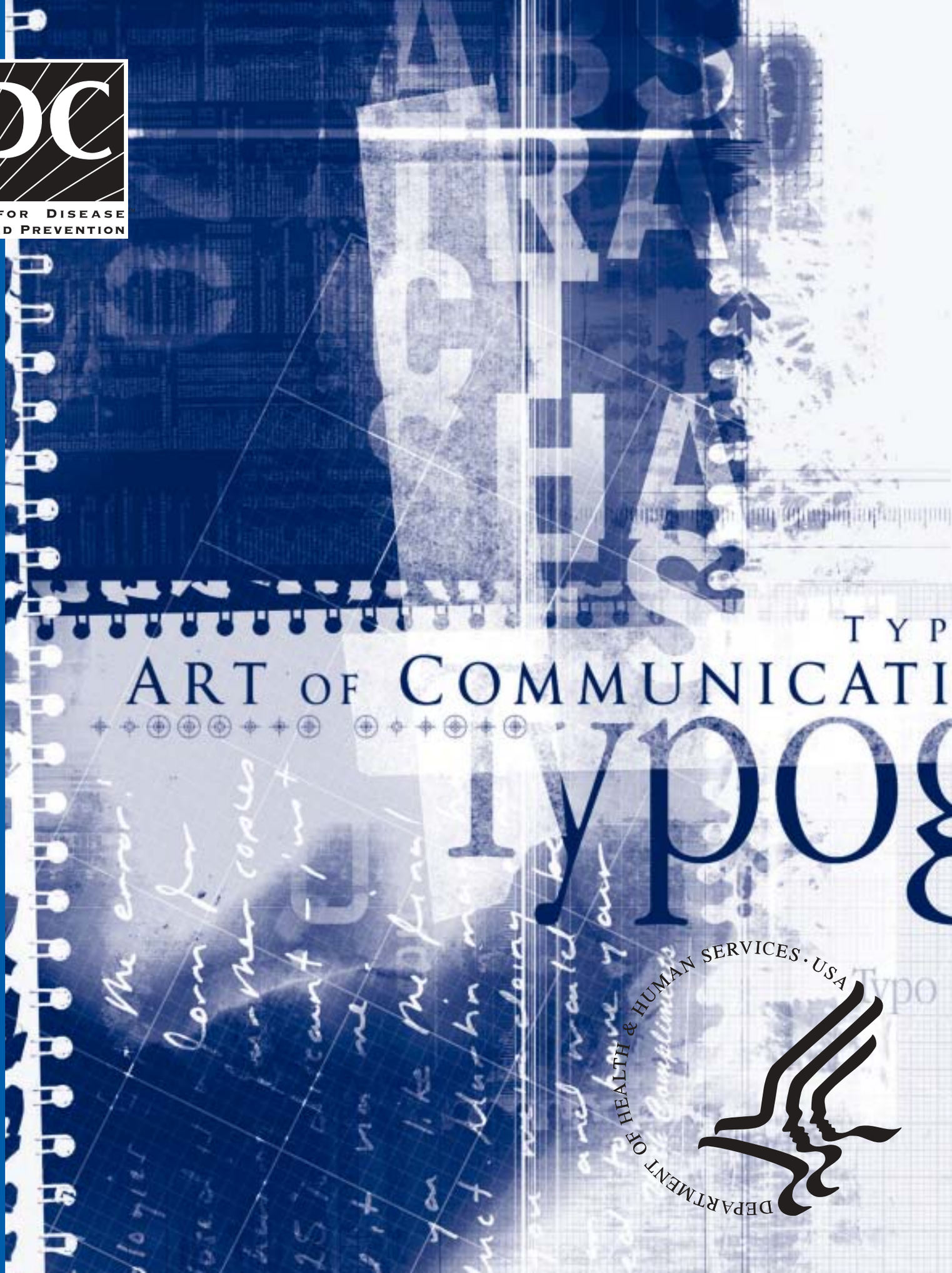
CDC Style Guide

August 2003

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION



CENTERS FOR DISEASE
CONTROL AND PREVENTION

CDC Style Guide

August 2003

U.S. Department of Health and Human Services

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Introduction

> "Of all the arts in which the wise excel, Nature's chief masterpiece is writing well."
>
> **John Sheffield**

The written word is one of the most effective ways to express thoughts and ideas, provide and share information, and educate and inform audiences. A clear and compelling message is based on simple, understandable words, correct sentence construction, and elegant style.

The *CDC Style Guide*

The *CDC Style Guide* will help everyone who writes documents ranging from letters to press releases to journal articles. The style guide includes writing guidelines and tips and is designed to save editors and writers time by answering frequently asked questions about grammar, style, punctuation, preferred word usage, and reference styles. In addition, the style guide provides guidelines for producing posters and electronic presentations and for writing for the Web. Finally, the style guide addresses clearance and correspondence procedures, presents reference citation styles, and includes useful appendices.

All CDC materials need to be clear and accurate. In addition, these documents should have a uniform look and feel and should reflect and support the CDC identity. Writers tend to develop a personal writing style, usually a mix of commonly accepted grammar rules and preferred stylistic conventions. The *CDC Style Guide* is meant to be a reference tool, so that everyone at CDC can have a common place to learn about grammatical questions, and make sure that our stylistic choices meet accepted rules. The grammar points in this style guide have been pulled from commonly accepted grammar references such as the *AMA Manual of Style*, the *Chicago Manual of Style*, and *Elements of Style* by Strunk and White.

The *CDC Style Guide* and its companion, the *CDC Identity Guide*, will help you communicate with greater efficiency and clarity. These guides will help ensure that your message is accurate and understandable and that it reflects the agency's look and mission. For help with incorporating the CDC identity themes into your documents, consult the *CDC Identity Guide*, or the *CDC Identity Management System* available at *http://intra-apps.cdc.gov/cdcidentity/Login/Home/login.asp.*

The Elements of Good Writing

The following are points to consider when writing your documents.

Be Concise

William Strunk, Jr. captured the essence of good writing when he said, "Vigorous writing is concise. A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts."

Be Clear

Good writing is also clear writing; it should include simple words whenever possible. Perhaps the one mistake that writers make most often is using complicated words instead of plain ones. If you want your message to be easily understood, choose simple words. For further guidance on plain writing, consult CDC's *Scientific and Technical Information Simply Put* at *www.cdc.gov/od/oc/simpput.pdf* or the Plain English Network's (PEN) Web site at *www.plainlanguage.gov.*

Consider the examples of famous scientists who were concise and used simple language to convey sophisticated concepts, proving also that simple does not mean simplistic. Watson and Crick described the double helix (the molecular structure of nucleic acids) in 900 words, one table, and six references. Arthur Kornberg wrote about the enzymatic synthesis of DNA in 430 words. Fritz A. Lipmann described coenzyme A in 250 words, one table, and five references.*

Be Precise

Good writing is also precise. The accurate and precise use of words is crucial in the medical and scientific fields. Your words can leave no room for error or misinterpretation. Many words in the English language are similar in meaning or sound. Be sure to know the differences between these words so you use the right word every time.

Be Correct

Finally, good writing is error-free and grammatically and stylistically correct. Incorrect grammar, confusing punctuation, erratic spelling, and awkward sentence construction

* Adapted from Martin M. Cummings, M.D., former director of the National Library of Medicine, in his 1973 honor lecture to the American Medical Writers Association.

will impede your message, slow the reading process, and make your writing look careless and unprofessional. A well-written document ensures that your message gets through.

Tip: For Your Writing

As you write, ask yourself the following questions:

- What is my key message?
- Am I accurately conveying my message?
- Will the readers immediately understand my message?
- Can I summarize my point in a few short and precise sentences?
- Can I express myself more clearly?
- Did I use the right words?

Tip: Writer's Checklist

These tips are adapted from the Elements of Style *by Strunk and White and are further developed in this style guide.*

- Write for your audience (identify your audience and its interests, education level, and other specifics).
- Use simple words (*we used,* NOT *we utilized*).
- Omit unnecessary words (*near,* NOT *in the vicinity of*).
- Avoid expletives (*there is, there are*).
- Avoid redundancies (*blue,* NOT *the color blue*).
- Avoid gender-specific words (*firefighter,* NOT *fireman*).
- Avoid jargon, archaic words, and buzz words (*aspect, idea, absolutely, really*).
- Avoid nominalization. Use verbs, not nouns (*the plan describes,* NOT *contains a description of*).
- Use strong action verbs (*consider,* NOT *give consideration to*; *concerns,* NOT *is concerned with*).
- Be brief and concise. Use short sentences and paragraphs. A readable sentence is short, simple, affirmative, and declarative.
- Use active rather than passive voice whenever possible (*I will know,* NOT *it will be known*).
- Avoid using too many capitals.
- Avoid negatives (*unsafe* instead of *not safe*).
- Avoid split infinitives whenever possible (*to go boldly*, NOT *to boldly go*).
- Be consistent in word use (if you call it a widget the first time, call it a widget throughout).
- Use parallel construction (in sentences, in lists).
- Use bullets for lists.
- Use tables, graphs, and charts, if appropriate.
- Use good design and layout, with plenty of white space (too many words on a page discourage readers before they begin reading).
- Use informative, meaningful titles, headings, and subheadings.

1 Common Grammar and Style Difficulties

> "Grammar is the prism through which all writing is refracted."
>
> **Patricia Robertson**

Writing clearly, concisely, and professionally requires the use of correct grammar. Nothing jars the reader more than coming upon words that are used incorrectly, subjects and verbs that do not agree, or misplaced modifiers that muddle the meaning of a sentence. This chapter discusses, in alphabetical order, the grammar rules and style principles you will encounter most frequently. Many topics mentioned in this section are discussed in depth in other sections of the *CDC Style Guide.*

Active Voice and Passive Voice

A verb is in the active voice when the performer of the act is the subject of the sentence. A verb is in the passive voice when the performer of the act is the object of the sentence.
Active voice: The physician **examines** the patient.
Passive voice: The patient **is examined by** the physician.

As a rule, use the active voice because it is more accurate, direct, precise, and interesting. Active voice is shorter and easier to read; it also flows better. The passive voice traditionally was the norm in technical writing because it was considered to be more scientific or objective. Most journals now encourage the use of the active voice.

However, the passive voice is preferred in the following circumstances, when:

- The subject is unknown.
  Example: A memo was circulated in the office.
- The subject is irrelevant to the matter or obvious.
  Example: The samples are being analyzed.
- The emphasis needs to be on the object, not the subject.
  Example: Smallpox was eradicated in 1980.

Dangling, Misplaced, and Squinting Modifiers

A modifier is a word or phrase that describes another word or phrase in the sentence. A modifier should be placed close to the word or group of words it modifies.

Dangling Modifier

A dangling modifier occurs when a word or phrase is implied rather than stated in a sentence. Adding the proper word or rephrasing the sentence can correct the mistake.

Incorrect: Having compiled all the data by hand, his results were illegible.
Correct: Because he had compiled all the data by hand, his results were illegible.

Misplaced Modifier

Misplaced words or phrases can result in ambiguous, humorous, or absurd statements.

Incorrect: She went into the hospital after being bitten by a spider in a bathing suit.
Correct: She went into the hospital in a bathing suit after being bitten by a spider.

Incorrect: The patient was referred to a psychiatrist with severe emotional problems.
Correct: The patient with severe emotional problems was referred to a psychiatrist.

Squinting Modifier

The imprecise placement of a modifier yields a squinting modifier. Be careful with modifiers such as *almost, exactly, even, hardly, just, merely, nearly, only, scarcely,* and *simply*. Their placement may alter the meaning of the sentence. Place the modifier to produce the meaning you intend to produce.

Examples: They were **only** asking about the vaccine. *(As if it were a minor issue)*
They were asking **only** about the vaccine. *(They asked about nothing else.)*
Only they were asking about the vaccine. *(No one else asked.)*

Each and Every

Each and *every* are always singular, whether they are used as indefinite pronouns or as modifiers.

Examples: **Each** of us **has** a task to complete.
Every epidemiologist, physician, and health official **is** dedicated to making this country safe and healthy.

Expletives

Expletives are not just four-letter words. The words *There* or *it* followed by a form of *to be* also are called expletives. Starting a sentence with an expletive often results in unnecessary verbiage. To be clear and concise, avoid expletives.

Avoid: There is evidence to suggest that smoking causes stomach cancer.
Use: Evidence suggests that smoking causes stomach cancer.

Avoid: It is often difficult to find links between diseases and the environment.
Use : Finding links between diseases and the environment is often difficult.

Imperative Mood

To emphasize recommendations and suggestions, use the imperative mood.

Weak: It is recommended that a committee be formed to study the cause of the fire.
Better: Form a committee to study the cause of the fire.

Parallelism

In parallel constructions, nouns must be parallel with nouns, verbs with verbs, adjectives with adjectives, and so on. Faulty parallelism is common and results in muddled communication.

Not parallel: Leave your name, number, and a brief message.
Parallel: Leave **your name, your number**, and **a brief message**.
Parallel: Leave your **name, number**, and **message**.

Not parallel: The scientist's goals were to find a cure and developing a vaccine.
Parallel: The scientist's goals were **to find** a cure and **to develop** a vaccine.
Parallel: The scientist's goals were **finding** a cure and **developing** a vaccine.

Not parallel: The proposed design is inefficient, invalid, and a danger to people's health.
Parallel: The proposed design is **inefficient, invalid,** and **dangerous** to people's health.

Correlative pronouns (both . . . and, either . . . or, neither . . . nor, not only . . . but also, whether . . . or) also must be parallel. For example, if a preposition applies to both elements, either place it before the first correlative or include it in both elements.

Not parallel: He was critical neither of the study design nor the results.

Parallel: He was critical **neither of** the study design **nor of** the results.

Parallel: He was critical of **neither** the study design **nor** the results.

Bulleted lists also must be parallel. The first item in each bullet must be in the same grammatical category.

Not parallel: A healthy lifestyle includes the following:

- Eating right.
- Avoidance of sweets.
- Exercise daily.
- Getting enough rest.

Parallel: A healthy lifestyle includes the following:

- **Eating** right.
- **Avoiding** sweets.
- **Exercising** daily.
- **Getting** enough rest.

Passive Voice

See "Active Voice and Passive Voice" on page 5.

Possessive

General Rule

The possessive of most singular nouns is formed by adding an apostrophe and an *s* (*'s*). The possessive of most plural nouns (except for a few irregular plurals) is formed by adding an apostrophe only.

Examples: the center's director
the laboratories' conclusions
the children's health

Singular Noun

For a singular noun, add *'s*, even if the noun already ends with an *s*.

Examples: the researcher's conclusion
the fox's fur
the virus's origin

Plural Noun

For a plural noun ending with an *s*, add an apostrophe only; do NOT add an extra *s*.

Examples: the researchers' conclusions
the foxes' fur
the viruses' origins

For a plural noun not ending with an *s*, add *'s* only.

Examples: women's health
the data's accuracy
five sheep's wool

Nouns Ending and Starting With an *S* Sound

If the first noun ends with an *s* (or an *s* sound) and the second noun starts with one, rephrase the sentence to avoid awkward pronunciation.

Awkward: the Congress's situation
Use: the situation of Congress

Awkward: the analysis's significance
Use: the significance of the analysis

However, if the final *s* (or *x* or *z*) of the first word is silent, insert *'s* to yield the proper pronunciation.

Examples: Lemieux's science
Arkansas's situation
Descartes's theories

Special Case–Eponyms

Eponyms, which are nouns derived from proper names of people, are common in scientific literature (Hansen's disease, Pascal's triangle). Although the possessive has been used traditionally in eponyms, the trend is to eliminate it. For example, the National Down Syndrome Society spells the condition without the apostrophe.

Following is a list of terms commonly used, with their *preferred* spellings.

Alzheimer disease	Crohn disease	Down syndrome
Graves disease	Hodgkin disease	Parkinson disease
Reye syndrome	Wilms tumor	

If the term includes more than one person, do not use the apostrophe.

Incorrect: Creutzfeldt-Jacob's disease
Correct: Creutzfeldt-Jacob disease

Note: Achilles' heel BUT Achilles tendon

The following table summarizes the rules of the possessive.

Noun	Rule
Singular Noun	Add 's. the pill's effectiveness the box's location the lens's cost
Plural Noun	For nouns ending with *s* or *es*, add apostrophe only. the pills' effectiveness the boxes' location the lenses' cost For nouns not ending with *s*, add 's. men's cancer rates the bacteria's origins deer's ticks
Two Nouns	If the first noun ends with an *s* (or *s* sound) and the second noun starts with one, rephrase the sentence. the strength of the analysis (NOT *the analysis's strength*) If the first noun ends with a silent *s*, *x*, or *z*, add 's to yield the proper pronunciation. Descartes's century Lemieux's lectures
Eponym	The tendency is to move away from using the possessive. Weber law (NOT *Weber's law*)

Preposition at End of Sentence

You may be familiar with a rule that says not to end a sentence with a preposition. When confronted with the rule, Winston Churchill said, "This is the sort of pedantry up with which I will not put." Although you should not abuse the practice, ending a sentence with a preposition can be appropriate.

Example: CDC provides health information people can count on.

Pronouns and Antecedents

You can shorten sentences by using pronouns, but be sure they have clear antecedents. For example, in the preceding sentence the antecedent of the pronoun *they* is unclear. Does it refer to *sentences* or to *pronouns?* Sometimes you have to rephrase the sentence or repeat the word.

Correct: You can shorten sentences by using pronouns, but be sure the pronouns have clear antecedents.

Punctuation

See the "Punctuation" chapter on page 37.

Redundancy

Redundancy is the use of several words that mean the same thing when one word would suffice. Redundancies make your writing seem careless and sloppy. Some redundancies are so common that you may be unaware of them, such as *reverting back* (you can only revert back) or *general consensus* (there is no other type of consensus). However, once you are aware of the problem, it is easy to correct. For a list of common redundancies, see the "Tautologies and Redundancies" section on page 77.

Sentence Length

Try to vary the length of your sentences; this will help delineate your ideas and maintain your readers' interest. Sentences that are all the same length are monotonous; sentences that are too short produce a choppy effect; and sentences that are too long are difficult to follow.

Sentence length also affects the readability of your material, which is something to consider if you are writing at a specific reading level. To assess the readability of a document, use the SMOG readability formula, which can be accessed at *www.cdc.gov/od/ads/smog.htm*.

Subject and Verb Agreement

Sometimes it is difficult to decide whether a verb should be singular or plural. The following list provides some guidance.

The number of, the total number of: the verb is singular.

Examples: **The number of** samples **was** unknown.
The total number of cases **was** hard to predict.

A number of, a total of: the verb is plural.

Examples: **A number of** patients **were** examined.
A total of 50 vials **were** sent to the laboratory.

As well as, in addition to, along with: the verb agrees with the main subject only.

Example: **Rubella**, as well as chickenpox, **is** contagious.

Or, neither . . . nor, either . . . or: the verb agrees with the subject closest to the verb.

Examples: The physicians or the **nurse has** to be present.
The physician or the **nurses have** to be present.
Neither the medication nor the **hospital stays were** helpful.
Neither the hospital stays nor the **medication was** helpful.

None, other quantities: the agreement of the verb is context dependent.

None: **None** of the **medication was** taken.
None of the **symptoms were** present.

Quantities: **Half** of the **pill was** enough.
Half of the **patients were** sent home.

Singular and Plural of Non-English Words

Many scientific terms are derived from other languages, particularly Latin and Greek. The plural forms of non-English terms often follow the rules of the original language. Following is a sample list of such terms. Because usage varies by publication, some terms have alternate plural spelling. For a more complete list, see the "Plural Endings from Non-English Languages" section of the *CBE Manual for Authors, Editors, and Publishers* (6th edition, page 88). ▼

Singular	*Preferred Plural*	*Acceptable Plural*
alga	algae	…
appendix	appendices	appendixes
criterion	criteria	criterions
datum	data	…
femur	femora	femurs
genus	genera	…
index	indexes	indices (in economics and mathematics)
insignia	insignia	insignias
phenomenon	phenomena	…
thorax	thoraxes	thoraces
medium	media	mediums
vertebra	vertebrae	vertebras

Split Infinitives

In general, avoid awkward constructions that split infinitive forms of a verb (to leave, to help) or compound forms (had left, are found out).

Avoid: She was ordered to immediately leave on an assignment.
Use: She was ordered **to leave** immediately on an assignment.

However, there are occasions when a split infinitive is necessary to convey meaning.

Examples: He wanted to really help his mother.

That / Which / Who

These pronouns are not interchangeable.

That and *which* refer to animals, things, or anonymous groups of people. Use *that* to introduce a restrictive (defining, limiting) phrase and *which* to introduce a nonrestrictive (parenthetical, nondefining) phrase. Insert commas before and after nonrestrictive phrases.

Hint: If the clause being introduced by *that* or *which* could be omitted or put in parentheses, use *which*. Otherwise, use *that*.

Who refers to people and animals with names or special talents. *Who* can introduce restrictive and nonrestrictive clauses.

That: The samples **that** he analyzed had been stored for 2 weeks. (The clause *that he analyzed* defines the noun *samples*; it tells which samples had been analyzed.)

Which: The samples, **which** he analyzed, had been stored for 2 weeks. (*Which* introduces extra information that could be dropped without affecting the sentence.)

Who: The giant pandas Lun Lun and Yang Yang, **who** came to Atlanta in 1999, attract a lot of visitors.

Tip: Who or Whom?

Correctly Choosing Who *or* Whom

1. Locate the main clause (in bold here).
   a. He is the one [who/whom] **found a cure.**
   b. He is the one [who/whom] **everyone admires.**

2. Drop *who* or *whom* from the main clause, you are left with a gap.
   a. _____ found a cure.
   b. everyone admires _____.

3. If *he* makes sense in the gap, *who* is correct; if *him* makes sense, *whom* is correct.
   a. **he found a cure** makes sense; therefore, the correct word is *who*.
   b. **everyone admires him** makes sense; therefore, the correct word is *whom*.

Who / Whom

The distinction between *who* and *whom* is often lost. However, these pronouns are not interchangeable; *who* stands for the subject of a clause, whereas *whom* replaces the object of a sentence.

Who: Marie Curie is a scientist who won two Nobel prizes. (*Who* stands for *Marie Curie*, the subject of the sentence.)

Whom: Marie Curie is a scientist whom we all heard about. (*Whom* replaces *scientist*, the object of the sentence.)

Wordiness

Effective writing is concise and to the point. As W. Somerset Maugham said, "Stick to the point, and, whenever you can, cut." Use the minimum number of words for the maximum effect. One key is to use strong verbs in the active voice and to limit the use of nouns, adverbs, adjectives, and buzz words. See the "Jargon"section on page 73 for examples of wordiness and their alternatives.

Weak: It is very important for all necessary precautions to be followed scrupulously.

Better: Follow all precautions.

Weak: A considerable number of people are utilizing the test at the present time.

Better: Many people are using the test now.

2 Mechanics

> "Tis better to be brief than tedious."
>
> **Shakespeare**

This chapter covers the use of abbreviations, acronyms, capital letters, and type styles. Although some rules are set, others are more flexible and depend on convention. For example, some manuals advocate the use of the article *the* in front of an acronym, others do not.

The rules mentioned in this section reflect long-standing CDC usage (we say *CDC* and not *the CDC*). However, as usual, the most important rule is to be consistent throughout the document and to use common sense over dogma.

Abbreviations

To ensure proper comprehension follow these rules: use abbreviations sparingly in text, never start a sentence with an abbreviation, and insert a period after most abbreviations. Following are examples of the correct use of abbreviations.

Addresses and U.S. States

In Letter Writing

On envelopes or in letters you can either abbreviate or spell out addresses. However, always abbreviate directions (N.E.). To abbreviate states, use the two-letter postal code (GA, MT).

Note: The policy of the Office of the Executive Secretariat is NOT to use abbreviations with addresses, neither on the envelope nor in the body of the letter, except for directions.

Non-abbreviated Example	*Abbreviated Example*
Centers for Disease Control and Prevention	Centers for Disease Control and Prevention
1600 Clifton Road, N.E., Mailstop D-14	1600 Clifton Rd., N.E., MS D-14
Atlanta, Georgia 30333	Atlanta, GA 30333

In Text

In text, spell out names of U.S. states when they stand alone or are used after a county. When a city and state are inside a sentence, place commas after the city and the state. Spell out the name of the state after the city or use standard abbreviations (see the list of abbreviations on page 19). Use the two-letter postal code (GA, MT) with ZIP codes only.

Examples: They live in Fulton County, Georgia, but near the DeKalb line. (NOT *Fulton County, GA*)

The agency is headquartered in Atlanta, Georgia, and has 10 regional offices.

The agency is headquartered in Atlanta, Ga., and has 10 regional offices. (NOT *GA*)

Use the abbreviation *U.S.* only as an adjective; spell out *United States* when it is used as a noun.

Examples: The latest U.S. figures show that one out of every four deaths results from cancer.

In the United States, one out of every four deaths results from cancer.

Include the name of the state at the first mention of the city if the clarification is important. Do not include the name of the state if it would be redundant. Do not include the city if it is irrelevant.

Examples: The chemical leak occurred in Paris, Texas. (Several cities share that name.)

She studied at the University of Virginia in Charlottesville. (Adding *Virginia* after the city is redundant.)

The Centers for Disease Control and Prevention released new guidelines. (*Atlanta* is irrelevant.)

Following is a list of standard and postal abbreviations for U.S. states, including freely associated states.

State	Abbreviation	Postal Code	State	Abbreviation	Postal Code
Alabama	Ala.	AL	Missouri	Mo.	MO
Alaska	Alaska	AK	Montana	Mont.	MT
American Samoa	Amer. Samoa	AS	Nebraska	Nebr.	NE
Arizona	Ariz.	AZ	Nevada	Nev.	NV
Arkansas	Ark.	AR	New Hampshire	N.H.	NH
California	Calif.	CA	New Jersey	N.J.	NJ
Colorado	Colo.	CO	New Mexico	N.M.	NM
Connecticut	Conn.	CT	New York	N.Y.	NY
Delaware	Del.	DE	North Carolina	N.C.	NC
District of Columbia	D.C.	DC	North Dakota	N.Dak.	ND
Federated States of Micronesia	F.M.	FM	Northern Mariana Islands	M.P.	MP
			Ohio	Ohio	OH
Florida	Fla.	FL	Oklahoma	Okla.	OK
Georgia	Ga.	GA	Oregon	Ore.	OR
Guam	Guam	GU	Palau	P.W.	PW
Hawaii	Hawaii	HI	Pennsylvania	Pa. or Penna.	PA
Idaho	Idaho	ID	Puerto Rico	P.R.	PR
Illinois	Ill.	IL	Rhode Island	R.I.	RI
Indiana	Ind.	IN	South Carolina	S.C.	SC
Iowa	Iowa	IA	South Dakota	S. Dak.	SD
Kansas	Kans.	KS	Tennessee	Tenn.	TN
Kentucky	Ky.	KY	Texas	Tex.	TX
Louisiana	La.	LA	Utah	Utah	UT
Maine	Maine	ME	Vermont	Vt.	VT
Marshall Islands	M.H.	MH	Virginia	Va.	VA
Maryland	Md.	MD	Virgin Islands	V.I.	VI
Massachusetts	Mass.	MA	Washington	Wash.	WA
Michigan	Mich.	MI	West Virginia	W. Va.	WV
Minnesota	Minn.	MN	Wisconsin	Wis.	WI
Mississippi	Miss.	MS	Wyoming	Wyo.	WY

Formal Titles and Academic Degrees

Abbreviate formal titles (e.g., Dr., Mr., Mrs., Ms.) in front of a last name. However, spell out *Doctor* and *Professor* if they start a sentence or if they do not immediately precede a last name.

Examples: We met Dr. Archer at the conference.
Doctor Archer attended the conference.
Stephen W. Hawking is the Lucasian Professor of Mathematics at Cambridge University.

Academic degrees (M.P.H., Ph.D.) are usually abbreviated. Do not include both an academic degree and *Dr.* with one name.

Example: Beverly Crusher, M.D., M.P.H. (NOT *Dr. Beverly Crusher, M.D., M.P.H.*)

Journal Titles

For a scientific audience, abbreviate the names of journals in reference lists according to the National Library of Medicine's *Index Medicus* at *www.nlm.nih.gov/tsd/serials/lji.html.* Do not italicize these abbreviations. For more details, see the "Reference Style" chapter on page 121.

For lay audiences (including Congress) and in texts, spell out and italicize the names of journals.

Mathematical Symbols

In text, avoid using mathematical symbols; use words instead. For more details on using mathematical symbols, see the "Numbers" chapter on page 31.

Avoid: We examined 90+ patients.
Use: We examined more than 90 patients.

Scientific Terms

The list of abbreviations commonly used in the scientific field (such as units of measure or technical terms) is too large to be included here. An exhaustive list can be found in the *AMA Manual of Style* (9th edition, chapter 11).

Acronyms

Acronyms, unlike abbreviations, are not followed by periods.

When to Use Acronyms

Spell out the term on first reference, followed by its acronym in parentheses. Use the acronym in the rest of the document.

Example: The Centers for Disease Control and Prevention (CDC) is testing the samples. According to CDC, the result should be available in 48 hours.

If the expanded form includes a possessive, do not include the possessive in the parentheses.

Example: The Centers for Disease Control and Prevention's (CDC) guidelines are listed on the Internet.

When to Use *the* With Acronyms

Omit the article *the* when the acronym is pronounced as a word (e.g., OSHA, NIOSH). If the acronym is not pronounced as a word, the rule depends on usage. The preferred usage at CDC is to omit the article in front of most acronyms unless it looks or sounds odd.

Incorrect: The NIOSH conducts research on occupational diseases and injuries.
Correct: NIOSH conducts research on occupational diseases and injuries.

Acceptable: At the CDC, we work hard to make people safer and healthier.
Preferred: At CDC, we work hard to make people safer and healthier.

When NOT to Use Acronyms

If a term appears only once or a couple of times in the document, spell it out rather than use the acronym. Remember that the use of many acronyms in a single document can impede comprehension and result in an "alphabet soup."

Some terms such as HIV or AIDS are so familiar that they do not need to be spelled out.

Avoid acronyms at the beginning of a sentence, in a title, or a heading, unless the acronym spells out a word (AIDS) or stands for an agency.

Avoid: Council for Scientific Research (CSR)
Use: Council for Scientific Research

Acronyms for CDC Centers, Institute, and Offices

The following table gives an overview of CDC's organizational components, as of August 2003.

National Center on Birth Defects and Developmental Disabilities	**(NCBDDD)**	provides national leadership for preventing birth defects and developmental disabilities and for improving the health and wellness of people with disabilities
National Center for Chronic Disease Prevention and Health Promotion	**(NCCDPHP)**	prevents premature death and disability from chronic diseases and promotes healthy personal behaviors
National Center for Environmental Health	**(NCEH)**	provides national leadership in preventing and controlling disease and death resulting from interactions between people and their environment
National Center for Health Statistics	**(NCHS)**	provides statistical information that will guide actions and policies to improve the health of the American people
National Center for HIV, STD, and TB Prevention	**(NCHSTP)**	provides national leadership in preventing and controlling human immunodeficiency virus infection, sexually transmitted diseases, and tuberculosis
National Center for Infectious Diseases	**(NCID)**	prevents illness, disability, and death caused by infectious diseases in the United States and around the world
National Center for Injury Prevention and Control	**(NCIPC)**	prevents death and disability from nonoccupational injuries, including those that are unintentional and those that result from violence
National Immunization Program	**(NIP)**	prevents disease, disability, and death from vaccine-preventable diseases in children and adults
National Institute for Occupational Safety and Health	**(NIOSH)**	ensures safety and health for all people in the workplace through research and prevention
Epidemiology Program Office	**(EPO)**	strengthens the public health system by coordinating public health surveillance; providing support in scientific communications, statistics, and epidemiology; and training in surveillance, epidemiology, and prevention effectiveness
Public Health Practice Program Office	**(PHPPO)**	strengthens community practice of public health by creating an effective workforce, building information networks, conducting practice research, and ensuring laboratory quality

Capitalization

Capitalizations within sentences should be used sparingly and accurately. In general, avoid unnecessary capitals because they slow the reading process. Use a capital letter only if you can justify it by one of the principles listed below.

Bulleted Lists

Capitalize the first word of each bulleted item.

Example: Take the following precautions to protect yourself from UV exposure:

- Limit direct sun exposure during midday.
- Cover up.
- Wear a hat.
- Use a sunscreen with an SPF of 15 or higher.

Compass Points

Capitalize *north*, *south*, *east*, and *west* when they designate regions but not when they designate directions.

Examples: Chicago is in the Midwest, but Atlanta is in the Southeast.
Acupuncture comes from the Far East.
Amicalola Falls State Park is in North Georgia.
The airport is 10 miles southwest of town.

Cross-references in Text

Capitalize nouns (e.g., table, figure, chapter, volume, appendix) if they are used as designators in the text and followed by a number or letter.

Examples: As described in Table 2
The cancer cells were spreading (Figure A)
Consult Volumes 2–4
See Chapter 5, Section B

When referring in general terms to a section or chapter do not capitalize these words. However, when referring specifically to the title of a section or chapter, capitalize the title as it appears originally and enclose it in quotation marks.

Examples: See the chapter on genetics. (*chapter* is set in lowercase because it is a designator and not a title.)
See Chapter 2 on genetics. (*Chapter* is capitalized because a number follows it.)
See the "Genetics" chapter. (*Genetics* is capitalized and in quotation marks because it is the title of that chapter.)
See the next chapter, "Punctuation," for more. (Note the commas.)

Set the words *line* and *page* in lowercase.
Example: The section starts on page 25, line 12.

Diseases and Microorganisms

When an eponym is included in the name of the disease, syndrome, or other term, do not capitalize the second word.

Parkinson disease	Down syndrome

Do not capitalize eponyms referring to units of measure or other well-established common usage terms. Do not capitalize eponyms derived from proper nouns (and used as adjectives).

curie	joule
caesarean delivery	fallopian tube
addisonian crisis	parkinsonian tremor

For microorganisms, except viruses, capitalize the singular genus name but not the specific epithet, and italicize both. Do not capitalize or italicize the genus name in the plural. Do not capitalize or italicize the name of viruses.

Examples: Tuberculosis is caused by the bacterium *Mycobacterium tuberculosis.*
The genus *Ehrlichia* includes seven recognized species. (Singular)
A number of other ehrlichiae also cause diseases in animals. (Plural)
The hepatitis B virus attacks the liver.

First Word of a Quotation

Quoted material should respect the original form. Usually the first word of a quote is capitalized. However, if the quotation is integrated into the sentence, you may want to use lowercase.

Examples: The article noted, "More than 2 million screening tests were provided."
The article noted that "more than 2 million screening tests were provided."

Geographic Names

Capitalize all geographic locations, including cities, counties, states, regions, countries, continents, bodies of water, mountains, forests, canyons, dams, parks, and streets. Following are some examples.

the Antarctic	the Atlantic Ocean	the Bay Area
Central Africa	the Great Lakes	the Gulf of Mexico
the Hoover Dam	Hudson Bay	Lake Ontario
Mexico City	the Mississippi River	New York State
the South Pole	Yellowstone National Park	the West Coast

Although a common noun (sea, ocean, park, river) used with a geographic name is capitalized in the singular, it is not capitalized in the plural.

Examples: the Mississippi River
the Mississippi and Missouri rivers

Government Agencies, Businesses, and Other Institutions

Capitalize the names of government agencies, businesses, and other institutions. Do not capitalize conjunctions, articles, or prepositions of three or fewer letters unless they start a sentence.

Congress the U.S. government the U.S. Army
the International Committee of the Red Cross (NOT *Of The Red Cross*)

For names of institutions, do not capitalize the article *the* unless it is part of the official title.

Examples: He gave a speech at The Johns Hopkins University.
He gave a speech at the University of Virginia.

When the name of the institution is used as a common noun, do not capitalize it.

Example: In 1990, she graduated from the University of Virginia. After she left the university, she moved to Atlanta.

Note: Do not capitalize *federal*, *state* and *local*, unless they start the sentence.

Example: The task force advises federal, state, and local governments.

Proprietary Names

Capitalize proprietary names of drugs and products, but do not include the trademark symbol. Do not capitalize the generic names of drugs.

Example: The physician prescribed Tylenol (acetaminophen).

Seasons and Holidays

Capitalize holidays and calendar events, but do not capitalize seasons.

Labor Day Fourth of July summer fall

Sociocultural Derivatives

Capitalize names of languages, peoples, races, ethnic groups, nationalities, political parties, and religions. However, do not capitalize *white* or *black* when referring to race.

the English language
French people
African Americans (BUT *blacks*)
Democrats and Republicans
Buddhist monks

Titles of Books, Essays, Headings, and Conferences

Capitalize major words and two-letter verbs (do, go, be). Do not capitalize the *to* of the infinitive, conjunctions, articles, or prepositions of three or fewer letters, unless they begin a sentence. Italicize titles if they are in running text.

Examples: What Is Rheumatoid Arthritis? (A stand-alone title is not italicized.)
How to Treat Ear Infections in Small Children
Call the toll-free number to order *What Is Rheumatoid Arthritis?* (A title inside a sentence is italicized.)

Capitalize both parts of dual verbs.

Examples: Gearing Up for a Healthier Lifestyle
Following Up on the Anthrax Scare

Do not capitalize the second part of hyphenated words.

Examples: Follow-up on the AIDS Vaccine
Long-term Effects of Radiation Exposure

Titles of Persons

Capitalize only formal titles used directly before a person's name.

Examples: In 1933, President Roosevelt said, "The only thing we have to fear is fear itself."
The president said, "The only thing we have to fear is fear itself."

In general, do not capitalize long titles; separate them from the individual's name with a comma.

Example: William Riker, the undersecretary of the cabinet, was the guest speaker.

The following table summarizes the use of capitals and lowercase letters.

	Capital Letter	***Lowercase Letter***
Bulleted Lists	Take these precautions: ■ Limit direct sun exposure. ■ Cover up. ■ Wear a hat.	
Compass Points	the South (a region)	turn south (a direction)
Cross-references in Text	Table 2, Chapter 5 see Chapter 5 on numbers see the "Numbers" chapter	this table, this chapter see the chapter on numbers go to page 10, line 2
Diseases and Microorganisms	Parkinson disease *E. coli*	parkinsonian gait coliform bacteria group
First Word of a Quotation	He said, "We are ready."	He said that "we are ready."
Geographic Names	Atlantic Ocean	the ocean
Government Agencies, Businesses, and Other Institutions	Congress the U.S. government the Republican Party the Iowa State Supreme Court the University of Virginia	congressional the government the party the state supreme court the university
Proprietary Names	Amoxyl (brand name)	amoxicillin (generic name)
Seasons and Holidays	Memorial Day	spring, winter
Sociocultural Derivatives	Native American, Hispanic	black, white
Titles of Books, Essays, Headings, and Conferences	*A Brief History of Time*	*The Long-term Benefits of Exercise* (Do not capitalize *to* of the infinitive, conjunctions, articles, or prepositions of three letters or less unless they start a sentence.)
Titles of Persons	President Roosevelt	the president

Type Styles (Bold, Italics, Underline, and All Caps)

Bold, *italics,* underline, and ALL CAPS are common features to help you alter the look of a document. Use these elements sparingly and with caution. If used incorrectly or too frequently, these features will distract from the flow of the words.

Using Type for Emphasis

To emphasize a point, use **bold** and *italics* instead of underlining or ALL CAPITAL LETTERS. Underlined text is more difficult to read and should be avoided. For the same reason, DO NOT WRITE EXTENDED AMOUNTS OF TEXT IN ALL CAPS. Use all caps only for short titles. In the rare instances where you have to use all caps in a text, use short words and bold them (e.g., **DANGER!**).

Italics

Italics are used for emphasis and in the following contexts:

Titles

When referencing in a document, italicize titles of books, magazines, newspapers, journals, pamphlets, films, television and radio programs, software programs, works of art, ships, and planes. All other titles are enclosed in quotation marks. *Note:* Do not italicize titles if they appear in references at the end of a document. For more information, see the "Reference Style" chapter on page 121.

New York Times	*Federal Register*	*Meet the Press*
Excel	USS *Enterprise*	Picasso's *Guernica*

Legal References

In a text, the names of cases, federal regulations, congressional hearings, and laws are written in the following manner. *Note:* Do not italicize these if they appear in references at the end of a document.

Case:	*Wilcox v United States*, 387 F2d 60 (5th Cir 1967)
Federal Regulation:	*66 Federal Register* 7068 (2001) (codified at 25 C.F.R. §15)
Hearing:	*Field Hearing on Air Quality and Health Impacts of the September 11 Attack on the World Trade Center,* 107th Cong., 1st Sess. (2002) (testimony of U.S. Representative Jerrold Nadler, D-NY)

The names of statutes are not italicized.

Example: Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §9601-9675 (1988)

Non-English Words and Phrases

Many foreign words are now part of the English language and are not italicized. However, italicize the words and phrases that have not been assimilated.

in vitro	in vivo	versus
tour de force	*coup d'état*	*incommunicado*

Scientific Terms

Some scientific terms are italicized for clarification or because they are foreign words. The rules for italicizing organisms are elaborate; we will mention only the most common rules. For more details, consult the "Nomenclature" chapter in the *AMA Manual of Style* (9th edition).

Italicize names of bacterial organisms, parasites, and strains in the singular. Capitalize the first word only.

Examples: the common human pathogen *Helicobacter pylori*
the malaria parasite *Plasmodium vivax*
Escherichia coli O157:H7 (Use the letter *O* and not the numeral *0*.)

If the names are used in the plural, use lowercase and do not italicize them. If you cannot determine the plural form, add the word organism or species after the italicized term.

Example: typing of group A streptococci

3 Numbers

> "I have often admired the mystical way of Pythagoras and the secret magic of numbers."
>
> **Sir Thomas Browne**

Use numbers correctly in written documents to ensure accuracy and to avoid confusion. Various guidelines govern the use of numbers in text and help determine whether to use numerals (1, 2, 3, I, II, III) or words (one, two, three).

Because the recording of numbers is based more on conventions than on rules, different sources adhere to different conventions. Therefore, use common sense, not dogma, when deciding which guidelines to apply. However, using the following guidelines promotes uniformity for all CDC documents.

For more details on the use of numbers, refer to the *AMA Manual of Style*.

Spelling Out Numbers

General Rule

In text, spell out numbers one through nine. Use numerals for 10 and above. Zero is usually spelled out, so as not to be confused with the letter *O*.

Examples: The virus infected five laboratory workers and seven animals.
The virus infected 10 laboratory workers and 12 animals.

When recording numbers in tables and figures—not in text—always use numerals. In addition, use numerals for units of measure (e.g., age, time, money) and forms of numbers (e.g., decimals, percents), even if they are below 10. For more details, see the "Using Numerals" section on page 33.

Examples: He came to the agency 2 years ago.
Toxic shock syndrome is fatal in 5% of cases.

Combination of Numbers Less Than and Greater Than 10

If you have a combination of numbers less than and greater than 10, treat related numbers alike.

Example: In 1997, two outbreaks of Ebola virus hemorrhagic fever resulted in 12 cases and 8 deaths. (Numerals are used for all related items because one of them is greater than nine. The first number is spelled out because it is unrelated and less than 10.)

Numbers Beginning a Sentence, Title, or Heading

Spell out the number if it starts a sentence, title, heading, or subheading. When a unit of measure or a symbol follows the number, it too must be spelled out. It is usually better to rephrase the sentence.

Correct: Eighty milligrams of aspirin per day can help prevent the recurrence of a heart attack.

Better: Taking 80 mg of aspirin per day can help prevent the recurrence of a heart attack.

If the number is a year, it can be expressed numerically.

Correct: 1980 marked the eradication of smallpox.

Better: The year 1980 marked the eradication of smallpox.

Consecutive Numbers

To avoid confusion or ambiguity in the case of two consecutive numbers that cannot easily be separated, spell out the one that is more easily understood in word form, or try to rephrase the sentence.

Example 1: The package contains twenty 50-mg pills.

Example 2: Out of five hundred, 200 were affected.

Better: Out of 500, a total of 200 were affected.

Large and Indefinite Amounts

Spell out indefinite numbers and amounts.

Examples: several hundred investigators
a few thousand people
thousands of people

Common Fractions

Spell out common fractions. Insert a hyphen only if the fraction modifies a noun.

Examples: Patients have adverse reactions to the medication in one third of the cases.
A two-thirds majority is needed. (NOT *two-third*)

Using Numerals

General Rule

In scientific text, express units of measure (e.g., age, time, money) and forms of numbers (e.g., decimals, percents) in numerals, even if they are below 10.

Examples: Preventing a cavity through water fluoridation costs about $4.
Only about 6% of children 4 to 8 years of age ride in booster seats.

Units of Measure

The following table outlines the main units of measure, with examples. ▼

Age	at the age of 65 years	five patients 65 years and older
	adults over 18 years old	the patient, age 79 years, recovered
	the 79-year-old patient	children 5 to 9 years of age
Clock Time	6 p.m.	6 o'clock (NOT *6 o'clock p.m.)*
	noon (NOT 12 noon)	noon to 1:30 p.m. (NOT *12 noon*)
	8 a.m. to 5 p.m.	8:00 a.m. to 5:30 p.m. (NOT *8 a.m. to 5:30 p.m.*)
Compound Modifier	a 6-foot-5-inch person	an 8-year-old study
Date	From October 2001 through January 2002, CDC investigated 100 cases.	
	On February 5, 2002, he had a stroke. (NOT *February 5th*)	
	See the March 2002 issue of *Nature*.	
	See the March 29, 2002, issue of *MMWR*.	
Measurement Range	In a range of numbers, place the unit of measure after the second number only, except when there is no space between the number and the unit of measure.	
	5×10 ft	5'×10'
	10–20 grams	10%–20%
	70 to 80 mL	70°F–80°F
Money	5¢	$7
	$12.50	$1,500
	£30.5 million	$10 million OR $10,000,000
	Repeat the money symbol sign with each number.	
	Example: Each tablet costs 10¢ to 50¢.	
	For a mixture of cents and dollars, use the dollar sign.	
	Example: Each tablet costs $.90 to $1.50. (NOT *90¢ to $1.50*)	

Units of Measure *(continued)*

Money *(continued)*

Repeat the word *million* or *billion* with each number.
Example: The vaccination program will cost $200 million to $250 million.

Express related amounts the same way.
Example: from $100,000 to $1,000,000 (NOT *$100,000 to $1 million*)

For fractional numbers, use the number, not the fraction.
Examples: The medication will cost $250,000. (NOT *$¼ million*)
The medication will cost $500 million. (NOT *$½ billion*)

Do not insert a space between the money symbol (i.e., $, £, ¥, and 1) and the numeral. However, insert a space if the unit of currency is an abbreviation (e.g., CHF, which is the abbreviation for the Swiss Franc).
Examples: $500 £200 ¥700 1600 CHF 300

Temperature

Do not insert a space between the numeral and the degree symbol. With a range, repeat the symbol after each number.
Examples: 75°F 28.5°C 60°C–90°C

Time Period

2 hours a 24-hour wait
the 1970s (NOT *the 1970's*) the '70s
the mid-'70s the 21st century
during 1995–1998 (NOT *1995–98*)

For less precise time frames, use mixed fractions.
Examples: The procedure will last about 3¼ hours.
He showed symptoms 2½ days after exposure.

Forms of Numbers

Decimals

If a unit of measure follows the numeral, use the decimal format, not fractions.
1.75 mg (NOT *1¾ mg*) 2.5 kg (NOT *2½ kg*)

If the value is less than 1, insert a zero before the decimal point.
0.2 g (NOT *.2 g*) 0.9 mg/kg

Ordinals

Ordinals generally express ranking rather than quantity, so spell out *first* through *ninth*, and use the numeral for *10th* and above.

Examples: The fourth patient was admitted in critical condition.
The 12th patient died shortly after his arrival.

When you have a mixture of ordinals below and above nine, use numerals.

Incorrect: The fifth and the 12th patients showed similar symptoms.
Correct: The 5th and the 12th patients showed similar symptoms.

Percentages

Use the numeral and the *%* symbol for specific percentages. Do not insert a space between the numeral and the symbol (25%). When a number starts the sentence, spell out both terms.

Examples: Over 90% of the children were vaccinated.
Ninety percent of the children were vaccinated.

In a range of percentages, insert the symbol after each number. However, in a series of percentages, the symbol follows the last figure only.

Examples: Familial predisposition may be responsible for 5% to 10% of prostate cancers.
The government received discounts of 10, 20, and 30%.

Important: Only use the word *percent* with a number; otherwise, use the word *percentage*.

Incorrect: A substantial percent of the population does not get enough exercise.
Correct: A substantial percentage of the population does not get enough exercise.

Formatting and Style Issues

Following are explanations of issues that arise when dealing with numbers.

Punctuation

Abbreviated units of measure do not have a period, unless they close a sentence.

Examples: 50 mg (NOT *50 mg.*) 2 dL (NOT *2 dL.*)

Singular and Plural

When the quantity is less than 1, the unit of measure is singular.

Examples: 0.5 gram (NOT *grams*) 0.2 second (NOT *seconds*)

When an abbreviated unit of measure follows a quantity, the abbreviation is singular.

Examples: 3 L (NOT *3 Ls*) 200 g (NOT *200 gs*)

Spacing

Insert a space between the numeral and the symbol, except for %, °C, °F, ° (for angles), money symbols, fractions, and inches/feet symbols.

25 g	40 mL	60 kg
30%	28.5°C	4”
£250	CHF 50*	5½ years

*A space is added because CHF is the currency abbreviation for the Swiss Franc and not a symbol.

In mathematical operations or equations, insert a space before and after most symbols (e.g., +, =, ×, ≥).

$E = mc^2$ $50 \times 3 = 150$

Tip: **Word 2000 Shortcut**

Inserting the µ and × Symbols

Use *µ* and × instead of the letters *u* and *x* for the microgram and multiplication symbols.

1. Place the cursor in the text where you want to insert the symbol.
2. On your toolbar, click **Insert**.
3. Select **Symbol**.
4. Select the **Symbols** tag. Under **Font**, scroll down and select **WP MATH A.**
5. Choose µ or × (they are on the second line).
6. Click **Insert** and **Close**.

Note: Use the same technique for other symbols.

Subject and Verb Agreement

Units of measure are treated as collective nouns and require a singular verb.

Example: Four hundred micrograms of folic acid is recommended.
(NOT *are recommended*)

4 Punctuation

> "Punctuation is the notation in the sheet music of our words."
>
> **Pico Iyer**

The rules of punctuation are strict and complex. Correct punctuation is critical to clear writing; incorrect punctuation can confuse the reader or alter the meaning of a sentence. Proper punctuation makes your text easier to understand, clarifies ambiguities, eliminates confusion, and accelerates the reading process.

The following list examines the most common types of punctuation problems. For a more detailed list, consult a grammar book. See the "Bibliography" section on page 149 for a list of grammar books.

Apostrophes

Apostrophes often are used incorrectly. However, you need to know only three simple rules to use apostrophes correctly every time: apostrophes are used in contractions and with possessive nouns, but NEVER to denote plural.

Use Apostrophes to Denote Contractions

The apostrophe stands for omitted letters or numbers.

Examples: We're working on a cure.
The disease first appeared in the '80s.

Because it is too colloquial, avoid using contractions in most business and professional documents. However, if you are writing brochures or pamphlets for the public, using contractions may be acceptable and even desirable; it can give the piece a more readable and approachable tone.

Use Apostrophes to Denote Possessive Nouns

The possessive case denotes ownership or possession and the apostrophe replaces the word *of (children's health* stands for *the health of children*). Following are examples of possessive formation. For more details on how to form the possessive, see the "Possessive" section on page 8.

Examples: the vaccine's availability (singular noun)
the virus's potency (singular noun ending with an *s*)
the agencies' policies (plural noun ending with an *s*)
women's health issues (plural noun not ending with an *s*)

NEVER Use Apostrophes to Denote Plural

This mistake, common with letters and dates, is even perpetuated by the *New York Times*, which uses the style "1990's" instead of "1990s." However, the *s* refers to a plural, NOT a possessive, and an apostrophe should not be used.

Incorrect: the ABC's of good dental hygiene
Correct: the ABCs of good dental hygiene

Incorrect: The disease was eradicated in the 1970's.
Correct: The disease was eradicated in the 1970s.

Brackets

Brackets and parentheses are not interchangeable. Use square brackets in a quotation to indicate words that are not part of the quote. Also use brackets to enclose words in a passage that are already in parentheses.

Examples: He added, "At the time the study was done [1998], we had no idea of the extent of the problem."
(polycyclic aromatic hydrocarbon [PAH] and polychlorinated biphenyl [PCB])

Colons

The most common use of colons is to introduce lists and quotes. A complete sentence must precede a colon, but a complete sentence does not have to follow a colon. Capitalize the first word after a colon only if it is a proper noun or if it starts a complete sentence.

Use Colons to Introduce Lists

Remember that a complete sentence must precede the colon.

Incorrect: A healthy lifestyle is based on: eating right and exercising. (A complete sentence does not precede the colon.)
Correct: A healthy lifestyle is based on two things: eating right and exercising. (A complete sentence precedes the colon.)

Use Colons to Introduce Quotes

However, if the introductory words do not form a complete sentence, use a comma.

Incorrect: George Bernard Shaw said: "I often quote myself. It adds spice to my conversation." (A complete sentence does not precede the colon.)

Correct: George Bernard Shaw said something appropriate: "I often quote myself. It adds spice to my conversation." (A complete sentence precedes the colon.)

Also Correct: George Bernard Shaw said, "I often quote myself. It adds spice to my conversation." (A comma introduces the quote.)

Use Colons for Emphasis

Example: He had only one interest: genetic research.

Use Colons in Titles

Example: *The Hot Zone: A Terrifying True Story*

Do NOT Use Colons After Verbs

Incorrect: Some health risks associated with obesity are: high blood pressure and high blood cholesterol.

Correct: Some health risks associated with obesity are high blood pressure and high blood cholesterol.

Do NOT Use Colons After *Such as*, *Including*, and *Consists of*

Incorrect: Folic acid has been added to foods such as: enriched bread, pasta, rice, and cereals.

Correct: Folic acid has been added to foods such as enriched bread, pasta, rice, and cereals.

Commas

Commas are often misused. To ensure proper comma use and placement, first ask yourself about the rationale for the comma. If you cannot find one, do not insert a comma. If you are still not sure, look at the examples below to find a justification.

Use Commas With Introductory Elements

An introductory element is a word, phrase, or clause that appears at the beginning of the sentence, before the independent clause.

Examples: After the results came in, the physician contacted the patient.
However, the disease is not contagious.

Use Commas With Contrasting Elements

Commas can emphasize two contrasting points or ideas in a sentence. Generally, a word introduces the contrast (e.g., not, but, yet, never, although).

Examples: He contracted the flu, not pneumonia.
We thought we had the result, but didn't.

Use Commas With Two Independent Clauses Joined by a Coordinating Conjunction

Only seven coordinating conjunctions exist in the English language. An easy way to remember them is with the acronym FANBOYS (for, and, nor, but, or, yet, so).

If you are not sure whether a comma is required, ask these two questions:
1. Can the two clauses stand by themselves?
2. Does the sentence have one of the FANBOYS?

If the answer is YES to BOTH questions, insert a comma before the conjunction.

Incorrect: The flu vaccine is available, and is being distributed locally.
(An independent clause does not follow the conjunction.)

Correct: The public health system is adequate, and the public can feel safe.
(Two independent clauses surround the comma.)

Tip: Coordinating Conjunctions

Remember the Conjunctions

F	for
A	and
N	nor
B	but
O	or
Y	yet
S	so

Use Commas With Coordinate Adjectives (Consecutive Adjectives)

Coordinate adjectives (two or more adjectives that modify a noun or pronoun) are separated by a comma. Adjectives are coordinated if you can switch their order without changing the meaning of the sentence or if you can insert *and* between the adjectives.

Incorrect: He had a big, cold sore. (The sore is not big and cold, the cold sore is big. Because you cannot insert *and*, the adjectives are not coordinated.)

Correct: He had a big cold sore.

Incorrect: He had a big cold glass of water in his hand. (The glass is big and cold. Because you can insert *and*, the adjectives are coordinated.)

Correct: He had a big, cold glass of water in his hand.

Use Commas With Nonrestrictive Elements

If the section of the sentence surrounded by commas can be removed from the sentence *without changing the meaning* of the sentence, use commas. Nonrestrictive elements usually occur in the middle of sentences and can be one or several words.

Example: The condition, which affects several million people every year, is preventable.

However, consider these examples:

Example 1: Editors who are too picky are a nuisance.

Example 2: Editors, who are too picky, are a nuisance.

Example 1 is restrictive because it is limited only to the picky editors (not all editors are picky). Example 2 is nonrestrictive because it implies that all editors are picky.

Both sentences are grammatically correct. However, the absence or presence of the commas changes the meaning of the sentences. The issue here is not placing the commas in the right or wrong spots, but using or omitting them to convey the *intended* meaning.

Use Commas With Dates and Geographic Locations

When writing the complete date, put a comma before and after the year.

Example: He attended a symposium in Paris, France, on March 10, 2002, and returned on March 15, 2002.

Do not place a comma between month and year.

Example: Toxic fumes were released between December 2001 and February 2002.

Use Commas With Series and Lists

Use commas to separate series of three of more terms. Also insert a comma before the last conjunction (called a serial comma).

Example: Eat a balanced meal, exercise, drink plenty of fluids, and avoid stress.

Use Commas With Direct Quotes

Often, a colon introduces a quote. However, if the introductory words do not form a complete sentence, use a comma.

Incorrect: Louis Pasteur said: "Chance favors only the prepared mind."
(A complete sentence does not precede the colon.)

Correct: Louis Pasteur said, "Chance favors only the prepared mind."
(A comma introduces the quote.)

Use Commas With Attribution

In most cases, use a comma instead of a period at the end of a quote that precedes an attribution.

Example: "We have the situation under control," the health official said.

Use Commas With Age, Degrees, and Titles

Examples: Ben Sisko, 45, attended the seminar.
Phil McGraw, Ph.D., was the guest speaker.
Jonathan Archer, vice-chair, attended the hearing.

Use Commas With Large Numbers

Use a comma with figures greater than 999, except in addresses.

Examples: He collected 1,243 samples for his test.
CDC's main campus is located at 1600 Clifton Road.

Tip: Word 2000 Shortcut

Inserting the en *or* em *Dash*

Place the cursor where you want to insert the symbol in the text.

1. On your toolbar, click **Insert**.
2. Select **Symbol**.
3. Under **Font**, select **(normal text)**.
4. Scroll down until you find the appropriate symbol.
5. Click on the symbol.
6. Click **Insert** and close the window.

Dashes

There are two dashes of different lengths: the *en* dash (–), and the *em* dash (—). The hyphen (-), technically not a dash, often is used incorrectly in lieu of a dash (for more details, see the "Hyphens" section on page 43). However, these elements should NOT be used interchangeably, as the examples below illustrate.

Note: Do not insert a space between the dash and its surrounding elements.

En Dash

Use the *en* dash to indicate ranges.

Examples: 1990–1995 12–15 mg 40%–50%

Em Dash

Use the *em* dash for emphasis, to indicate a change in thought, or to separate a series of words.

Examples: He came to the meeting—for the first time ever—and spoke up.
We will have the results of the tests soon—if the laboratory is open.
He mentioned the benefits—improved muscle tone and weight loss—of regular exercise.

Ellipses

An ellipsis indicates the deletion of words in text or in a quote. An ellipsis is made up of three periods separated from each other and from surrounding text by a space (. . .).

Example: We have not journeyed across the centuries . . . because we are made of sugar candy.

In the preceding quote by Churchill, the words omitted are, "across the oceans, across the mountains, across the prairies."

If a new sentence starts after the ellipsis, use four periods. Do not insert a space before the first period.

Example: We shall fight on the beaches. We shall fight on the landing grounds. . . . We shall never surrender!

Churchill's complete quote was, "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!"

Hyphens

A hyphen connects words to make them more understandable. Some words are always hyphenated (state-of-the-art, up-to-the-minute); others are temporarily hyphenated to clarify or prevent ambiguity (well-known, re-create). A compendium of frequently occurring hyphen use follows. For a more complete list of rules, consult the *AMA Manual of Style*.

Hyphenate Nouns Combined With Adjectives

Example: A fat-free, high-fiber, low-cholesterol diet will help you lose weight.

Hyphenate Nouns Combined With Nouns

The hyphen indicates that the two nouns are of equal value or have common characteristics.

Examples: She is a writer-editor at CDC.
Women should consult an obstetrician-gynecologist once a year.

Hyphenate Time Periods Used as Modifiers and Numbers

Examples: The month-long investigation yielded some results.
There is a 10-day waiting period to enroll in the program.
Twenty-five people contracted the disease.

Hyphenate Fractions

Hyphenate fractions used as adjectives. However, do not hyphenate fractions used as nouns.

Examples: A two-thirds majority is needed. (*Two-thirds* is an adjective and requires hyphenation.)
Two thirds of the patients did not respond to the medication. (*Two thirds* is a noun and is not hyphenated.)

Hyphenate Compound Proper Nouns

Hyphenate compound proper nouns when they function as adjectives. However, do not hyphenate them when they function as nouns.

Examples: Pre-term birth is the leading cause of death among African-American infants. (*African-American* is an adjective.)
African Americans suffer disproportionately from chronic and preventable diseases. (*African Americans* is a noun.)

Hyphenate to Avoid Ambiguity

Hyphenate numerals, *re-* words, or any other words to avoid ambiguity. In the following examples, the presence or absence of the hyphen alters the meaning.

Examples: The 10 year-old children were vaccinated. (Ten children who are 1 year of age)
The 10-year-old children were vaccinated. (All the children who are 10 years of age)

Examples: The mathematician resolved the equation. (She found a solution.)
The mathematician re-solved the equation. (She had to do the equation again.)

Examples: He has a small bowel problem. (A small problem concerning his bowel)
He has a small-bowel problem. (A problem concerning his small bowel)

Do NOT Hyphenate Adverbs Ending in *ly*

Example: Chickenpox is a highly contagious disease.

Do NOT Hyphenate Medical Conditions, Latin and Foreign Expressions, or the Full Names of Chemical Compounds

Do not hyphenate these if they are used as adjectives.

a priori	per diem	in situ
in vivo	in vitro	hydrogen sulfide gas
sickle cell anemia	squamous cell carcinoma	ex officio*

*Hyphenate *ex-* only when it is a prefix meaning *former* (ex-director). The *ex* in *ex officio* is not hyphenated because it is Latin for *out of* or *without* and therefore not a prefix.

Do NOT Hyphenate Most Prefixes

Do not hyphenate most prefixes unless they precede a proper noun, a capitalized word, or an abbreviation (see the exceptions below).

Examples: The American Cancer Society is a nongovernment agency.
Information is also available for non-English speakers.

Examples: Subatomic physics encompasses nuclear and elementary particle physics.
Sub-Saharan Africa has more than 28 million HIV/AIDS sufferers.

Do NOT hyphenate the following prefixes.

ante	anti	bi	co	contra
counter	de	extra	infra	inter
intra	micro	mid	neo	non
over	pre	post	pro	pseudo
re	semi	sub	supra	trans
tri	ultra	un	under	

Exceptions

Always hyphenate *all-*, *ex-* (when it means *former*), and *self-*.

Examples: The tobacco lobby is an all-powerful force.
The ex-surgeon general was on CNN last night.
A self-support group can help those who want to quit smoking.

Also hyphenate the prefix if the spelling would be awkward or difficult to read without it, for example if the letter ending the prefix and the one starting the word are the same (anti-infective, intra-aortic, re-enter, shell-like).

Example: Aspirin is a common anti-inflammatory drug.

Parentheses

Use parentheses sparingly, because they tend to break the reader's concentration. Use them only when you must insert background or reference information. Remember William Safire's words: "Parenthetical remarks (however relevant) are unnecessary."

Examples: Entitlement programs (e.g., Medicare, Medicaid) and the Americans with Disabilities Act are examples of national policies.

The number of older adults (those aged 65 years or older) has increased 11-fold in the past century.

Periods

When to Use Periods

Use periods with abbreviations, such as degrees (M.D., Ph.D.), states (Ala.), and titles (Mr., Dr.).

When NOT to Use Periods

Do not use periods with such words as CDC or ATSDR; these are acronyms, not abbreviations. Never end a title, heading, or subheading with a period because it slows the reading process.

Quotation Marks

With direct quotes, place periods and commas inside quotation marks; place colons, semicolons, and question marks outside of quotation marks unless they are part of the quote.

Examples: "We are working on a cure," he said.

"What are our next steps?" he asked.

Avoid using quotation marks as an apology for a word or phrase. Either omit the quotation marks or use another term.

Avoid: We used the "gold standard" method of…

Better: We used the gold standard method of…

Best: We used the most valid method of…

Semicolons

Semicolons convey separation of thought and information.

Use Semicolons to Link Independent Clauses

Use a semicolon between two independent clauses instead of a conjunction (e.g., and, or) or before a conjunctive adverb (e.g., however, therefore, thus).

Examples: The tests came back yesterday; they were inconclusive.
Tuberculosis is a serious disease; however, it is treatable.

Use Semicolons to Separate Items That Have Internal Commas

Example: In attendance were Dr. Black, EPA; Dr. Brown, CDC; Dr. White, NIH; and Dr. Green, ATSDR.

Use Semicolons to Clarify Several Individual Clauses

Example: He stopped drinking, gave up fatty foods, became a vegetarian, and took up running; but even with these changes, he still had high cholesterol.

5 Words

> Proper words in proper places make the true definition of a style.
>
> **Jonathan Swift**

Mark Twain once wrote, "The difference between the right word and the almost right word is really a large matter—'tis the same as that between lightning and the lightning bug." Choosing the right words to express facts, thoughts, and ideas is crucial to good writing. Using a word improperly or using the wrong word dilutes the impact of our writing and can change the meaning of a sentence or a document.

The first section of this chapter, "Inclusive Language," presents guidelines on using language to describe people in an unbiased manner. The next section, "Word Definitions," discusses the proper use of words that are sometimes misused and provides examples of proper use. The last section, "Vocabulary Issues," addresses vocabulary problems and mentions alternatives to redundancies and jargon.

Inclusive Language

When describing people, avoid using biased language. Following are guidelines on proper language use.

General Terminology

disability, handicap, normal, abnormal

Disability refers to a condition that limits a person's ability to carry out a function. Avoid using *handicap*, which is a judgmental term. When comparing persons with disabilities to others, use the term *nondisabled* person or *person without disabilities* rather than *normal* person, because *normal* is associated with *abnormal*.

Put people first, not their disability, and avoid depersonalizing terms such as *epileptic* or *diabetic*.

Avoid: disabled person, epileptic, diabetic, asthmatic

Use: person with (who has) a disability, person with epilepsy, diabetic patient, boy with asthma

gender, sex

Gender is a grammatical term that denotes whether a noun is masculine, feminine, or neutral. However, *gender* has evolved to also refer to the categories of *man* and *woman*, which are based mainly on the sex of the person. *Sex* refers to the biologic characteristics of males or females. Use *sex* and not *gender* to refer to people's sex, unless the context might cause confusion, as in this example: sex is a risk factor for HIV.

Following is a list of gender-neutral terminology.

Avoid	*Use*
chairman, chairwoman	chair, chairperson
congressman	member of Congress, representative, legislator
fireman	firefighter
layman	layperson
mailman	mail carrier, letter carrier
man, mankind	people, humans, human beings, humanity, humankind
mothering	parenting
policeman, policewoman	police officer
postman	postal worker
repairman	maintenance worker
spokesman, spokeswoman	spokesperson

individual, person

Because the term *individual* is dehumanizing, change *individual(s)* to *person(s)* unless you need to distinguish individuals from a class or group.

Example: Both individuals and institutions participated in the test.

male, female; men, women

When distinguishing the sex of adults, use the nouns *men and women*; for children, use *boys and girls*; for adolescents, use (as appropriate) *boys and girls* or *young men and*

young women. Avoid using *male* and *female* as nouns unless a group contains both children and adults.

Example: The males [boys and men] were at higher risk than the females [girls and women].

people, persons

Strictly, *people* is correct for a large, indefinite group (European people) and *persons* is correct for an exact or small group (12 persons in the study). However, some critics consider that *persons* is pedantic and stodgy and that *people* is the plural of *person*.

Age

Avoid vague terms such as *school-aged children, teenagers, older women* without first defining them (i.e., infants aged 5 months to 1 year, children aged 6–12 years, adolescents aged 13–17 years, women older than 65 years).

A *youth* is one young person (usually a young boy or young man). *Youth* can refer to young people in general (the youth of the United States). In either case, it is a singular noun. Therefore, avoid constructions such as "risk behaviors among youth" (NOT *youths*) and "too many youth smoke." Replace with *young people* or *adolescents*.

Following are AMA's age designations.

Neonates or newborns	birth to 1 month
Infants	1 month to 1 year
Children	1 year through 12 years. Sometimes, *children* may be used to include newborns and infants. Children may also be referred to as *boys* or *girls*.
Adolescents	13 years through 17 years. They may also be referred to as *teenagers* or as *adolescent boys* or *adolescent girls*, depending on the context.
Adults	18 years or older. Refer to them as *men* or *women*.

Race or Ethnicity

When race and ethnicity are relevant, make sure you use the correct term. Below is an explanation of different classifications of race and ethnicity. For a complete list of race and ethnicity classification, consult the Office of Management and Budget at *http://www.whitehouse.gov/omb/fedreg/ombdir15.html.*

Alaska Native (Aleuts, Eskimos, Indians of Alaska), Alaskan

An Alaska Native (NOT *Alaskan Native*) is a person whose origins are in any of the original peoples of Alaska and who maintains cultural identification through tribal affiliation or community attachment. An Alaskan is anyone who was born in Alaska or who is a long-term resident of Alaska.

American Indian or Native American

An American Indian is a person whose origins are in any of the original peoples of North, Central, or South America (except Alaska) and who maintains cultural identification through tribal affiliation or community attachment. Whenever possible, specify the nation or people (e.g., Navajo, Nez Perce, Inuit) rather than use the more general term.

Asian

An Asian is a person whose origins are in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, The Philippines, Thailand, and Vietnam. Do not use the word *oriental* (rugs are *oriental*, not people).

Black or African American

An African American is a person whose origins are in any of the black racial groups of Africa. If appropriate, specific terms such as *Haitian* or *Bahamian* may also be used. When discussing scientific data, use the term that was used when the research (the source of the data) was being conducted. Put the word *black* in lowercase letters.
Do not hyphenate *African American* as a noun; however, hyphenate it as an adjective.

Examples: In 1998, African Americans represented 48% of all reported persons with AIDS in the United States. (*African Americans* functions as a noun.)
In 1998, AIDS was diagnosed in 6,600 African-American women in the United States. (*African-American* functions as an adjective.)

Hispanic or Latino

A Hispanic is a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. The term *Spanish origin* may also be used. Because the terms are vague, use the more specific geographic origin, if possible.

Native Hawaiian or Other Pacific Islander

A Native Hawaiian is a person whose origins are in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific islands. It does not include a person who is native to the State of Hawaii by virtue of being born there. Other terms such as *Part-*

Hawaiian may also be used when appropriate. *Note:* Capitalize *Part-Hawaiian* because it is a legal status. However do not capitalize *part* with other nationalities (example: *part-Japanese*).

White

This is a person whose origins are in any of the original peoples of Europe, the Middle East, or North Africa. Do not capitalize *white*, unless it starts a sentence. Avoid the term *Caucasian* because it technically refers to people from the Caucasus region.

Sexual Orientation

Sexual orientation should be mentioned only when scientifically relevant. Use the term *sexual orientation* and not *sexual preference*. Because they are either too vague or pejorative, avoid using *homosexual* or *gay* as nouns. Using these terms as adjectives is acceptable (homosexual man, gay man). Use *lesbians* and *gay men* when referring to specific groups.

Vague: homosexuals (the term does not specify the sex)
Clear: gay men, lesbians, bisexual persons, heterosexual persons

Word Definitions

Many words in the English language are similar in meaning or sound alike, and even the best writers occasionally have questions about their usage. Following is an alphabetical list of words that are frequently used improperly.*

Tip: Word 2000 Shortcut

Finding the Right Word

To use the Thesaurus:
Place the cursor on the word.
Press **Shift + F7**.

abort

Abort means "to stop in the early stages." A pregnancy, but not a fetus or a woman, may be aborted.

Incorrect: The fetus was aborted.
Correct: The pregnancy was aborted.
Better: The pregnancy was terminated.

absorption, adsorption

Absorption indicates an active, ongoing process in which something is taken up by something else by various physical actions.

Example: The absorption of spilled juice into a paper towel occurs by capillary action.

* This list is adapted from *Medical English Usage and Abusage* by Edith Schwager, *The American Heritage Book of English Usage: A Practical and Authoritative Guide to Contemporary English*, and the *CBE Manual for Authors, Editors, and Publishers.* Other contributions were provided by CDC's National Center for Infectious Diseases, National Center for Environmental Health, and National Center for Chronic Disease Prevention and Health Promotion.

Adsorption describes the holding or accumulation of something, such as a gas, a liquid, or a solute (a substance that has been dissolved in another substance) on the surface of a solid or liquid.

Example: The removal of dissolved gases from tap water is achieved by their adsorption onto a substance such as activated charcoal.

acute, chronic

Use these terms to describe only the duration—not the severity—of symptoms, conditions, or diseases. Acute diseases have a sudden onset, sharp rise, and short course. Chronic diseases are marked by long duration or frequent recurrence. Avoid using these terms to describe people (e.g., avoid expressions such as chronic smokers).

Examples: CDC focuses on identifying risk factors for chronic diseases, which are illnesses that are prolonged, do not resolve spontaneously, and are rarely cured completely.

Up to 25% of injuries that require acute care in the United States are alcohol related.

ad, exam, lab

These are examples of short forms of words; they should not be used in formal writing.

affect, effect

The verb *affect* means "to produce an effect upon;" the noun *affect* is a rarely used psychology term that refers to the immediate expressions of emotion. The verb *effect* means "to bring about" or "to cause;" the noun *effect* means "a distinctive impression."

Examples: The noise affects [does something to] my hearing.

Her affect [attitude] belied her words.

The effect [results] of the new policy will be noticeable.

The new policy will effect [produce] a new attitude among employees.

although, while

Use *while* only to connote time. Otherwise, use *although*.

Examples: He contracted the disease while traveling abroad. (*While* refers to the period of time he was abroad.)

Although we didn't yet know the results of the first study, we set up the second study.

among, between

Use *among* with objects denoting three or more persons or things. Use *between* with objects denoting two persons or things.

Examples: There were sharp disagreements among the five panelists.
There was a sharp disagreement between the two scientists.

amount of, number of

Use *amount of* for noncountable nouns (amount of water, work, light). Use *number of* for countable nouns (number of experiments, studies, test tubes).

Examples: Even small amounts of lead exposure can result in learning and behavioral problems among children.
A review of a number of studies on the use of DES among pregnant women showed that the drug had no effect on reducing the risk of miscarriage.

and / or

Avoid using slashes instead of words; instead use *and* or *or*. In most cases use *or*, which allows for either of two options and does not preclude that both options may pertain.

Example: The women worked at the plant or lived near it.

assure, ensure, insure

Assure means "to inform confidently." *Ensure* means "to make certain." *Insure* means "to guarantee life or property against loss."

Examples: The health inspectors assured the public that the water was safe to drink.
To ensure your safety, keep your seat belt fastened at all times.
We insured our new car yesterday.

to author, to write

Use *to write*.

avert, avoid

Avert means "to prevent" or "to ward off." *Avoid* means "to keep clear of" or "to shun."

Examples: Because he acted quickly, the danger was averted.
Because he didn't ski, he avoided the risk of breaking a leg.

based on, on the basis of

Use *based on* only after some form of the verb *to be* or implied verb *to be*.

Incorrect: Based on these data, we can reasonably assume that smoking causes cancer.

Correct: On the basis of these data, we can reasonably assume that smoking causes cancer.

Correct: The assumption that smoking causes cancer is based on these data.

between . . . and, from . . . to, from . . . through

These expressions are not synonymous because they imply different time frames. *Between* June *and* October covers July, August, and September; it does not include June or October. *From* June *to* October covers June, July, August, and September; it does not include October. *From* June *through* October covers June, July, August, September, and October.

biannual, biennial

Biannual means "twice a year;" it is a synonym for semiannual. *Biennial* means "every 2 years."

Examples: During the early 1980s, biannual national vaccination campaigns substantially reduced the number of polio cases in Brazil.

The 10th Biennial Symposium on Statistical Methods was held in 2001. The 11th symposium will be in 2003.

biopsy

Biopsy is the procedure of removing and examining tissue, cells, or fluids from the body. Do not use it as a verb. Observations are made on the biopsy specimen, not on the biopsy itself.

Example: The biopsy specimen should contain a minimum of 10 hair follicles.

case, patient

A *case* is an instance, example, or episode of disease. Do not use *case* to refer to a patient. A *patient* is a person under medical care for a disease.

Examples: The small child had a case of chickenpox.

The physician examined five patients.

caesarean delivery, caesarean section

The preferred terms are *caesarean delivery*, *caesarean birth*, or *abdominal delivery*.

Example: An elective caesarean delivery increases the risk to the infant of premature birth and respiratory distress syndrome.

cohort

A *cohort* describes a group of individuals who have a statistical factor (such as age or class) in common in a demographic study. A cohort does not refer to one individual.

Example: In his paper on asbestos-related mortality in insulation workers from 1943 to 1976, the researcher found marked increases in death due to lung cancer in this occupational cohort.

compared to, compared with

Use *compared to* to make an analogy or to compare dissimilar items. Use *compared with* when comparing items that are in some way related. In scientific writing, *compared with* is almost always correct.

Examples: The human heart can be compared to a pump (both move fluids).
The human heart can be compared with a canine heart (it has the same number of chambers but it is larger, beats at a different rate, etc.).

compendium

A *compendium* summarizes a larger work; it is NOT a comprehensive work.

Example: *The Compendium of HIV Prevention Interventions with Evidence of Effectiveness* lists the findings of CDC's HIV/AIDS Prevention Research Synthesis Project.

compose, comprise

Compose means "to be made of," "to include," or "to contain," and takes the passive voice.

Example: Fuel oils are composed of many chemicals.

Comprise means "to be composed of" or "to consist of;" the whole comprises its parts, never the reverse. *Comprise* takes the active voice. Never use *to be comprised of.*

Incorrect: The United States is comprised of 50 states.

Incorrect: Fifty states comprise the United States.

Correct: The United States comprises 50 states.

concentration, level

In medical usage, *concentration* describes a quantity set within the context of another quantity. Thus, the relative content of any substance that is dissolved or dispersed within a solution or mixture is referred to as the concentration of that substance.

Example: We detected arsenic in the soil in concentrations ranging from 2.1 to 17 parts per million.

Level is usually descriptive rather than quantitative, conveying a sense of the relation a particular range of concentrations has to a standard or normal concentration of a substance.

Example: Blood lead levels of 10 g/dL or more in children are considered elevated.

congenital, heritable

Congenital conditions or characteristics are usually not part of the organism's normal genetic makeup. Congenital describes conditions or traits that are acquired, either at birth or during development in the uterus. Most often, congenital indicates that some factor, such as a drug, a chemical, an infection, or an injury, has upset the careful timing and balance of the developmental process in a way that adversely affects the fetus.

Example: A baby born with spina bifida most likely cannot pass this congenital condition on to future generations.

Heritable characteristics or conditions are intrinsic to the genetic makeup of an individual and are capable of being passed from one generation to the next.

Example: A baby born with a heritable disease, such as hemophilia, can pass the disease on to future generations.

connote, denote

Connote suggests or implies something. *Denote* means "to be explicit."

Examples: The results of the study connote that an increase in fruit and vegetable consumption leads to reduced risk for heart disease and cancer.

The symbol "$P < .05$" denotes that the results of the study are significant and did not occur by chance alone.

contagious, infectious

Contagious refers to a disease that can be transmitted from one living being to another through direct contact (as with measles) or indirect contact (as with cholera).

Example: Chickenpox is an acute contagious disease.

The agent responsible for the contagious character of a disease is described as being *infectious*, the usual culprits being microorganisms, such as viruses and bacteria, or macroorganisms, such as fungi or parasitic worms.

Example: Louis Pasteur discovered that most infectious diseases are caused by germs.

contraception, contraceptive

Contraception is the practice of preventing pregnancy. *Contraceptive* is the method used for contraception.

Examples: Popular methods of contraception include birth control pills and condoms.
The pill is the leading contraceptive method among women under age 30.

contract, develop

Patients do not *develop* diseases; they *contract* diseases. Diseases develop in patients.

Incorrect: The patient developed brucellocis after ingesting contaminated milk.

Correct: The patient contracted brucellocis after ingesting contaminated milk.

critical patient

Patients are not *critical*, but their status or condition is.

Incorrect: The patient was critical.

Correct: The patient was in critical condition.

diagnose

Conditions, diseases, and disorders are *diagnosed*, not patients.

Incorrect: The child was diagnosed with rubella.

Correct: The physician diagnosed rubella.

die of, die from, die with

People die *of*, not *from*, a condition or disease. People can also die *with* a disease that is not the immediate cause of death.

Example: The elderly man died of injuries sustained in a car crash and with Alzheimer disease.

doctor, physician

Doctor is a title applying to those who hold advanced degrees (e.g., Ph.D., D.D.S, D.V.M.). *Physician* refers to a doctor of medicine. Do not use the title and the degree together.

Incorrect: Dr. Stephen Jay Gould, Ph.D.

Correct: Dr. Stephen Jay Gould

Correct: Stephen Jay Gould, Ph.D.

dose, dosage

Dose means "the amount to be taken at one time." *Dosage* means "the amount (doses) to be taken over a period of time."

Examples: Give the vaccine over a period of time, in a series of properly spaced doses.
New drugs are usually introduced in low dosages and gradually increased over time.

due to, because of

Use *due to* only after some form of the verb *to be* or implied verb *to be*. Never begin a sentence with *due to*. If *due to* could be replaced with *caused by*, it is correct.

Incorrect: He succeeded due to his hard work and great talent. (*Caused by* cannot be substituted, therefore *due to* is incorrect.)

Correct: His success was due to hard work and great talent. (*Due to* is correct because you can substitute *caused by*.)

e.g., etc., i.e.

Use *e.g.*, (*exempli gratia:* for example), *etc.*, (*et cetera:* and others), and *i.e.*, (*id est:* that is) with care; they have different meanings.

The abbreviation *e.g.*, is followed by an example or an incomplete list of examples.

Example: Certain behaviors are harmful (e.g., smoking, drinking, overeating).

The abbreviation *i.e.*, does not introduce an example; it indicates that what follows is an explanation or clarification of what has just been said. If a complete list follows, insert a conjunction before the final item in the list.

Example: We studied three harmful behaviors (i.e., smoking, drinking, and overeating).

Use *etc.*, with discretion, and never after an example or list of examples. Because a list of examples implies that not every item is included, *etc.* is redundant.

Incorrect: To be successful, investigators need certain characteristics (e.g., leadership ability, curiosity, tenacity, etc.).

Correct: To be successful, investigators need certain characteristics (e.g., leadership ability, curiosity, tenacity).

Use *e.g.*, and *i.e.*, only within parentheses. Otherwise spell out f*or example* and *that is.*

Example: We studied several types of behaviors; for example, we studied teenagers' tendency toward risky behavior.

e-mail

Use *e-mail* rather than *email* or *E-mail*.

endemic, epidemic, pandemic

Endemic describes a disease (or characteristic) that is restricted to a particular region, such as cholera and plague in parts of Asia. A disease is endemic in an area; the area is not endemic. *Epidemic* refers to a disease that involves many more people than usual in a

particular community or a disease that spreads into regions in which it does not normally occur. *Pandemic* is the outbreak of a disease occurring over a wide geographic area and affecting a large number of people.

Examples: Cholera is endemic on the Indian subcontinent and in Sub-Saharan Africa.
Occurrences of influenza often result in epidemics.
HIV/AIDS is pandemic in Africa.

enhance

Enhance means "to heighten" or "to increase," especially to improve in value, quality, desirability, or attractiveness. Avoid using *enhance* to indicate an increase in an undesirable outcome. *Enhance* could be replaced with *improve*, *heighten*, *increase*, *elevate*, *enlarge*, or *augment*.

Avoid: Smoking enhances the risk for lung cancer.

Use: Smoking increases the risk for lung cancer.

etiology, cause

Etiology is the study or description of causes or origins of a disease, not the immediate *cause* of a disease.

Examples: The etiology of cancer is a maze of unknowns.
The cause of heart failure was acute myocardial infarction.

exercise, physical activity

Exercise is planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness. *Physical activity* is any bodily movement produced by skeletal muscles that results in energy expenditure.

Examples: These exercises can be done while sitting at your desk.
Even moderate physical activity, such as walking, can result in health benefits.

farther, further, furthermore

Use *farther* only in relation to distance. *Further* can be used for any greater degree, greater extent, or greater distance. *Furthermore* means "in addition to what has just been said." Avoid using *further* for *furthermore*.

Examples: With the increasing level of noise in urban areas, many families are moving farther away from cities.
The center calls for further research on ways to minimize risk of hearing loss in the workplace.
Furthermore, additional recommendations for preventing hearing loss should be included in the report.

fever, temperature

Fever is a rise in body temperature above normal. A person's *temperature* is either normal or abnormal. Everyone has a temperature. Do not use *temperature* if *fever* is intended.

Example: If the patient has a temperature of 37.8˚C, he has a fever of 0.8˚C.

fewer, less

Use *fewer* with countable units and *less* with noncountable units.

Example: We collected fewer blood samples for this study, and we collected less blood from each person.

follow, follow up, follow-up, followup

Follow and *follow up* (two words) are verbs; *follow-up* (hyphenated) is an adjective; *followup* (one word) is a noun. Cases (instances of disease) and clinical courses may be followed. Patients or study subjects are not followed; they are observed. One can follow up on either cases or patients.

Examples: They must follow strict research protocols. (Verb)
The clinician followed up with her patients. (Verb)
Followup occurs 24 hours after the drug is administered. (Noun)
CDC conducted a follow-up study on the effects of pollutants in the environment. (Adjective)

germ, microbe, microorganism, pathogen

Germ and *microbe* are nontechnical terms describing a living organism, especially one invisible to the naked eye, that can cause diseases. The technical term is *pathogen*, which describes an agent that causes diseases, especially a bacterium, fungus, or other microorganism.

Examples: Disinfect areas where there are both high concentrations of dangerous germs and a possibility that they could spread to others.
Drug resistance occurs when microbes develop ways to survive medicines meant to kill or weaken them.
The pathogens under surveillance in FoodNet include *E. coli* and *Salmonella*.

Microorganism is a general term that describes all one-celled microscopic organisms, both disease-causing and benign.

Example: Many microorganisms, such as *typhoid bacillus*, are adapted exclusively to humans.

good, well

The adjective *good* and the adverb *well* are not interchangeable. *Good* means "something that is as it should be;" it qualifies a noun (good data). *Well* means "satisfactorily;" it qualifies a verb (to eat well).

Examples: The study produced good results. (*Good* qualifies the noun *results*.)
The study went well. (*Well* qualifies the verb *to go*.)

-ic, -ical

Omit the *al* when it is unnecessary (e.g., use *epidemiologic* rather than *epidemiological, biologic* rather than *biological*). However, the meaning of some words changes depending on the ending. For example, *historic* refers to something that is famous in history, whereas *historical* refers to something that is about history or based on history.

Examples: Thomas Jefferson is featured in many historical novels.
Thomas Jefferson participated in many historic events.

immunize, vaccinate

To immunize means "to confer immunity." To vaccinate means "to administer a vaccine."

Example: People who were vaccinated against smallpox may no longer be immunized against the disease.

incidence, prevalence

Incidence refers to the rate of occurrence, such as the number of new cases of a disease occurring at a certain time. *Prevalence* is the total number of cases (or percentage) of a disease existing at a certain time in a certain area. *Incidence* expresses the number of new cases, whereas *prevalence* expresses the total number of cases.

Examples: The highest incidence of acute hepatitis C (HCV) is found among persons aged 20 to 39 years.
The highest prevalence of HCV infection is found among persons aged 30 to 49 years.

include

Include (and *includes, included, including*) precedes an incomplete list only.

Incorrect: The United States includes 50 states.

Correct: The United States includes Alaska and Hawaii.

infer, imply

Infer means "to draw a conclusion from evidence." *Imply* means "to suggest without actually stating." Usually the speaker or writer implies, and the listener or reader infers.

Examples: We can infer from this study that PCBs cause cancer in animals.
The latest study implies that PCBs also cause cancer in humans.

inject, inoculate

Medications, preparations, and drugs are *injected*, not patients or animals.

Incorrect: The physician injected the patient with insulin.

Correct: The physician injected insulin into the patient.

You *inoculate* an animal or patient with something.

Example: We inoculated each mouse with 0.5-mL aliquot.

Internet

Capitalize *Internet*.

lay, lie

To lay means "to place;" *laid* is the past tense. *To lie* means "to be in a reclining position;" its past tense is *lay*. *To lie* can also mean "to make an untrue statement;" its past tense is *lied*.

Examples: I asked him to lay the folder on my desk. He laid the folder on my desk yesterday.
He is depressed and lies in bed all day. He lay in bed yesterday.
You can't believe him; he lies all the time. He lied yesterday.

may, might

Both indicate possibility or probability. Strictly, *may* is present tense, *might* is past tense.

Examples: He believes he may be ill.
He believed he might have been ill.

Often *may* and *might* are used interchangeably, with *may* indicating more certainty than *might*.

Example: The study may answer some questions and might answer all of them.

Might rather than *may* is correct in hypothetical situations.

Example: Had they known the results, the members might have concluded differently. (NOT *may*)

maximize, maximal, minimize, minimal

Maximize means "to increase to the greatest amount possible," not simply "to increase." *Maximal* means "the upper limit," "the most comprehensive," not "somewhat more" or "much more."

Examples: CDC has guidelines on how to freeze food to maximize safety and freshness.
The maximal retention calcium intake for adolescents is 1,300 mg/d.

Minimize means "to decrease to the least amount possible," not simply "to decrease."
Minimal means "the least possible," not "somewhat less" or "a lot less."

Examples: To minimize your exposure to farm pesticides, wear appropriate protective gear.
The cost of tracking our progress will be minimal.

methodology

Methodology is the study of methods or a body of methods, rules, and postulates. Otherwise, use *method(s)*.

Example: After completing a course on audience research methodology, we decided to use qualitative research methods, including focus groups and interviews, to develop messages for CDC's folic acid campaign.

molecular weight

Molecular weight means "the relative mass of a substance." It is a pure number and has no units.

Incorrect: The molecular weight of the protein is 30,000 daltons.
Correct: The molecular mass of the protein is 30,000 daltons.
Correct: The molecular weight of methane is 16.

morbidity

Morbidity means both "the relative incidence of disease" and "the condition of being diseased." Change *morbidity* to *illness*, *disease*, or *condition* when writing for lay audiences.

Example: Millions of people suffer from illnesses that can be prevented or improved through regular physical activity. For example, the morbidity rate for heart disease is 135 per 100,000 Americans.

mortality, mortality rate, fatality

Mortality means "the number of deaths per standard unit of population per unit of time." Change *mortality* to *death* for lay audiences. *Mortality rate* means "the number of deaths per number of persons at risk," as in infant mortality rate (the ratio of numbers of infant deaths during a calendar year to the total number of live births during that year). Distinguish *mortality* from *fatality*. *Fatality* is a death resulting from a disaster.

Examples: Breast cancer mortality rates declined significantly during 1992–1998.
One of the fatalities in the accident was a small child.

N, n

N (uppercase) refers to the number of subjects in an entire study. *n* (lowercase) refers to the number of subjects in a subgroup within a study.

Examples: The Keokuk County Rural Health Study is a large, prospective and comprehensive study of households in Keokuk County, Iowa (N = 1,000).
We used responses of female controls (n = 475) from the population-based Cancer and Steroid Hormone Study.

nation

Because CDC publications often have an international readership, avoid using *nation* or *this country* as a synonym for the *United States.*

Avoid: This nation has a vast public health network.

Use: The United States has a vast public health network.

negative, normal, abnormal

These terms apply to the results of laboratory tests or medical examinations, not to tests or examinations themselves.

Incorrect: The throat culture was negative. The patient's blood test was abnormal.

Correct: The culture was negative for streptococci. Results of the blood test showed abnormal levels of iron.

normal, abnormal x-rays

The results of x-rays are *normal* or *abnormal*, not the x-rays themselves.

Incorrect: The x-ray is abnormal.

Correct: The results of the x-ray are abnormal.

-ology

-ology is a suffix that means "science of" or "study of." Use terms ending in *-ology* only to refer to the discipline or function and not to the subject of the discipline. Avoid, for example, using *pathology* to mean *pathologic tests* or *serology* to mean *serologic tests.*

Incorrect: The pathology should help us understand the virus's make-up.

Correct: The pathologic test should help us understand the virus's make-up.

over, under

These terms can be ambiguous when referring to time spans, ages, or quantities. Do not use *over* and *under* with time spans. Depending on your meaning, use *for* or *for*

more than instead of *over;* use *less than* instead of *under*.

Ambiguous: They studied the group over 10 years. (Does this mean *for 10 years* OR *for more than 10 years?*)

Clear: They studied the group for 10 years.

Clear: They studied the group for more than 10 years.

When referring to age groups, replace *over* and *under* with the more precise *older than* and *younger than*.

Avoid: All of the participants were over 65 years of age.

Use: All of the participants were older than 65 years of age.

When referring to numbers of persons, things, or groups, replace *over* and *under* with *more than* and *fewer than* or *less than*, whichever is appropriate.

Avoid: Over 2,000 people attended the conference.

Use: More than 2,000 people attended the conference.

Pap smear, Pap test

Change *Pap smear* to *Papanicolaou test*. If the term is repeated, write it out in full the first time, put the abbreviation *Pap test* in parentheses, and use the abbreviation from then on.

Example: A Papanicolaou test (Pap test) is an invaluable tool in the fight against ovarian and vaginal cancer. Every woman should get a Pap test annually.

parameter

This term is often misused. The word has a specific statistical meaning and should not be used to mean measurement, value, or number. Except when a descriptive quantity for a statistical population is meant, change *parameter* to *measurement, value, quantity, variable,* or *number*.

Example: Sites along the Mississippi River were not included in the analysis because they were outside the parameters of the study.

pathology

Pathology is the study and description of disease processes, abnormalities, and lesions; do not use it in place of *abnormalities* or *lesions.*

Example: CDC is sponsoring a workshop on the pathology and emergence of infectious diseases.

percent, percentage

Use *percent* only with numbers. Use *percentage* with nouns.

Examples: Thirty five percent of high school students always wear their seat belts.
A large percentage of the population is allergic to poison ivy.

Note: In graphs that give percentages, the label on the axis should read *percent*, not *percentage*.

person

The plural of *person* is *persons*, not *people*. *People* refers to a group of persons who share particular characteristics (the American people).

Example: The chronic disease prevention guidelines apply to all persons, not just people from the United States.

positive test results

Be sure to say what you mean because it could be bad news, not good news.

Example: A positive reaction to the TB skin test usually indicates latent TB infection.

preventative, preventive

Use *preventive*.

principal, principle

The adjective *principal* means "most important," or "most influential." The noun *principal* refers to a person who has controlling authority or is in a leading position. The noun *principle* refers to a basic belief, law or doctrine, or to an assumption.

Examples: The principal cause of mesothelioma, a rare lung cancer, is exposure to asbestos. (*Principal* is an adjective.)
The principal is new to this school. (*Principal* is a noun.)
Stick to your principles. (*Principle* means beliefs.)
The acceleration principle is a theory in economics. (*Principle* means a law.)

regime, regimen, regiment

A *regime* is a form of government. A *regimen* is a plan to improve and maintain good health. A *regiment* is a military unit.

Examples: The *ancien régime* refers to the political and social system of France before 1789.
Treatment of diabetes requires a strict regimen that includes a carefully

calculated diet, physical activity, blood glucose testing, and multiple daily insulin injections.
The 65th Infantry Regiment began as a volunteer unit in 1899.

relation, relationship

A *relation* is an association between two or more items. Reserve the term *relationship* to describe a state of affairs among people related to or dealing with one another.

Examples: Numerous studies have established the relation between lung cancer and exposure to asbestos.
The two health communicators have a good working relationship.

research subjects, control subjects, study participants

Research subjects have the particular characteristic, engage in the particular behavior, or are exposed to the particular variable (e.g., a certain drug) under study. Research subjects are recruited, selected, sometimes subjected to experimental conditions, and observed.

Control subjects are as similar as possible to research subjects except that they do not have the particular characteristic under study. Control subjects are recruited, selected, sometimes exposed to a placebo, and observed.

Study participants can be either the research or the control subjects.

respectively

Avoid using *respectively* to connect components in a sentence; this construction forces readers to pause and puzzle over which components go together.

Avoid: The smoking rates for boys, girls, men, and women were 18, 15, 27, and 26%, respectively.

Use: The smoking rates were 18% for boys, 15% for girls, 27% for men, and 26% for women.

sacrifice

Sacrifice is a euphemism for killing laboratory animals. Use *kill* or *humanely kill.*

serum samples

Because serum does not occur in discrete units, a person cannot have more than one; that is, a patient has serum, not sera, just as one has blood, not bloods. Discrete

quantities of serum can be collected; refer to these as *serum, serum samples,* or *serum specimens* rather than *sera*.

Example: He collected serum samples from hospital staff at risk for hepatitis B.

significant

Because *significant* has a specific statistical meaning, it should not be used as a synonym for *important*. In a nonstatistical context, use another word such as *important, substantial, notable, major,* or *great*. When statistical significance is meant, *P* values are usually given.

Example: The mean blood pressure was significantly lowered, with a *P* value of .05.

since, because

To avoid ambiguities, use *since* with time frames only (e.g., since 1960), not as a synonym of *because*.

Ambiguous: Since they researched that topic, they found out more about it. (Does it mean, *Because they researched the topic?* OR *Since the time when they researched that topic?*)

t test

The *t* is lowercase and italicized.

Example: A paired *t*-test was used to compare pre-and post-training scores of immigrant and U.S.-born Asians.

toxic, toxicity, toxin, toxicant

Toxic means "pertaining to or caused by a poison or toxin." *Toxicity* means "the quality, state, or degree of being poisonous." *Toxins* are natural poisons (e.g., snake venom). *Toxicants* are manufactured poisons (e.g., chemical pesticides).

Examples: All explosives generate toxic fumes when they detonate.

They investigated the extent of exposure and toxicity among users of a skin lotion containing mercury.

When botulinum spores grow in contaminated foods or inside the digestive tract of a young child, they can produce a toxin that causes botulism.

A number of toxicants, such as lead and arsenic, were present in the soil.

United States, U.S.

Use *United States* as a noun. Use *U.S.* as an adjective.

Examples: In 1999, 46.5 million adults in the United States smoked cigarettes.

In 1999, 46.5 million U.S. adults smoked cigarettes.

use, utilize, usage

The verb *to use* is always preferred. In general, the short form of a word is preferred over the long form.

versus, vs., *v*

Both *vs.* and *v* are abbreviations for *versus*, which means "in contrast to." Use *v* (without a period) only in legal citations and italicize the citation (*Brown v Board of Education*). Avoid using *versus* in comparisons.

Avoid: The women's response rate (82%) was high versus the men's response rate (34%).

Use: The women's response rate (82%) was much higher than the men's response rate (34%).

vicious circle, vicious cycle

Vicious circle is the correct term, not *vicious cycle*.

Website, World Wide Web, the Web

A website is a particular location on the World Wide Web. *World Wide Web* is synonymous with the *Web*. However, capitalize *World Wide Web* and the *Web*.

Tip: **Word Use**

Strunk's Advice on Word Use

- Prefer the familiar word to the 'hifalutin.
- Prefer the single word to the circumlocution.
- Prefer the short word to the long.
- Prefer the standard to the offbeat.
- Prefer the specific to the general.
- Prefer the definite to the vague.
- Prefer the concrete to the abstract.

Vocabulary Issues

Buzz Words (Fillers)

You can often omit these words without changing the meaning of the sentence. Leaving them out will make the sentence clearer. Follow Mark Twain's advice: "As to the adjective, when in doubt, strike it out."

Following is a list of fillers to avoid. ▼

a total of	absolutely	actually
as a matter of fact	basically	completely
current	definitely	each and every one of
existing	extremely	fine
for all intents and purposes	good	great
I believe that	important	in due course
in the end	it is important that	it should be noted
I would like to point out	I would like to say	I would like to stress
last but not least	major	obviously
of course	quite	really
significant	the fact of the matter is that	the month of
very		

Incomparables

Incomparables such as *perfect* are absolute and therefore cannot be qualified or modified. You can say *almost* or *nearly perfect* but not *more perfect*.

Following is a list of incomparables. ▼

absolute	best	complete	equal
eternal	fatal	final	least
lethal	perfect	square	supreme
terminal	total	unanimous	worse

Tip: **Top 10 Jargon Words**

Jargon	Alternative
as well as	and, also
currently	now
emphasize	stress
in addition to	and, also
in order to	to
in the vicinity of	near
large number of	many (or say how many)
the majority of	most
utilize	use

Jargon

Simple, plain English words are always preferable to complicated ones. As Francis de Sales said, "There is no artifice as good and desirable as simplicity."

Following is a list of jargon words and their alternatives.

Avoid	*Prefer*
A	
a considerable amount	much
a considerable number	many
accomplish	do, achieve
accordingly	so
accumulate	gather
acquire	get
activate	begin, start
adequate number of	enough
adjacent to	next to, near
advantageous	useful, helpful
afford the opportunity	allow
allocate	give
along the lines of	like, as in
ameliorate	improve
an estimated	about
as a consequence of	because
as a result of the fact that	because
as long as	if, since
as regards	about
as well as	and, also
at all times	always
at an early date	soon (or say when)
at the moment	now
at the present time	now
at the time that	when
attain	reach
augment	increase

Avoid	*Prefer*
B	
by means of	by
C	
close proximity	near
commence	begin, start
completion	end
comply with	follow, obey
components	parts
conceal	hide
concerning	about
construct	build
contrary to	against
cumulative	added
currently	now
customary	usual
D	
depict	show
demonstrate	show, prove
desist	stop
despite the fact that	although, though
detrimental	harmful
disconnect	cut off, unplug
disseminate	send, distribute, spread
due to the fact that	because
duplicate	copy
during the course of	during
during the time that	while
during which time	while

Avoid	Prefer
E	
effect (v)	make
effectuate	bring about, carry out
elucidate	explain
employ	use
endeavor to	try
enquire	ask
ensuing	following
equivalent	equal
evaluate	test
except when	unless
F	
facilitate	make easier, ease, help
facility	building, laboratory, office
feasible	possible
feedback	comments, response
finalize	complete, conclude, finish
following	after
for the duration of	during, while
for the purpose of	for
for the reason that	because
formulate	work out, devise
frequently	often
functionality	function
fundamental	basic
G	
give rise to	cause

Avoid	Prefer
I	
illustrate	show
impact (v)	affect, influence
implement	carry out, do
in almost all instances	nearly always
in a number of cases	in some cases (or say how many)
in a timely manner	promptly, soon
in addition to	and, also
in advance	before
in case of	if
in conjunction with	and, with
in most cases	often, mostly
in order to	to
in reference to	about
in spite of the fact that	despite
in terms of	about
in the absence of	without
in the amount of	for
in the context of	in
in the course of	during, while
in the event of	if
in the near future	soon
in the neighborhood of	about, around
in the vicinity of	near
is in a position to	can
it is clear that	clearly
it is incumbent upon us	we must
in view of the fact	as, because
it would appear that	apparently
it is probable that	probably
inception	start
initial	first
input	comment
inquire	ask
institute (v)	begin, set up, start

Avoid	*Prefer*
L	
large number of	many (or say how many)
linkage	link
listing	list
location, locality	place
M	
magnitude	size
manner	way
manufacture	make
materialize	occur, happen, appear
methodology	methods, procedure
mitigate	moderate, ease, soften, relieve, reduce
moreover	besides, also, and
N	
necessitate	require, need
nevertheless	but, however
not in a position to	unable
O	
objective	aim, goal
observe	see
obtain	get
on a regular basis	regularly
on behalf of	for
on numerous occasions	often
on the condition that	if
on the grounds that	because
on the occasion that	when, if
on the part of	by
operate	use
operational	working, active, running
otherwise	or
output	product

Avoid	*Prefer*
P	
paradigm	pattern, example
parameter	boundary, limit, extent
partially	partly
permit	let
pertaining to	about
place (v)	put
portion	part
predominant	main
preparatory to	before
presently	soon, shortly
previous to	before
prioritize	rank
procure	get, obtain
prolonged	long
provided that	if
purchase	buy
R	
regarding	about, on
regulation	rule
remainder	rest
represents	is
request (v)	ask
require	need
reside	live, stay
residence	home, house
retain	keep
S	
solely	only
state (v)	say
statutory	legal, by law
strategize	plan
subsequently	later
subsequent	next
subsequent to	after

Avoid	*Prefer*
substantial	big
substantiate	prove
sufficient	enough
T	
take into consideration	consider
terminate	end, finish, stop
the majority of	most
thereafter	then
through the use of	by, with
transmit	send
transpire	happen, occur, take place
U	
ultimate	last, final
uniform	same, similar
unoccupied	empty
until such time	until
upon	on
utilization	use
utilize	use
V	
viable	possible
virtually	almost
visualize	see
W	
with regards to	about

Tautologies and Redundancies

A tautology is a needless repetition of a word, idea, or statement, such as in "Five minutes before he died, he was still alive." Although this is an extreme example that might never be used, we use many other tautologies without even realizing it. As Thomas Jefferson said, "The most valuable of talents is that of never using two words when one will do." Below is a list of common tautologies and their alternatives. ▼

Superfluous	*Correct*
A	
absolutely complete	complete
absolutely essential	essential
actual/past/present experience	experience
added bonus	bonus
advance planning/notice	planning/notice
already exist	exist
and also	and, also (but not both)
ask the question	ask
assembled together	assembled
at about	at, about (but not both)
B	
basic fundamental	basic, fundamental (but not both)
cancel out	cancel
C	
CD-ROM disk	CD-ROM
center around	center
clearly evident	evident
blue/red/yellow in color	blue/red/yellow
completely destroyed	destroyed
complete monopoly	monopoly
consensus of opinion	consensus
contributing factor	factor
controversial issue	issue
cooperate together	cooperate
costs a total of	costs
current status	status
D	
doctorate degree	doctorate
E	
each and every	each, every (but not both)
end result	result
exactly identical	identical
extremely minimal	minimal
F	
few in number	few
filled to capacity	filled
final outcome	outcome
first and foremost	first
foreign imports	imports
future plans	plans
G-H	
general public	public
HIV virus	HIV
I	
if and when	if, when (but not both)

Superfluous	*Correct*
it is clear	(omit)
it is obvious	(omit)
J-L	
join together	join
large in size	large
M	
mixed together	mixed
month of January	January
more and more often	often
N	
new breakthrough	breakthrough
none at all	none
O	
over and over again	repeatedly
overexaggerate	exaggerate
P	
past history/experience	history/experience
period of time	period, time (but not both)
point in time	now, today
postpone until later	postpone
R	
repeat again	repeat
S	
small in size	small
square in shape	square
still remains	remains
sum total	total
T	
temporary loan	loan
time period	time, period (but not both)
total number	total
true fact	fact
12 noon/12 midnight	noon, midnight
U	
unite together	unite
usual habit	habit
V	
visible to the eye	visible

Words Commonly Misspelled

English spelling can be difficult and illogical. Remember George Bernard Shaw's explanation of why *ghoti* is pronounced *fish*: *gh* as in rough, *o* as in women, *ti* as in fiction. The following pages contain a list of commonly misspelled words. ▼

Incorrect	*Correct*
A	
accomodate, acommodate	accommodate
acumulate	accumulate
agressive	aggressive
alright	all right
amuck	amok
auxilliary	auxiliary
B	
bacallaureate	baccalaureate
barbituates	barbiturates
C	
catherization	catheterization
changable	changeable
committment, comitment	commitment
concensus	consensus
correspondance	correspondence
D	
day-long	daylong
dependant (adjective)	dependent
diarhea	diarrhea
dietician	dietitian
dilemna	dilemma
dispell	dispel
disatisfied	dissatisfied
E	
elegible	eligible
embarass	embarrass
exagerate	exaggerate
excede	exceed
existance	existence
eye witness	eyewitness
F	
ficticious	fictitious
flurescent	fluorescent
fluride	fluoride
forword	foreword
fullfill	fulfill
G	
gassify	gasify
H	
harrass	harass
heigth	height
hemorhage, hemorrage	hemorrhage
hemmoroid	hemorrhoid
I	
indispensible	indispensable
innoculate	inoculate
interferred	interfered
irelevant	irrelevant
L	
lenghth	length
likelyhood	likelihood
liquify	liquefy

Tip: **Word 2000 Shortcut**

Spell Check

To check spelling and grammar **click F7**.

Incorrect	*Correct*	*Incorrect*	*Correct*
M			
managable	manageable	predominately	predominantly
manouver	maneuver	prefered	preferred
mispell	misspell	procede	proceed
N		**R**	
nation-wide	nationwide	reccur	recur
nightime	nighttime	relevent	relevant
O		rythm	rhythm
ocasion, occassion	occasion	**S**	
occurence, occurrance	occurrence	skilful, skillfull	skillful
ophtalmology	ophthalmology	supercede	supersede
P		**T**	
paralel, parallell	parallel	threshhold	threshold
personel	personnel	**U-W**	
preceed	precede	untill	until
precedant	precedent	withold	withhold

6 Tables, Charts, and Graphs*

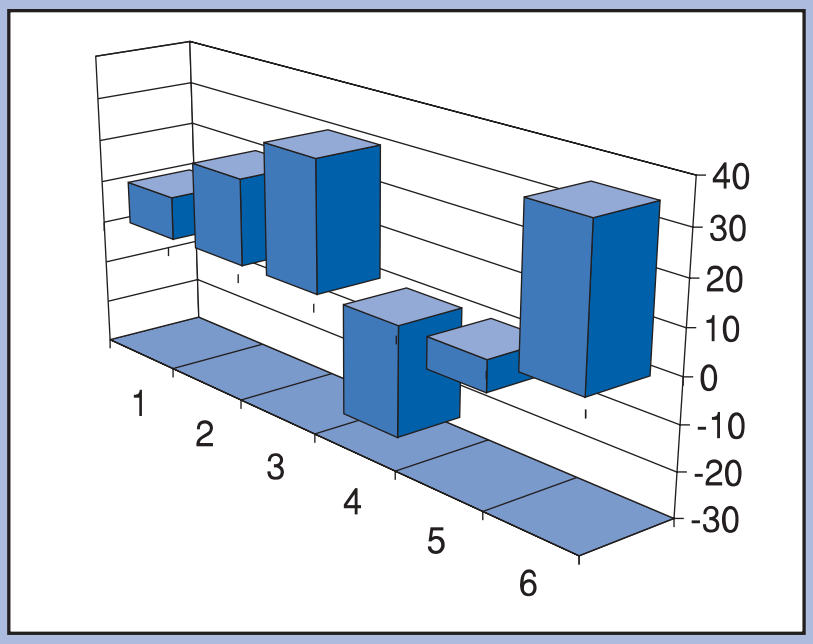
> "You can observe a lot by just watching."
>
> **Yogi Berra**

This chapter presents the different types of data graphics or visuals (i.e., tables, charts, and graphs) and explains which are best suited for the information you need to convey. A visual can convey ideas in a way words cannot and visuals are often the most effective way to display large sets of numbers or data. An effective visual combines simplicity of design and complexity of data.

Above All Else, Show the Data

A visual should focus on the data, not on the visual itself. Visuals that are too decorative distract from the main message, which is to convey data at a glance. Instead of a clean visual, you end up with "chartjunk."

Example: "Chartjunk"



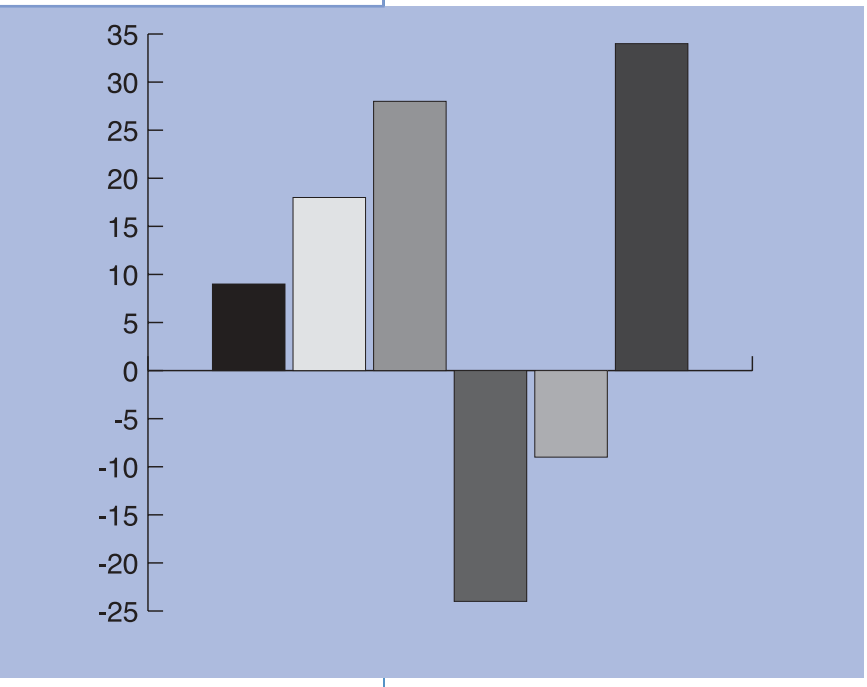
This computer chart violates many design theories. It is enclosed in a box, has a grid, has too many vertical and horizontal lines, and is three-dimensional in perspective. The effect is too busy, and the information is difficult to read.

Avoid "Chartjunk"

One simple way to avoid "chartjunk" is to eliminate or reduce the clutter around a visual, such as explicit grids around a table (unnecessary), extra borders (useless), heavy lines (cumbersome), two- or three-dimensional effects (deceptive), or color (distracting). This type of visual surplus is noninformation that should be eliminated through careful editing.

* A version of this chapter originally appeared in ATSDR's *VIC Style Guide*.

Example: Redesigned Chart



Because all the "chartjunk" has been eliminated, the effect is much more sober, and the chart is actually readable.

The Elements of a Visual

Effective visuals convey complex ideas with simplicity, clarity, and efficiency. To succeed, visuals should

- Show the data.
- Focus the reader's attention on the meaning of the data (content), not on the graphic design itself (format).
- Avoid distorting the data.
- Present a lot of information in a small space.
- Encourage comparisons of the different data.
- Serve a clear purpose (compare, contrast, describe, explore).
- Be accompanied by and closely related to the text.

Guidelines for Enhancing Visuals

To be attractive and effective, the visual should

- Have the proper format and design (e.g., table, pie chart).
- Have a balanced look and a relevant scale (do not create a visual for a small amount of data).
- Be technically and scientifically accurate.
- Avoid decorations and "chartjunk."

Tables

Definition

Tables are numerical values displayed in rows and columns. They are useful for showing a large number of data in a small space, either with numbers or words. The purpose of a table is to present data or information and to support statements in the text. A table should stand independently, without any explanations from the text.

The Six Elements of a Table

A table typically contains six major elements:

1 **Number and title.** Each table needs a number and a title that succinctly describes what the table represents. The title for each table should be unique, brief, and informative. The title should be in bold to stand out and should not be followed by a period.

2 **Column headings.** Each column should have a heading that contains the main categories of information and identifies the entries in the columns. Headings should be brief and descriptive. Units of measure, where necessary, should be either specified as part of the heading or enclosed in parentheses under the heading. Column headings are usually in bold.

3 **Row headings (or data stubs).** The left-hand vertical column carries a column heading and lists the items about which information is given in the table.

4 **Body (or data field).** The body consists of individual cells (data points) and contains the information or data the author wants to present. These data can be numbers, text, or symbols.

5 **Rules (or lines).** Rules separate the table into its various parts. A common mistake in designing tables is to enclose the information in a grid. Instead of guiding the reader's eye through the data, the striped texture of a grid actually fights with the information. Tables look better if they are not closed on all sides.

6 **Source and footnotes.** The source line identifies the origin of the data. When a source line is needed, it appears below the table and the footnotes. Footnotes explain individual items in the table and minimize the visual clutter of a table. Following are a few guidelines and tips on how to use footnotes properly.

General Guidelines for Using Footnotes

- Use abbreviations in the table, and define them in footnotes.
- List the footnotes in the order in which they appear in the table. Go across rows from left to right, not across columns from top to bottom.
- If a footnote applies to the entire table, put the footnote symbol after the title.
- If a footnote applies to an entire column or row, place the footnote symbol after the column or row heading.

Using Footnote Symbols

For 10 footnotes or less, use the following superscript symbols in order:

*	Asterisk
†	Dagger
‡	Double dagger
§	Section mark
¶	Paragraph mark

For footnotes 6 through 10, double the symbols. For more than 10 footnotes, use superscript lowercase letters (e.g., 152[a], 240[b]) instead of numbers because numbers could be mistaken for the numerical data within the table.

Tip: **Word 2000 Shortcut**

Inserting Footnote Symbols

Place the cursor where you want to insert the symbol.

1. On your toolbar, click **Insert, Symbol** to open the **Symbols** window.
2. Select the **Symbols** tab. Under **Font** select **(normal text)** and under **Subset** choose **Basic Latin**.
3. Scroll down until you find the appropriate symbol.
4. Highlight the symbol and click **Insert**.
5. Click **Close** to close the window.

Tip: **Word 2000 Shortcut**

Superscripting Symbols

Highlight the symbol, letter, or number you want to superscript.

1. On your toolbar, click **Format, Font** to open the **Font** window.
2. Select the **Font** tab, select **Superscript**.
3. Click **OK**.

Example: Table

Indoor Air Results in Classroom, Offices, and Hallways—
Webster Middle School, Milwaukee, Wisconsin, July 10, 2000

Chemical	Lowest Level Detected	Highest Level Detected	Frequency of Detection	Comparison Value	Outdoor Air Levels in Milwaukee 1996–1998
Petroleum-Based VOCs*					
Toluene	11†	21	5 in 6	420.0‡	0.6–10.6
Total xylenes	7.9	24.5	5 in 6	100.0§	0.7–6.5
Chlorinated VOCs					
Chloroform	ND¶	ND	0 in 6	NA	ND
cis-1,2-dichloroethylene	0.8	8.1	6 in 6	303.3‡	NA
Trans-1,2-dichloroethylene	ND	1.3	1 in 6	597.0‡	NA
1,1-dichloroethylene	ND	ND	0 in 6	0.02**	NA
Methylene chloride	1.0	5.8	6 in 6	3.8**	0.4–1.3
Vinyl chloride	ND	ND	5 in 9	0.1**	ND

* VOCs: Volatile organic compounds.
† All concentrations in micrograms per cubic meter ($\mu g/m^3$).
‡ EPA's reference dose.
§ ATSDR's chronic environmental media evaluation guide.
ND: Not detected.
** Cancer risk evaluation guide for 1 in 1,000,000 excess lifetime cancer risk.
Source: Chemex Laboratories, Milwaukee, Wisconsin, 1998.

Charts and Graphs

Definition

Charts and graphs represent numerical data in visual form. They show trends, movements, distributions, comparisons, and cycles. The following sections present common types of charts and graphs.

Example: Bar Chart

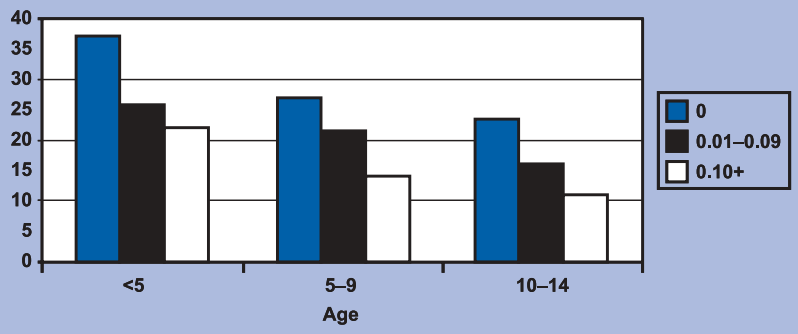


Figure 1. Restraint use among child passenger fatalities by child's age and the BAC of their driver, Unites States, 1985–1996
Adapted from *JAMA* 2000;283:17

Bar Charts

A bar chart is most effective for comparing amounts, frequencies, sizes, or magnitudes of several items at one time. Bar charts consist of horizontal or vertical bars of equal width, scaled in length to represent some quantity.

Formatting Guidelines for Bar Charts

- Make sure the space between the bars is no less than half the width of the bar and no more than twice the width of the bar.
- Identify the bars with a key.
- Use solid colors instead of patterns on the bars.
- Use contrasting colors for charts that have more than one series of bars.

Pie Charts

A pie chart presents data as wedge-shaped sections of a circle and shows the relative size of a whole divided into segments. The circle must equal 100%, or the whole of some quantity, with the wedges representing the various ways the whole is divided. Pie charts are the most easily understood at one glance.

Formatting Guidelines for Pie Charts

- Make sure the wedges together equal 100%.
- Begin at the 12 o'clock position, and sequence the wedges clockwise from the largest to the smallest.
- Restrict the number of wedges to seven. Too many items make the pie look cluttered and too few items will not make a useful graph.
- Give each wedge a distinctive color, pattern, shade, or texture.
- Keep all callouts (the labels that identify each wedge) horizontal, and include the percentage value for each wedge.
- Explode one slice to call attention to it.

Example: Pie Chart

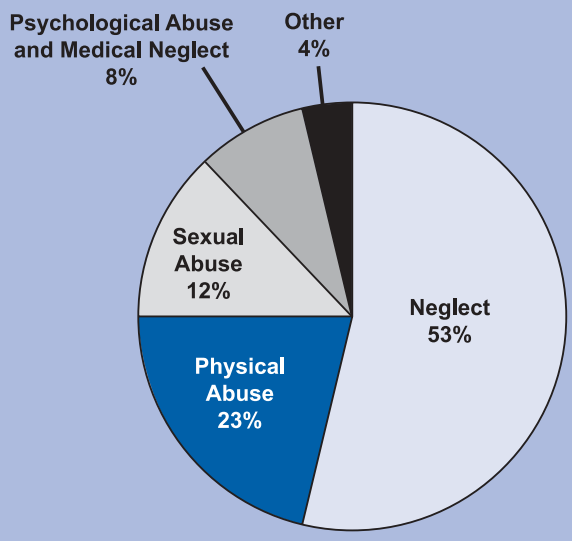


Figure 1. Types of child maltreatment
Source: Administration for Children Families

Flowcharts

A flowchart illustrates, in sequence, the progressive steps of an operation. Flow charts allow the reader to identify the essential steps of the process quickly and easily. Most flowcharts go from left to right and top to bottom, but the flow may be different. Remember that in the strictest environments, each element of a chart has a specific meaning (e.g., boxes versus circles).

Formatting Guidelines for Flowcharts

- Arrange the items from left to right or top to bottom.
- Use arrows to indicate the direction.
- Label or identify all the steps in the process.
- Include a key for symbols readers may be unfamiliar with.

Example: Flowchart

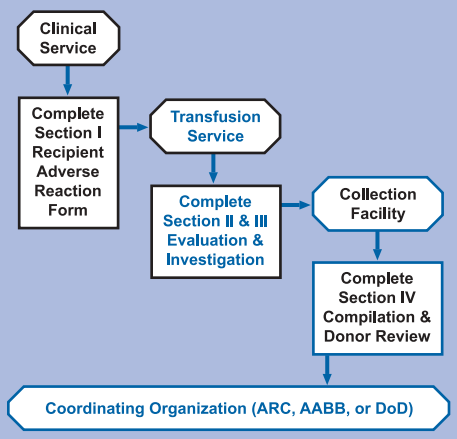


Figure 1. Adverse reaction reporting
Source: CDC, National Center for Infectious Diseases

Organization Charts

An organization chart illustrates the hierarchy of an organization, the functions of each unit or department, and how they interrelate. The title of each organizational component (e.g., person, office, section, or division) is placed in a separate box, which is then linked to other boxes appropriate to the organizational relationship.

Formatting Guidelines for Organization Charts

- Use a wider organizational block to denote more authority.
- Use a heavier line weight on the lines between the organizational blocks than on the blocks themselves.
- Whenever possible, keep organizational blocks of the same authority the same size.

Example: Organization Chart

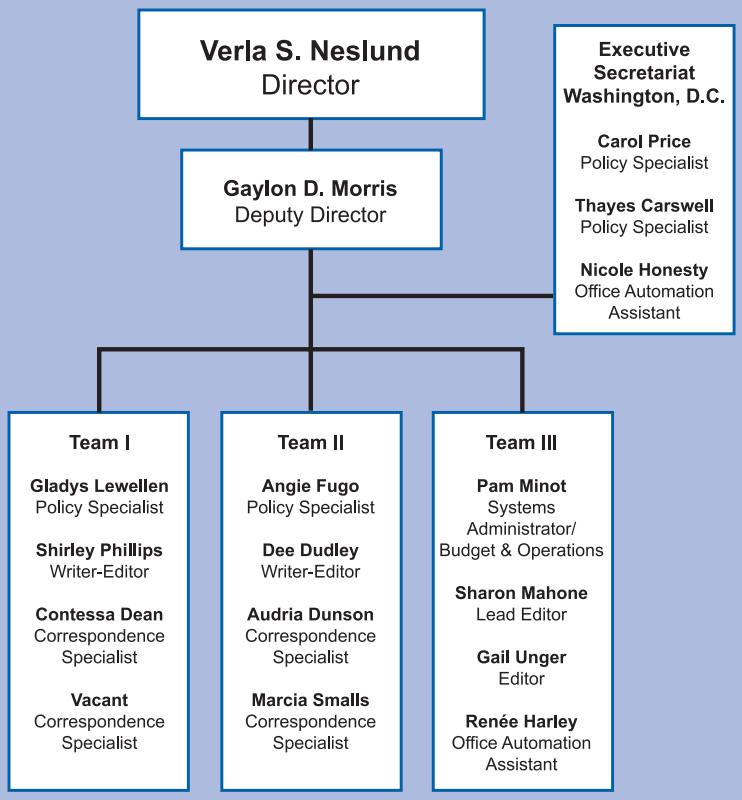


Figure 1. Executive Secretariat organization chart

Line Graphs

A line graph is most effective for illustrating trends over time. The line graph shows the relation between two variables or sets of numbers by points connected in a continuous line. The graph can have more than one set of variables (more than one line), allowing for comparisons between two sets of statistics for the same period of time. When creating such a graph, label each line.

Example: Line Graph

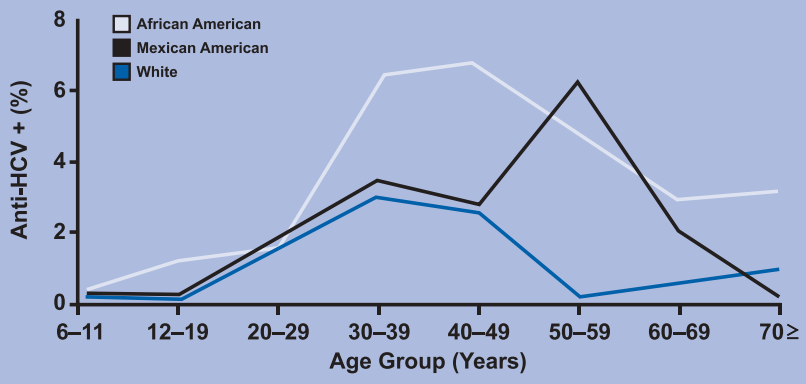


Figure 1. Prevalence of hepatitis C virus (HCV) infection by age and race/ethnicityóUnited States, 1988–1994
Source: CDC, Third National Health and Nutrition Examination Survey

Formatting Guidelines for Line Graphs

- Indicate the zero point of the graph (where the two axes intersect).
- Divide the vertical and horizontal axis in equal portions.
- Use the minimum number of grid lines so the lines stand out against the background.
- Make all lettering horizontal if possible, except for the vertical axis, which is usually positioned vertically.

7 Guidelines for Exhibits, Posters, and Electronic Presentations*

> "Good things, when short, are twice as good."
>
> **Balthasar Gracian**

Different Documents, Different Purposes

A document intended to be presented to a live audience (in the form of an exhibit, poster, or *PowerPoint* presentation) differs greatly from a document intended to be read on paper (such as a fact sheet or a pamphlet). Therefore, the writing must be different as well. The following table lists the differences between the two types of documents. ▼

	Presentation Graphic (Exhibit, Poster, *PowerPoint*)	***Printed Document*** (Article, Book)
Format	Large size, projected on a screen or mounted on a wall	Small size (typically 8 ½" × 11")
Purpose	To support a message	To carry a message
Presentation	Outline of key points	Detailed, informative piece
Reader/Document Ratio	Many readers/one document	One reader/one document
Audience	Reader scans document	Reader reads document

Big, Bold, Simple, and Consistent

Consider the above-mentioned factors when making a presentation graphic. Above all, use a design that is big, bold, and simple. A presentation graphic is rarely too big, bold, or simple. Audiences won't complain about a slide being too simple, but they will complain about one being too complex and busy.

* A version of this chapter originally appeared in ATSDR's *VIC Style Guide*.

Communication Is the Key

Remember that you are the presenter of the message, and the presentation graphics must support your message, not be your message. Presentation graphics are only tools; they can greatly enhance your message, but they should not replace it. Following are a few suggestions to enhance your presentation.

- **Use visuals sparingly.** In fact, visualize giving your presentation without the visual aid. If you can do it, it is a sign that you, and not the slide show, are the master of the presentation.
- **Build in blank, black slides.** This enables you to speak to the audience directly without your regular slides distracting them.

Reasons for Using the CDC *PowerPoint* Templates

PowerPoint templates have been developed for use across CDC to project a consistent image to our many external audiences. These templates are available through the *CDC Identity Management System*, at *http://intra-apps.cdc.gov/cdcidentity/Login/Home/login.asp.* Regardless of which template you choose, the addition of your text and supporting images should be the only customization made to these pieces—the designs must remain constant. If you have any questions about how to use these items, contact your brand coordinator.

All CDC staff are encouraged to use the templates because the templates:

- Reinforce the identity of CDC in the minds of the public and distinguish it from other agencies. Using the templates ensures that the corporate identity of our agency is presented consistently and persuasively.
- Are easy and convenient to use. Remember that your goal is to deliver the presentation, not to spend all your time creating it.

Using the official templates will save you time, ensure your presentation looks professional, and reinforce the identity of the agency.

Creating Successful *PowerPoint* Presentations

Follow the guidelines below to produce a clean and professional presentation and to avoid an electronic circus. Most of these guidelines also apply to other types of presentations.

General Guidelines

Just because the presentation looks splendid on your computer screen at the office does not guarantee its effectiveness in front of a large audience. You need to rehearse the presentation, both for timing and delivery, and you must have a back-up plan.

- **Set up prior to audience arrival.** Arriving early will give you time to get acquainted with the facility and the equipment and to set up the material properly. You will also have time to greet your audience without being distracted by having to set up equipment at the last minute. You can never be certain that the technology you are using will be compatible with the resources available to you for the presentation. Checking out your equipment early can save you some embarrassment.
- **Practice on site.** If at all possible, practice your presentation at the actual site. This will enable you to become comfortable with the equipment and the setting. The best test for readability is to sit in the last row of the room. If the slide can be read from the last row, it is well designed.
- **Have a back-up plan.** Technology can be tricky. If possible, have handouts to distribute in case of equipment failure.

Design Guidelines

Resist the temptation to use every tool available in *PowerPoint;* excessive visual and auditory elements will distract from the message. The key to a well-designed document is knowing which elements to include, but also—more importantly —which ones to exclude. The best, most powerful designs are the simple ones, the ones that use the minimum number of elements for the maximum effect.

- **Use visuals sparingly.** Do not present too many slides. If you have more detailed support materials, such as tables, include them in a handout. A rule of thumb is one slide for every two minutes of presentation time.
- **Use a simple layout.** Horizontal rules, bullets, icons, clipart, and other visual markers can be effective when used in moderation. Your layout should focus on your message. Too many embellishments clutter the slide and distract from the primary focus of the slide, which is the message.
- **Make slides easy to see.** Be sure the text, pictures, and graphs are large enough to be seen even in the last row of the room. Use a 48-point font for titles and a 36-point font for body text.

Text Guidelines

Use words sparingly and leave plenty of white space in the slide. Crowding the slide with words is distracting to the audience. Your visual aids should support your presentation, not be your presentation.

- **Present only one message per slide.** Presenting more than one key point is distracting.
- **Use titles and headings correctly.** Place the title and headings in the same spot on every slide. Do not put a period at the end of the title because this encourages the reader to stop reading.
- **Use key words or phrases instead of complete sentences.** This will make the message easier to read and retain.
- **Follow the 6×6 rule.** Use no more than six lines of text and no more than six words per line. The slide should have no more than 36 words. The slide should be an outline of key points that support your message—not the message itself.
- **Avoid data dump in number charts.** Use a maximum of 30 numbers per slide. As a rule, put the complete data in handout form and present only the bottom line information in the slide.
- **Limit typefaces.** Use no more than three compatible, simple typefaces; otherwise the slide will look too busy.
- **Use serif typefaces preferably, such as Times New Roman** (serif typefaces have "feet" at the tops and bottoms of the characters). Use the bold setting to ensure the thin strokes of the serifs are easily readable. Keep in mind that fancy and unusual typefaces are much harder to read than simple ones.
- **Use upper and lowercase text.** All caps are difficult to read.
- **Use bullets smaller than text height.** This will help focus attention on your text. The bullet is only a marker preceding a line of text; it is not part of the message.
- **Left-justify bullets, dashes, and text.** This focuses the attention to the left side of the slide, at the start of every line of text.

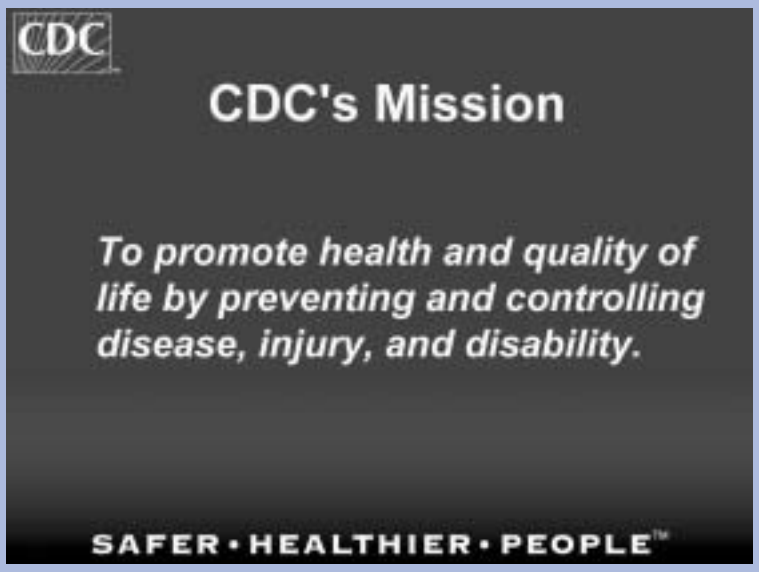
Visual Guidelines

- **Resist the temptation to over design.** In the words of architect Mies van der Rohe, "Less is more." Apply this motto and you will create a powerful and effective presentation.
- **Keep the background simple.** Do not use patterned backgrounds because they make the slide harder to read. A background should never interfere with the information presented on the screen. Use no more than three colors for text—two colors are preferred—or the slide will become too busy and distract the viewer from the message.
- **Use a strong contrast between background color and text color.** This ensures maximum legibility.

- **Use artwork with caution.** Artwork might be fun and entertaining, but it is sometimes inappropriate for professional presentations. Above all, the images must be relevant to the topic; don't include them just because they look pretty.
- **Limit sound effects and music.** Using too many sound effects or too much music will clutter your presentation and distract your audience from hearing your message.
- **Limit the number and kinds of transitional effects.** Using too many different transitional effects also will clutter your presentation and distract the audience.
- **Limit the use of animation.** Animation displays objects on your screen one at a time. For example, if you are using bulleted points, viewers see the first bullet first, then the second, and so on. There are many choices, but most are inappropriate if you want to achieve a professional look. Use discretion.

Example: Bad

Example: Good

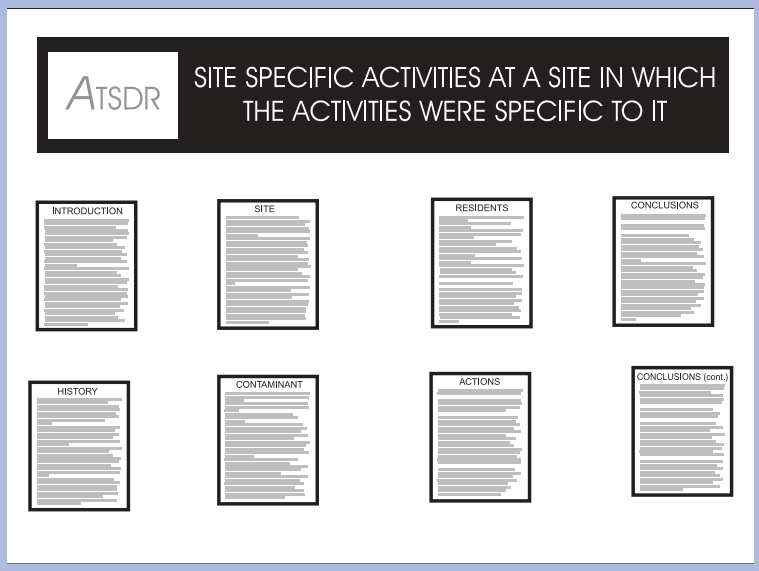


PowerPoint Tricks

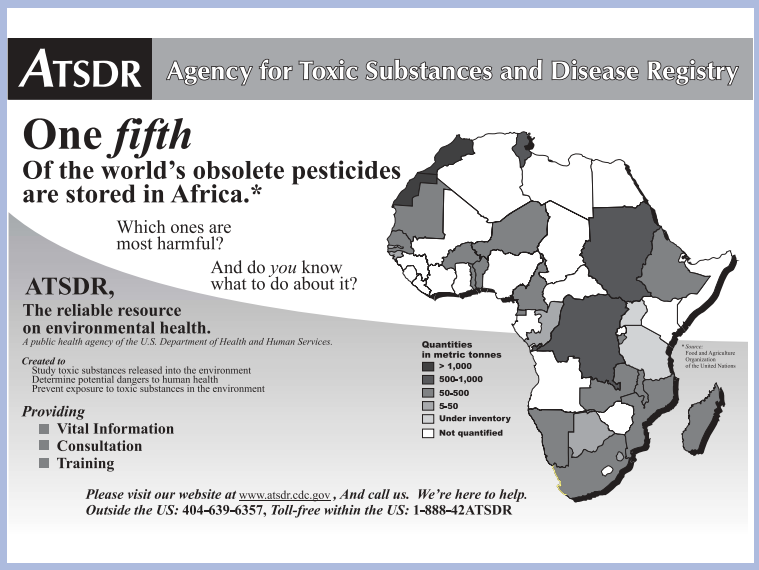
Here are a few tricks that will help you navigate between slides.

- **Know your slide numbers.** When you are in *slide show* view, you can move to any slide by hitting the slide number and pressing "Enter." This is useful, for example, if you are answering questions and want to move rapidly to a key slide.
- **Use the "b" key.** When you are in *slide show* view, you can get a black screen by pressing the "b" key. This is useful if you want to momentarily stop the presentation to answer a question. Press the key again to come back to the slide.
- **Have a specific concluding slide.** End your presentation with a slide that says *Thank You* or one that repeats the title of your presentation. As a safety measure, insert a blank slide so you don't mistakenly click out of the slide show.

Example: Bad



Example: Good



Poster Preparation Tips

Consider the following factors when preparing information in poster form.

Capture Your Audience's Attention

Your exhibit needs to catch the attention of people passing by your booth. You have only a few seconds to do this, so your exhibit must be bold and designed more like a billboard than a fact sheet. Design the exhibit to grab attention at distances up to 10 feet; the narrative material and tables should be clear and readable at a minimum distance of 3 feet.

Keep Your Audience's Interest

An effective exhibit is not a report or a journal article hung on a wall. It should highlight, through visual display, the major points or components of your topic so the viewer can readily understand them. Resist the temptation to reproduce full pages of text. Viewers will be more intrigued by crisp, terse phrases and bulleted lists. No one will read full pages of dense text and you will lose the crucial points of your presentation. Consider distributing fact sheets or providing copies of materials to supplement your exhibit.

8 Writing for the Web

> "Everything should be made as simple as possible, but not one bit simpler."
>
> **Albert Einstein**

Many of the writing principles that govern printed material also apply to online material. Your writing must be concise, clear, precise, and correct. However, you need to make some adjustments in your approach and adapt the document to the unique requirements of the Web.

Most Web users reportedly use the Web to gather information, and they want the information quickly. To ensure that users get information quickly, follow these guidelines.

Be Brief

Reading text on a screen is more difficult, more tiring, and more tedious than reading text in a printed format. Because of the computer screen's low resolution, a person's reading rate is greatly reduced. Keep pages and paragraphs short, and use the active voice. Web documents should be shorter than their hard-copy counterparts.

Group the Information to Make It Scannable

Most Web users scan the page rather than read word for word. Keep your document scannable by using titles, headings, and subheadings and by chunking (grouping) the information in short paragraphs. Whenever possible, use bulleted lists. Nothing conveys the information better and faster than bulleted lists.

Be sure to use meaningful headings and subheadings, not catchy, cryptic ones.

Avoid:	Methodology of Research Into Neural Tube Defects in the Hispanic Community
Avoid:	Nature vs. Nurture—The Impact of Ethnic Beliefs on Children
Use:	Studies Link Neural Tube Birth Defects to Low Folic Acid Consumption Among Hispanics

Although the first two choices are accurate (and even provocative), they are too cryptic. The most effective headings do not ask questions—they answer them.

The third option telegraphs the content, linking birth defects to low folic acid consumption in Hispanics, and requires no supporting information.

Start with the Conclusion

Web users are usually impatient. To grab their attention, you need to present the conclusion and emphasize the key messages upfront, using the inverted pyramid style.

Example: Extensive research has found that all women of childbearing age should take 400 micrograms of folic acid every day before they get pregnant to significantly reduce the risk of certain birth defects.

This first sentence contains all of the critical information of the article; a reader can continue reading for more details about how the research was conducted and why folic acid works.

Be Simple

Avoid blinking icons, moving text, and aggressive colors; they are distracting and may make your information look unprofessional. Use graphics sparingly because they take a long time to download. A simple design and layout is better than a complex one. Readers want clear information fast, not visual noise that takes an eternity to download.

Be Accurate

Edit the page carefully for content, spelling, and grammar. Make sure that the links are accurate and active.

Use Consistent Page Design

A site that is easy to understand and navigate must have a consistent look. You can accomplish this by repeating certain elements throughout the pages. Each page should have the same look and feel as all the other pages on the site. The following elements should be repeated on all pages: color scheme, formatting elements, layout, typography (fonts), illustrations, and navigation buttons.

Twelve Tips for a Concise Scannable Web Site

Before completing your Web page or online document, check the following:

1. **Purpose and message.** Is the purpose achieved? Is the key message clear and presented at the top of the page?
2. **Audience.** Does the document reach the intended audience? Is appropriate jargon and vocabulary clearly explained?
3. **Content.** Is the information chunked? Are the titles, headings, and subheadings clear?
4. **Organization.** Is the page well organized? Is it navigable?
5. **Appearance.** Is the text easy to read? Is the document scannable?
6. **Graphics.** Are the graphics relevant? Do they complement the text, not substitute for it? Do the graphics enhance or distract from the message? Do the graphics have descriptive captions?
7. **Speed.** Does the document download quickly?
8. **Currency.** Is the information up-to-date? Is there a mention of when the page was last updated?
9. **Reliability.** Is the information accurate and reliable? If outside sources are mentioned or linked to, are these credible?
10. **Accuracy.** Is the document error-free (no grammar mistakes, misspellings, typos, odd breaks)? Do links work correctly?
11. **Interaction.** Is contact information listed?
12. **Section 508 (accessibility).** Can individuals with disabilities navigate the site? For more details consult the CDC IT Accessibility page at *http://intranet.cdc.gov/accessibility/section508/default.htm.*

Electronic Glossary: How Do You Spell That Word?

The digital age has created enough new jargon to give anyone a headache. While the debate over the spelling of some Web-related words is now settled (most everyone agrees that Internet and Web are capitalized), it is still open for other terms (is it online or on-line?). Until dictionaries agree on a standardized spelling, the following list provides guidance on preferred spelling of computer-related terms at CDC.

INCORRECT	*CORRECT*
E-mail, E-Mail, email	e-mail
the internet	the Internet
the net	the Net
off-line	offline
on-line	online
url	URL
the web	the Web
Webmaster, Web master	webmaster
web site, Website, Web Site	website
world wide web	World Wide Web

Help from the Web

For more information, consult the following sites.

Government Websites

Writing for the Web

www.cdc.gov/nccdphp/cdnr/cdnr_sp0104.htm

This page by NCCDPHP gives advice on how to write and edit Web pages.

Writing for Online Reading

www.cdc.gov/od/hissb/docs/uisg-writing1.pdf

This short pdf file gives guidelines and standards for writing CDC documents that will be put online.

CDC Website Redesign Project

http://intranet.cdc.gov/redesign/default.htm

This website gives information on template design and other issues.

HHS Web Page Guidance

www.hhs.gov/policy/internet/webcust.html

This HHS site provides guidance on creating a customer-oriented Web page.

Methods for Designing Usable Websites

www.usability.gov/methods/collecting_writing.html

This site by the National Cancer Institute elaborates on how to write effectively for the Web.

Nongovernment Websites

The Web Style Guide

http://info.med.yale.edu/caim/manual/contents.html

This comprehensive style guide by Yale professors Patrick Lynch and Sarah Horton discusses all aspects of Web design.

Jakob Nielsen's Website

www.useit.com/

Jakob Nielsen is a renowned expert on Web usability.

The Sevloid Guide to Web Design

www.sev.com.au/webzone/design.asp

This site lists more than 100 tips and techniques for effective website creation.

9 CDC-Specific Guidelines

> "He gains everyone's approval who mixes the pleasant with the useful."
>
> **Horace**

This chapter addresses CDC guidelines to be followed when mentioning CDC, its centers, institute, and offices (CIOs), and the Department of Health and Human Services (HHS). It also takes you through the steps of the clearance process and provides tips on correspondence.

Attribution to CDC, CIOs, and HHS

To ensure a consistent image and to promote the CDC identity, integrate the following elements into all CDC documents:

- Include a standard description of the agency.
- Reference HHS.
- Reference CDC properly.
- Reference CIOs properly.

CDC Templates

CDC has developed templates to ensure consistency when communicating about the agency. The templates are on CDC's *Identity Management System* at *http://intra-apps.cdc.gov/cdcidentity/Login/Home/login.asp.*

Including the Standard Description of CDC

Insert the following paragraph at the end of every press release. ▼

> *The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.*

Insert this message in any other materials as appropriate, including fact sheets and backgrounders, reports, correspondence, and websites. Tailor the standard language to reflect the specific health topics addressed in the content.

Example: The Centers for Disease Control and Prevention (CDC) protects hospital patients' health by preventing and controlling disease outbreaks; informs clinicians about the dangers of antimicrobial resistance and ways to prevent it; and works in partnership with state and local health departments and medical associations to promote clinical standards to prevent antimicrobial resistance.

Referencing CDC

Spell out the agency name the first time, followed by the acronym in parentheses. Use the acronym thereafter. Do not insert *the* in front of the acronym. However, using *the* is acceptable when referring to data, a product, or program that belongs to CDC. The possessive form of CDC can be used to convey the same meaning.

Examples: CDC is committed to improving the public's health and safety.
The *CDC Style Guide* is a quick and easy reference tool for employees.
CDC's style guide is a quick and easy reference tool for employees.

Referencing HHS

CDC must acknowledge its relationship to HHS on all documents, even ones developed for internal distribution. At least one of HHS's identifiers (either the eagle logo or the department's name spelled out) and at least one of CDC's identifiers (any treatment of the CDC design element or the agency's name spelled out) must appear somewhere on the document.

When referring to HHS, spell out the department the first time, followed by the acronym HHS (not DHHS) in parentheses. Use the acronym thereafter.

Specific guidelines on how HHS should be included on the cover and attribution pages of all communication products are found at *http://intranet.hhs.gov/read/esguide/*.

Referencing an Individual Center, Institute, or Office

The public often perceives CIOs as separate from CDC. This confusion primarily stems from the use of acronyms when referring to the CIOs, without the inclusion of the acronym CDC. To strengthen CDC's identity, avoid using acronyms and always connect the CIO to CDC.

Confusing: According to NCID, the threat of antimicrobial resistance is increasing.

Clear: CDC's infectious diseases center announced that the threat of antimicrobial resistance is increasing.

Where possible, refer to the specific program within the center. Identifying the specific program is sufficient; it is not necessary to reference the center.

Example: CDC's folic acid program seeks to increase consumption of folic acid among women of childbearing age.

However, when quoting a CIO director in a press release, use the complete name of the CIO and attribute the CIO as part of CDC.

Example: "Tomorrow marks the fifth anniversary of the SafeUSA partnership," said Dr. Suzanne Binder, Director of CDC's National Center for Injury Prevention and Control.

If you use the complete name of the CIO and if it appears multiple times in the document, spell it out the first time, followed by the acronym in parentheses. Use the acronym thereafter. However, if you carbon copy a CIO on the original document, spell out the CIO in the cc: line.

Incorrect: cc: NCID

Correct: cc: National Center for Infectious Diseases, CDC

Note: The above rule applies to external documents only. You may use the CIO's acronym when it is cc'd on internal documents.

Clearance Information

This section addresses the most common clearance processes, including the (1) Executive Secretariat clearance for correspondence, (2) HHS clearance for communication contracts, campaigns, and products, and (3) CDC clearance for media relations activities.

For additional information about HHS and CDC clearances, refer to the CDC *Clearance Info* page at *http://intranet.cdc.gov/od/oc/clearance/*, where you can also download forms.

Executive Secretariat Clearance Process

Any correspondence requiring the signature of the Director or Deputy Directors, CDC; the Assistant Secretary for Health and Surgeon General, HHS; the Deputy Secretary, HHS; the Secretary, HHS; or the President of the United States must be reviewed and cleared by CDC's Office of the Executive Secretariat.

When CIOs draft response letters or memoranda that have to be signed by any of these persons, the drafts must be sent back to the Office of the Executive Secretariat within the following time frames:

Director's signature	5 days
Deputy Director's signature	5 days
Secretary's signature	3 days

If CIOs are asked to reply to the senders directly, they have 5 working days to respond. CIOs are responsible for obtaining the proper signature(s), dating the response, and mailing the document. CIOs should then forward a copy of the signed, dated final copy to the Office of the Executive Secretariat so that the file can be closed.

Also, when CIOs initiate letters or memoranda that have to be signed by the above-mentioned persons, these documents must be submitted in draft form (i.e., double-spaced) to the appropriate Executive Secretariat contact person for clearance and processing. To find your CIO's contact person, call 404-639-7120. The draft must contain the proper approvals at the CIO OD level.

HHS Clearance Process

All communication campaigns; publications and audiovisual products; and contracts for communication activities and products must be cleared by HHS' Office of the Assistant Secretary for Public Affairs (OASPA) before any products can be developed. Submit all forms to CDC's Office of Communication.

HHS usually takes 3 to 4 weeks to respond to a clearance request. Requests involving sensitive content, expensive products, or large campaigns may take longer. To ensure adequate time, allow 6 weeks for the clearance process.

Note: HHS will occasionally respond more quickly to a clearance request. However, requests for rush approval should be limited to public health crises in which a CIO must produce materials immediately to meet the public's need for information.

The types of clearance procedures are
1. Communication campaign clearance (HHS Form 524).
2. Communication contract clearance (HHS Form 524).
3. Publications (HHS Form 615) and audiovisual clearance (HHS Form 524a).

A detailed explanation of the clearance process and the clearance forms are available at *http://intranet.cdc.gov/od/oc/clearance/*.

Clearance is NOT required for
- Reprints and minor revisions (e.g., contact names, meeting agendas, and phone numbers).
- Individual issues of journals and newsletters. These types of publications only need to receive clearance once a year. However, send two copies of each issue to OASPA.

CDC's Media Relations Division Clearance Process

Clear all media requests and all print, electronic, and Internet products developed for release to the media through the appropriate CIO communications office (assuring Center Director approval) and through CDC's Office of Communication Media Relations Division (MRD). Allow a minimum of 2 weeks for clearance.

Media Requests

Media requests will be directed to MRD, unless the CIO already has an agreed-upon plan to manage media calls.

All media requests for policy explanations, requests regarding high-profile or controversial issues, or any requests that have potential for national media interest must be coordinated through MRD. MRD will coordinate these requests with HHS/OASPA, as needed, and advise CIOs.

CIOs must inform MRD about on-camera media interviews in advance (those not involving national issues or sensitive areas), and inform MRD regarding media filming and/or videotaping that is scheduled on-campus. Media requests on subjects not related to your specific CIO must be referred to MRD.

Media inquiries, events, or initiatives that involve more than one CIO, or go beyond CDC purview (e.g., another federal agency) must be coordinated by MRD working closely with the appropriate CIO communication office(s) and OASPA.

No CDC staff should accept an invitation to a press event or press conference without prior approval by the appropriate CIO communication office and MRD, in consultation with the HHS press office.

After-hours media inquiries that come to CDC security staff are routed to the MRD director or designee, who will coordinate as appropriate with HHS and the CIO communication offices. CIO communications staff should have a system in place for after-hours contact, preferably beepers and/or on-call press officers.

Media Products

All print, electronic, and Internet products developed for release to the media must be cleared through the appropriate CIO communications office and MRD. In addition, all media materials developed by grantees or partners for CDC or including a CDC quote must be cleared by MRD before release.

All print materials must be formatted according to MRD guidelines and must include the HHS or CDC logo in the top left corner. A masthead template is available through CDC's *Identity Management System* at *http://intra-apps.cdc.gov/cdcidentity/Login/Home/login.asp.*

The CDC Office of Communication's Health Communication Division coordinates with CIOs on script development for television and films, including documentaries and specials. CIOs must keep MRD updated on all television, film, and Internet projects.

All CDC-sponsored organized media events, such as press conferences, media availabilities, and editorial boards, require MRD approval before commitments are made. MRD will notify HHS/OASPA and will work with them to involve the Secretary and other HHS and White House officials when appropriate. Participation by CDC representatives in organized media events sponsored by other government, private sector, and nonprofit organizations also must be cleared through MRD, before commitments are made.

Note: According to HHS policy, contractors are not used to promote media coverage of events or topics (e.g., pitching topics or events to media). Use OASPA staff, rather than contractors, to produce video news releases.

Working with CDC's Media Relations Division

CDC's policy is to provide timely and accurate information so that the public, Congress, and the news media may assess and understand CDC's health information and programs. Bear in mind the following points regarding media relations activities:

- Make available final reports, information, and recommendations.
- Create open, honest communication that is based on sound science and that conveys accurate information.
- Do not withhold information solely to protect CDC or the government from criticism or embarrassment.
- Release information consistent with the Freedom of Information Act.
- Base prevention messages on supportable scientific data and sound behavioral and communication research principles. At all times, maintain scientifically valid and accurate health messages.
- Create targeted health messages that are sensitive to language and cultural differences and community norms.

A final note: Remember to get official clearance on ALL materials before proceeding through the approval and printing process.

Executive Secretariat Correspondence Guidelines

Clarity and brevity are important features of all correspondence documents. Use plain English and avoid highly technical language or jargon. The policy of the Office of the Executive Secretariat is to insert two spaces at the end of a sentence. Please adhere to this rule when submitting correspondence to that office. Following are guidelines from CDC's Office of the Executive Secretariat for developing letters, memoranda, and information alerts and advisories.

Many of these guidelines come from the HHS Executive Secretariat, available at *http://intranet.hhs.gov/read/esguide/msges.html*.

Letters Guidelines

In-house Summary Statement

All CIO-originated correspondence must be accompanied by a one-paragraph justification called an in-house summary statement. The paragraph should include the following information: subject, purpose, summary, concerns (if any), recommended actions, contact person, and telephone number. See Appendix A for a sample in-house summary statement (page 129).

Summary Statement—Secretarial Correspondence

Letters requiring the Secretary's signature must include a summary statement. The CIO writes that summary statement and includes it as a cover page to the letter. All summary statements should serve as stand-alone documents and should not exceed one page. See Appendix A for a sample summary statement (pages 130–31).

Summary statements should be formatted as follows:

- Name of correspondent(s).
- Subject/issues raised by correspondent.
- Major points in the response.
- Other pertinent information.
- Contact person(s).

Salutation

Letters must be properly addressed and include the proper distribution list information.

The following table presents the correct way to send correspondence to members of Congress.

Person	*Address*	*Salutation*
Senator (in Washington, D.C.)	The Honorable (full name) United States **Senate** Washington, D.C. 20510	Dear Senator (surname)
Senator (Local district/office)	The Honorable (full name) United States **Senator** Address	Dear Senator (surname)
Representative (in Washington, D.C.)	The Honorable (full name) House of Representatives Washington, D.C. 20515	Dear Dr./Mr./Ms. (surname) *Note:* Do not write *Dear Representative*
Representative (Local district/office)	The Honorable (full name) Member, U.S. House of Representatives Address	Dear Dr./Mr./Ms. (surname)

The complete list of salutations is in the *United States Government Printing Office Style Manual 2000*, available at *www.access.gpo.gov/styleman/2000/chapter_txt-16.html*.

Enclosure

Limit the letter to one or two pages. Include any additional information as an enclosure. If you include an enclosure, insert the word "Enclosure" at the bottom of the letter (or the word "Attachment" at the bottom of a memorandum) and mention it in the body of the letter. In addition, add the appropriate heading at the top of the first page of the enclosure.

Following are examples of heading formats for enclosures. Center and bold the heading.

Centers for Disease Control and Prevention
Response to the Honorable Jack Kingston on
Hepatitis Prevention and Control
Prepared May 2002

OR

Responses to Comments dated 05/15/02
by the Department of Health and Human Services
Draft for National HIV Case Surveillance System Guidelines
Prepared by the Centers for Disease Control and Prevention
May 2002

OR

Influenza Among Travelers on Cruise Ships
Prepared by the Centers for Disease Control and Prevention
May 2002

Copy Notation

Every draft should include a copy notation, introduced by the initials *cc* and set two spaces after the signature block. The *cc* shows all the people who will get a copy of the letter or memorandum. The *cc* section also include other information such as file names and name of preparer.

General Correspondence

cc:
OD *[the Office of the Director always gets a copy]*
CDC/W *[for congressional correspondence, the Washington Office gets a copy]*
FMO *[for congressional correspondence, FMO gets a copy]*
NCEH *[CIO preparing the response; e.g., NCID, NIOSH, PHPPO]*
CDC ID ES 1234; Doc. Name: pickaname.doc *[tracking number provided by the Office of the Executive Secretariat, document name provided by the CIO]*
Prepared by: RJackson, NCEH, (770) 488-7000 *[first initial and last name of preparer, no space, CIO, contact number]*
Spelling verifier used by: NSmith 8/12/01 *[first initial and last name of person who typed the letter, no space, date prepared]*

Correspondence from Congressional Liaison Office (CLO)

cc:
OD
NCHSTP
CLO/OS
FMO
OPS
CLO/OS No. 123456789
CDC ID 1234; Doc. Name: pickaname.doc
Prepared by: ESeiler, NCHSTP, (404) 639-8008
Spelling verifier used by: NSmith 09/20/2001

The following table offers additional guidelines on drafting letters and general memoranda.

DOs	DON'Ts
General	*General*
Be responsive to correspondents' concerns. Put yourself in place of the correspondents. Would you be satisfied?	Don't include extra information on a subject that does not address the correspondents' concerns.
Style	*Style*
Be brief. Keep responses to one page if possible but not more than two. On rare occasions, an enclosure may be required.	Don't include lengthy paragraphs describing technical matters in great depth.
Use plain English. Keep sentences and paragraphs short, where possible.	Don't use technical language or jargon (except when absolutely necessary and only when fully explained).
	Don't sound defensive.
Use active voice frequently.	Don't overuse passive voice.
Use *I* when making a personal statement. *Example:* I appreciated learning about….	Don't use *we* when making a personal statement. *Example:* We understand that you...
	Don't overuse the word *that*.
Use the word *attachment* when attaching material to a memo and the word *enclosure* when enclosing material with the letter.	
Spell out the word *percent*.	Don't use the % symbol.
Content	*Content*
In the first sentence, thank correspondents for providing their views on the subject of inquiry. In the second sentence, thank them for any congratulatory or personal statements.	Don't repeat the entire, lengthy question that was posed in the incoming letter.
Give the good news, a positive message, or alternative solution up-front.	Don't bury the good news at the end of the letter.
Use the response as an opportunity to inform correspondents about any of the following, if applicable/relevant: ■ Approved funding increases in a program of concern. ■ Approved new initiatives. ■ Recent announcements. ■ An upcoming event.	

DOs	*DON'Ts*
Format	*Format*
When referring to a date, use only the number (e.g., August 12)	When referring to a date, don't use the number followed by *th* (e.g., August 12th)
Use Times New Roman, font size 12	

Specific Memoranda Guidelines

The most frequently used types of memoranda are simple action, complex action, briefing, and information memoranda.

Simple Action Memorandum

Use this memorandum (sometimes referred to as a *Decision Memorandum*) to obtain approval to release a report, obtain agreement to issue a housekeeping or noncontroversial regulation, seek a decision on attending a meeting, and more.

This memorandum, addressing a single straightforward issue, should not exceed two pages. If you need approval to issue a lengthy report, plan, or other document, include an abbreviated summary and two copies of the report. Submit lengthy relevant background material, when necessary, in the form of tabbed attachments.

The issue section should contain a concise statement (preferably one sentence or short paragraph) of the issue or problem. If this memorandum is an invitation, include the invitation in this section, along with details (e.g., dates, times).

The discussion section should contain pertinent information regarding the origin, background, and implications of the issue or problem. It should also contain a brief statement explaining why the *Action Requested By* date should be met. See Appendix A for a sample of a simple action memorandum (pages 132–33).

Complex Action Memorandum

Use this memorandum to present an issue that is not straightforward and for which a variety of alternatives or options need to be presented. The key to this memorandum is the clear presentation of the issue and background, and the development of options, with pros and cons for each option presented in bulleted form.

Start at the beginning and state, in context, what needs to be done as well as the outcome. Present options and pros and cons in a neutral fashion so as not to favor any one side.

The issue section should contain a concise statement (preferably one sentence or short paragraph) of the issue(s) or problem(s).

The background section should contain pertinent information regarding the origin, background, and implications of the issue(s) or problem(s). It should also contain a brief statement explaining why the *Action Requested By* date should be met.

In the options and discussion section, each option should be listed clearly and concisely. Each option should be followed by a discussion that includes information about who would benefit if the option were chosen, who would be adversely affected, what would be the anticipated reaction of those affected, and how much the option will cost in terms of dollars, staff, and administrative responsibilities. Each discussion should be followed by the pros and cons, in bulleted form.

The recommendation section provides a recommendation regarding the suggested course of action. When several issues are presented, a recommendation for each set of options should be made.

The decision section should list each option or recommendation with appropriate approval/disapproval lines for the addressee's use. See Appendix A for a sample complex action memorandum (pages 134–35).

The following table offers guidelines on drafting simple action and complex action memoranda.

DOs	*DON'Ts*
Provide a clear and concise explanation of the issue requiring a decision (preferably a short paragraph of the issue/problem).	
Provide framework of the decision to be made in the form of chronological background information.	Don't overwhelm the presentation with details.
Provide a minimum of two options. Include in the options section anticipated reactions from external groups (e.g., Congress, industry, states).	
Provide a minimum of two pros and cons for each option. Present the pros and cons in a balanced fashion.	Don't provide an unbalanced set of pros and cons.
Provide costs of options if available/applicable.	
Provide a date/time frame in which a decision is required only if a true time constraint exists (explain in the discussion section).	Don't provide a date/time frame unless a true constraint exists.
Make the case for selecting a particular option in the recommendation section.	

Briefing Memorandum

Use a briefing memorandum to brief HHS officials on a public health issue or to provide information for an upcoming event (e.g., meeting, speech, hearing). These memos should contain clear and concise information to familiarize HHS officials with the purpose of the briefing.

The *Background* section should contain information about the issue at hand. When appropriate, present questions that may be raised in the *Issues of Concern* section. The *Discussion* section should summarize HHS' current or previous responses to the issues addressed in the *Background* section. When appropriate, provid talking points. See Appendix A for a sample briefing memorandum (pages 136–40).

Information Memorandum

Use an information memorandum to provide the Secretary with information that the sender believes the Secretary should have. Limit the memorandum to two pages or less, divided into two sections (*Purpose* and *Information Text*). Add additional information if it improves the clarity of the document. See Appendix A for samples 1 and 2 of an information memorandum (pages 141–46).

Information Alert and Information Advisory Guidelines

Information Alert

This document should be submitted to the Secretary only for **urgent** matters, for example, when:

- An important public health or safety problem has been identified.
- New information has been obtained about a major issue of concern to the Secretary or the White House.
- A sensitive press/media story is imminent.

An information alert should only contain a few bullets describing

- The issue/problem.
- Why it is critical for the Secretary to have the information **now.**
- What the department is doing/planning/proposing to do to address the issue/problem.

When necessary, provide additional information as an attachment. See Appendix A for a sample information alert (pages 147).

Information Advisory

Because the Secretary's schedule may preclude face-to-face contact, an information advisory may be a suitable substitute. Use judgment when preparing an advisory and make clear why the Secretary needs to have the information. This document should be prepared for events/situations that could arise in the near-term.

An information advisory should be no longer than two pages and should describe

- The issue/problem.
- Some background.
- What the department is doing/planning/proposing to do to address the issue/problem.

When necessary, provide additional information as an attachment. See Appendix A for a sample information advisory (pages 148).

The following table offers guidelines on drafting information alerts and advisories.

DOs	*DON'Ts*
Use information alerts for urgent matters requiring the Secretary's immediate attention.	Don't use information alerts or advisories when simple transmission of a document/information through the Executive Secretary, HHS, is all that is needed or if a secretarial action memorandum is more appropriate.
Describe why the information being conveyed through an information alert is urgent and what actions you are proposing to address the issue/problem.	
Keep information alerts to a few bulleted points.	
Use information advisories to inform the Secretary about an important matter that does **not** require his immediate attention.	
Keep information advisories to no more than two pages using a bulleted format.	
Indicate if there is press, congressional, or White House interest.	
Advise the Secretary of any other concern or controversy surrounding the issue.	
Add an attachment when necessary.	
Convey information not meeting the criteria for information alert or advisory to the Executive Secretary, HHS, using a short cover memorandum.	
	Don't use excessively technical language.

Transmitting Other Information

There will be other information that an OPDIV/STAFFDIV may want to provide to the Secretary's office that does not meet the criteria for an information alert or advisory. Such information should be transmitted with a short cover memorandum to the attention of the Executive Secretariat, HHS, who will then forward it to appropriate senior officials. The cover memorandum should summarize the nature of the information provided and the intended audience.

10 Reference Style

> "The secret to creativity is knowing how to hide your sources."
>
> **Albert Einstein**

For biomedical and professional journal citations, CDC follows the Uniform Requirements for Manuscripts Submitted to Biomedical Journals, available at *www.icmje.org/*.

When sending a manuscript to a journal, first check the specific journal's requirements, because some journals have style guidelines that differ from the Uniform Requirements.

Referencing in the Text

The Uniform Requirements follows the citation-sequence system. Citations are in parentheses and are numbered consecutively in text, tables, and figures. Full references (author, title, etc.) appear at the end of the document.

Guidelines for Referencing in the Text

- Number references consecutively in the order in which they are first mentioned in the text, tables, and figures.
- Number references that appear in tables or illustrations consecutively, as though they were part of the text.
- If a document is cited again, use the same initial number (do not assign a new number to that citation).

Example: The American and Western Pacific Regions have been certified free of indigenous wild poliovirus (1). Current challenges to global polio eradication efforts include ongoing intense transmission in northern India (2,3), and continued importations of wild poliovirus into polio-free areas (4–7).

Referencing at the End of the Document

List references in the order in which they appear in the text, tables, and figures. Abbreviate journal titles according to the National Library of Medicine's *Index Medicus*, available at *www.nlm.nih.gov/tsd/serials/lji.html*. The list of journals indexed is at *ftp://nlmpubs.nlm.nih.gov/online/journals/ljiweb.pdf*.
Following are examples of reference citations. (Some examples come from he Uniform Requirements.) In the absence of guidelines for some of the nonstandard communication materials, the citations have been adapted to mirror Uniform Requirements' guidelines.

Journal Article

Standard Journal Article

One to Six Authors

Churchill JE, Ashley DL, Kaye WE. Recent chemical exposures and blood volatile organic compound levels in a large population-based sample. Arch Environ Health 2001;56(2):157–66.

More than Six Authors

Campagna D, Stengel B, Mergier D, Limasset JC, Diebold F, Michard D, et al. Color vision and occupational toluene exposure. Neurotoxicol Teratol 2001;23(5):473–80.

Organization as Author

The Cardiac Society of Australia and New Zealand. Clinical exercise stress testing. Safety and performance guidelines. Med J Aust 1996;164:282–4.

No Author Given

Cancer in South Africa [editorial]. S Afr Med J 1994;84:15.

Volume With Supplement

Shen HM, Zhang QF. Risk assessment of nickel carcinogenicity and occupational lung cancer. Environ Health Perspect 1994;102 Suppl 1:275–82.

Issue With Supplement

Payne DK, Sullivan MD, Massie MJ. Women's psychological reactions to breast cancer. Semin Oncol 1996;23(1 Suppl 2):89–97.

Volume With Part

Ozben T, Nacitarhan S, Tuncer N. Plasma and urine sialic acid in noninsulin-dependent diabetes mellitus. Ann Clin Biochem 1995;32(Pt 3):303–6.

* Some examples come from the Uniform Requirements.

Issue With Part

Poole GH, Mills SM. One hundred consecutive cases of flap lacerations of the leg in aging patients. N Z Med J 1994;107(986 Pt 1):377–8.

Issue With no Volume

Turan I, Wredmark T, Fellander-Tsai L. Arthroscopic ankle arthrodesis in rheumatoid arthritis. Clin Orthop 1995;(320):110–4.

No Issue or Volume

Browell DA, Lennard TW. Immunologic status of the cancer patient and the effects of blood transfusion on antitumor responses. Curr Opin Gen Surg 1993:325–33.

Pagination in Roman Numerals

Fisher GA, Sikic BI. Drug resistance in clinical oncology and hematology. Introduction. Hematol Oncol Clin North Am 1995;Apr 9(2):xi-xii.

MMWR Article

CDC. Certification of poliomyelitis eradication. The Americas, 1994. MMWR 1994;43:720–2.

Type of Article Indicated as Needed (e.g., Letter, Abstract)

Wassernaar T, Blaser M. Contagion on the Internet [letter]. Emerg Infect Dis 2002;8(3):335–6.

Book and Other Monograph

Personal Author(s)

Bland M. An introduction to medical statistics. 3d ed. Oxford (UK): Oxford University Press; 2000.

Editor(s), Compiler(s) as Author(s)

Wilson W, Drew L, Henry N, editors. Current diagnosis and treatment of infectious diseases. New York (NY): Mc Graw-Hill; 2001.

Organization as Author and Publisher

Institute of Medicine (US). Looking at the future of the Medicaid program. Washington, DC: The Institute; 1992.

Chapter in a Book

Ferguson J. Biological weapons and US law. In: Lederberg J, editor. Biological weapons: limiting the threat. Cambridge (MA): MIT Press; 1999. p. 81–92.

Conference

Association Publication

ACGIH. Threshold limit values for chemical substances and physical agents and biological exposure indices. Cincinnati (OH): American Conference of Governmental Industrial Hygienists; 1991. p. 95–6.

Conference Paper Presented at Meeting

Zarus GM, Nyhan T, Schmidt H, DeVoney D, Gonzalez A. Integrating technologies to investigate episodic airborne VOC exposures. Presented at: International Society of Exposure Analysis Annual Meeting; 2001 Nov 4–8, Charleston, SC.

Conference Proceedings

Kimura J, Shibasaki H, editors. Recent advances in clinical neurophysiology. Proceedings of the 10th International Congress of EMG and Clinical Neurophysiology; 1995 Oct 15-19; Kyoto, Japan. Amsterdam: Elsevier; 1996.

Conference Paper Published in Proceedings

Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sep 6–10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p. 1561–5.

Other Published Material

Newspaper Article

Terhune C. Smoking costs the nation $157 billion per year, health researchers say. The Wall Street Journal 2002 Apr 12;Sect. A:3 (col. 5).

Magazine Article

Gibbs N. Making time for a baby. Time 2002 Apr 15;159(5):48–54.

Newsletter Article

Chlordimeform cotton tolerances end by December 1990 proposed. Pestic & Tox Chem News 1988;16(17):27.

Editorial

Baker JC. Hazards of welding [editorial]. Occup Health 1975;39:63–8.

Letter to the Editor

Orr MF. Public health risks of railroad hazardous substance emergency events [letter to the editor]. J Occup Environ Med 2001;43:738–40.

Audiovisual Material

HIV+/AIDS: the facts and the future [videocassette]. St. Louis (MO): Mosby-Year Book; 1995.

Map

North Carolina. Tuberculosis rates per 100,000 population, 1990 [demographic map]. Raleigh (NC): North Carolina Dept. of Environment, Health, and Natural Resources, Div. of Epidemiology; 1991.

Dictionary and Similar References

Stedman's medical dictionary. 26th ed. Baltimore (MD): Williams and Wilkins; 1995. Apraxia; p. 119–20.

Legal Material

Public Law

Preventive Health Amendments of 1993, Pub. L. No. 103-183, 107 Stat. 2226 (Dec. 14, 1993).

Unenacted Bill

Medical Records Confidentiality Act of 1995, S. 1360, 104th Cong., 1st Sess. (1995).

Code of Federal Regulations

Informed Consent, 42 C.F.R. Sect. 441.257 (1995).

Hearing

Increased drug abuse: the impact on the nation's emergency rooms. Hearings before the Subcomm. on Human Resources and Intergovernmental Relations of the House Comm. on Government Operations, 103rd Cong., 1st Sess. (May 26, 1993).

Congressional Record

Bregan PR. The return of lobotomy and psychosurgery. Congressional Record 1972 Feb 24;118:E1602–12.

Federal Register

Availability of administrative reports of health effects studies. Fed Regist 1993 May 20;58:29413–14.

U.S. Census Data

Bureau of the Census. 1980 census population: characteristics of the population. Washington, DC: US Department of Commerce; 1982:62–76.

Congressional Testimony

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Appendix A–Sample Correspondence

In-house Summary Statement

Subject: Invitation to the Secretary to Attend the 2002 Cancer Conference

The National Center for Chronic Disease Prevention and Health Promotion would like to invite Secretary Tommy G. Thompson to be the plenary speaker at the 2002 Cancer Conference, to be held in Washington, D.C., on June 11, 2002. The theme of this year's Conference is "Meeting the Challenges of Comprehensive Cancer Control" and is co-sponsored by the National Cancer Institute. Because of the Secretary's interest in cancer control, his presence and participation will provide an excellent opportunity to reinforce the Administration's commitment to addressing this chronic disease. We recommend that the Executive Secretariat process this invitation as soon as possible. Please contact Mr. John Smith at (404) 639-9826 if you have any questions.

Summary Statement—Secretarial Correspondence

NAME OF CORRESPONDENT: Representative Henry A. Waxman (D-CA)

SUBJECT/ISSUES RAISED BY CORRESPONDENT:

Congressman Waxman expressed concerns that releasing data from the Vaccine Safety Datalink (VSD) could jeopardize this important vaccine safety program if it compromises the willingness of professionals or families to participate.

MAJOR POINTS IN THE RESPONSE:

- The Department recognizes the importance of vaccine safety in facilitating public acceptance of immunizations.
- The Department will work to see if a data sharing process for the VSD can be developed that balances the need to protect the confidentiality of patients, as well as proprietary data, with the principle of openness in research.

OTHER PERTINENT INFORMATION:

None.

CONTACT PERSONS:

Mirtha Beadle, OS/ES, (202) 205-9042
Verla S. Neslund, CDC, (404) 639-7120

Secretarial Correspondence

The Honorable Henry A. Waxman
House of Representatives
Washington, D.C. 20515-6143

Dear Mr. Waxman:

Thank you for your letter expressing concerns that releasing data from the Vaccine Safety Datalink (VSD) project could endanger this important vaccine safety program if it compromises the willingness of professionals or families to participate. I want to assure you that the Department of Health and Human Services (HHS) recognizes the importance of vaccine safety in facilitating public acceptance of immunizations—one of our most valuable tools in disease control and prevention.

As noted by the Institute of Medicine in its reviews of vaccine safety during the past decade, large population cohorts like the VSD are essential for scientific studies to assess potential causal links between vaccine and adverse events. Furthermore, HHS recognizes that there are many other important collaborations between managed care and public health organizations and will work to prevent these collaborations from being jeopardized.

At the heart of the issue is how we can ensure investigations of vaccine safety concerns in the United States are of the highest scientific caliber and independence so the study findings will have the maximal credibility to the largest audience. To help attain these goals, the Department will work to see if a data sharing process for the VSD can be developed that balances the need to protect the confidentiality of patients, as well as proprietary data, with the principle of openness in research.

Please call me if you have any further thoughts or questions. I look forward to working with you on this issue.

Sincerely,

Tommy G. Thompson

Simple Action Memorandum

TO: The Secretary
Through: DS _____
COS _____
ES _____

FROM: Director
Centers for Disease Control and Prevention

SUBJECT: West Nile Virus Information for State Governors—ACTION

Action Requested By: July 22, 2002

ISSUE

In follow up to the Acting Principal Deputy Assistant Secretary for Health's August 23, 2001, briefing for you on the Department of Health and Human Services' (HHS) West Nile virus activities, attached for your approval and signature is a letter to State Governors providing information on HHS and other federal agencies' support available to the states to help facilitate a coordinated effort to mitigate the impact of West Nile virus and other emerging infectious diseases.

DISCUSSION

There has been considerable public and media attention given to the continued emergence of West Nile virus in the United States. Since its initial recognition in the Northeast in the late summer of 1999, the virus has spread via migratory birds to 21 states and the District of Columbia, with the most recent identification in areas of the deep South and upper Midwest. Wherever this mosquito-transmitted virus has been detected, it has generated concern about its potential for causing significant outbreaks of human illness. Other concerns include its impact on equine populations and wildlife ecology, the effectiveness and safety of control measures used to reduce the risk to communities, and the costs associated with monitoring and control measures.

The federal agency leading the West Nile effort is the Centers for Disease Control and Prevention (CDC), which is responsible for assisting the states in tracking the virus, providing public education and control guidelines, and providing laboratory diagnostic

training and support. CDC scientists provide technical assistance, and most states have requested and received financial support from CDC. The National Institutes of Health is supporting, through universities and the private sector, research designed to develop effective therapies and a human vaccine for this and other similar illnesses, while CDC is conducting research on the effectiveness of control measures and their optimal application. Recently, a vaccine for West Nile virus was provisionally licensed by the U.S. Department of Agriculture to protect our valuable equine populations. The vaccine is already being shipped by the company to affected areas of the eastern United States. The Environmental Protection Agency regulates pesticides and provides assistance in ensuring appropriate applications of control measures. The Department of Interior's U.S. Geological Survey's National Wildlife Health Center in Madison, Wisconsin, supports bird testing throughout the country.

Even though there is intense federal activity and support to address the introduction of West Nile virus, the major effort for prevention and control rests at the state and local level. As at the federal level, aspects of West Nile virus monitoring and control cross agency boundaries within each state, and coordination at all levels is essential to have maximum effect.

The introduction of West Nile virus into the United States illustrates the continued threat of infectious diseases, both naturally occurring and intentional. The key to addressing them is a well-resourced and trained public health system working in a coordinated fashion combined with cutting-edge science to combat and control disease.

RECOMMENDATION

That the Secretary sign the attached letter and send to all State Governors.

DECISION

Approved_____ Disapproved_____ Date_____

Julie Louise Gerberding, M.D., M.P.H.

Attachment:
Tab A – Letter to State Governors

Complex Action Memorandum

TO: The Secretary
Through: DS _____ (when appropriate)
COS _____
ES _____

FROM: Assistant Secretary for Management and Budget
Centers for Disease Control and Prevention

SUBJECT: How to prepare a complex action memorandum—ACTION

Action Requested By: July 5, 2002

ISSUE

Insert a concise statement (preferably one sentence or short paragraph) of the issue(s) or problem(s).

FACTS

Insert pertinent information regarding the origin, background, and implications of the issue(s) or problem(s).

Also insert a brief statement explaining why the "Action Requested By:" date should be met.

Single-space text, double-space between paragraphs.

OPTIONS AND DISCUSSION

1. OPTION: List each option clearly and concisely.

DISCUSSION: After each option, insert a discussion section that includes information about who would benefit if the option were chosen, who would be adversely affected, what would be the anticipated reaction of those affected, and how much the option will cost in terms of dollars, staff, and administrative responsibilities.

PROS AND CONS: Insert the pros and cons for each option, in bulleted form.

Pros:

-
-
-

Cons:

-
-
-

2. OPTION:

DISCUSSION:

Pros:

RECOMMENDATION

Provide a recommendation regarding the suggested course of action. When several issues have been presented, provide a recommendation for each set of options.

DECISION

1. OPTION: List each option or recommendation with appropriate approval/disapproval lines for the addressee's use.

   Approved_____ Disapproved_____ Date_____

2. OPTION: _____

   Approved_____ Disapproved_____ Date_____

(Signing Official's Name)

2 Attachments:
Tab A – Copy of Report on...
Tab B – Letter to Senator Smith

Briefing Memorandum

TO: The Secretary
Through: DS _____
COS _____
ES _____

FROM: Acting Principal Deputy Assistant Secretary for Health

SUBJECT: Vaccine Issues — BRIEFING

TIME: May 11, 2001, 10:30 – 11:30 a.m.

PLACE: The Secretary's Conference Room

PARTICIPANTS

Arthur Lawrence
Martin Myers
David Fleming
Ben Schwartz
Karen Midthun
John La Montagne
Thomas Balbier
William Raub
David Benor

PURPOSE

The purpose of this briefing is to discuss ongoing activities to address two challenges to our immunization programs—ensuring an adequate supply of important vaccines and maintaining the public's trust and confidence in vaccines.

BACKGROUND

Vaccine Supply Issues
There are a number of factors that affect vaccine supply and distribution.

1. Influenza Vaccine - The purchase, distribution, and administration of influenza vaccine are mainly private-sector responsibilities. Since supply is determined by commercial companies and distribution is not controlled by the government, we remain potentially vulnerable to shortages or delays in the future.

The United States experienced a delay in the production of the influenza vaccine for the 2000-2001 influenza season. Some vaccine companies experienced difficulty with growing a new virus strain. Two of four companies had manufacturing problems; one of these companies decided not to produce the vaccine. The delay in production of the vaccine led to subsequent distribution problems; however, a potential vaccine shortage was averted. TAB A describes actions taken by the Department's Interagency Vaccine Groups (IAVG) to help ensure an adequate supply of influenza vaccine for consumers.

Last November, 29 members of Congress asked the General Accounting Office (GAO) to investigate the actions taken by vaccine suppliers. GAO is expected to publish a report on its findings in mid-May. The draft GAO report has been circulated for Departmental comment. On March 7, 2001, Representative Peter DeFazio (Oregon) introduced a bill, H.R. 910, to amend the Public Health Service (PHS) Act to provide that the Secretary may undertake the emergency distribution of influenza vaccine through assumption of title to all influenza vaccines at the original contracted prices. In addition, on March 8, 2001, Representative Gary Condit (California) proposed legislation, H.R. 943, to amend the PHS Act to permit the use of appropriated funds to support limited administrative costs of a distribution system for influenza vaccine.

For the 2001-2002 influenza season, there are currently three vaccine companies producing influenza vaccine for the U.S. population. In a usual year, 70-76 million doses of vaccine are distributed. Based on vaccine companies' estimates in a "best-case scenario," the total possible vaccine available for this season may be up to 84 million doses. However, there is likely to be a substantial amount of vaccine available late season, resulting in a situation similar to last year.

A "worst-case scenario," assuming one company does not produce any vaccine, would result in the availability of approximately 60 million doses. One company is working under a consent decree and must comply with various regulatory stipulations and have approved inspections by an independent review group and the Food and Drug Administration (FDA). Results of these inspections may influence whether the manufacturer chooses to produce any vaccine at all, and there is a high likelihood that any vaccine produced would be delayed.

2. Tetanus Toxoid-Containing Vaccines (DTaP, Td, and DT) - Since 2000, the number of vaccine companies distributing diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine decreased from four to two vaccine companies. Inventories have been low; however, as a result of FDA's approval of a new preservative-free formulation of Tripedia (one of the two DTaP vaccines in distribution), vaccine companies should soon be able to increase supply and comply with vaccine demand.

Only one company is distributing all adult Td, pediatric DT, and tetanus toxoid vaccines. This company is prioritizing distribution to the military, hospitals, and trauma centers. Vaccine shortages have occurred locally around the country and, in some circumstances, routine Td boosters recommended every 10 years are being suspended. It may be 12-18 months before supply can meet demand. TAB B describes actions taken by the IAVG to address vaccine shortages.

3. Oral Polio - Inactivated polio vaccine is recommended for routine immunization against polio. However, in the event of a polio outbreak, CDC believes that oral polio vaccine (OPV) would be the vaccine of choice. Currently, the United States does not have a stockpile of OPV, which may be needed in response to an imported outbreak. The only U.S. licensed vaccine company terminated production in 2000. The CDC and FDA are working with two companies to develop an OPV stockpile.

Public Trust and Confidence in Vaccines

Because immunization coverage levels in the United States are high and disease rates are low, public attention is shifting from the benefits of vaccines to potential vaccine risks. Since vaccination is a relatively memorable event, any illness following immunization may be attributed to the vaccine. A serious illness following immunization could be either coincidental or, in very rare instances, caused by the vaccine. The U.S. House of Representatives' Committee on Government Reform has held several hearings on the issue of vaccine safety since May 1999. The IAVG has provided testimony about our vaccine safety system at several of the hearings, most recently at a hearing, "Autism - Why the Increased Rates? A One Year Update," on April 25-26, 2001. TAB C delineates actions taken by the IAVG.

ISSUES OF CONCERN (when appropriate)

DISCUSSION

Vaccine Supply Issues

Influenza Vaccine

- The influenza vaccine companies have stated that they have the production capacity to equal or exceed last year's production. However, FDA believes there is uncertainty that capacity is sufficient in the event that any one company experiences production difficulties.
- CDC has developed a contingency plan (TAB D) for addressing a potential influenza vaccine shortage or delay.
- The Director, CDC, has sent a letter of appreciation to Aventis Pasteur for agreeing to work with CDC to implement contingency plans in the event of a vaccine shortage (TAB F).
- CDC has requested that States develop contingency plans in the event there is a shortage of influenza vaccine and has provided written guidelines to assist them in planning. CDC requested states submit their draft contingency plans by June 2001. CDC will hold a workshop at the National Immunization Conference in May 2001 to share planning efforts and best practices so that plans can be finalized by August of this year.

Public Trust and Confidence in Vaccines

- As part of the IAVG's Vaccine Safety Implementation Plan, a contract was recently initiated with the Institute of Medicine (IOM) of the National Academy of Sciences to establish an Immunization Safety Review Committee for a period of 3 years. During this first year of reviews, the committee will look into allegations of potential links between autism and vaccines, thimerosal-containing vaccines and developmental disorders, and the harmful effects, if any, of receiving multiple vaccines simultaneously. The IAVG will monitor the IOM's reviews for appropriate action. A copy of the IOM's first report examining alleged linkages between measles-mumps-rubella vaccine and autism is provided in TAB E.
- CDC is funding the establishment of new Clinical Immunization Safety Assessment Centers to improve scientific understanding of vaccine safety issues at the individual patient level. Such studies may provide insight into the pathogenesis and risk factors of adverse vaccine reactions.
- FDA continues numerous actions to assure the safety and purity of vaccines, many in collaboration with the IAVG. These include research and standards to reduce or remove the potential risk from any unintended presence of viruses or other impurities, including removal and reduction of unneeded or potentially harmful

additives (e.g., mercury as thimerosal), and facilitating development of newer, more highly purified types of vaccines (e.g., purified or recombinant protein and DNA vaccines).

TALKING POINTS (when appropriate)

Arthur J. Lawrence, Ph.D.
Assistant Surgeon General

6 Attachments:
Tab A - Influenza Vaccine
Tab B - Tetanus Toxoid-Containing Vaccines
Tab C - Public Trust
Tab D - Vaccine Contingency Plan
Tab E - IOM Report
Tab F - Letter to Aventis Pasteur

Information Memorandum—Sample 1

TO: The Secretary
Through: DS _____
COS _____
ES _____

FROM: Director
Centers for Disease Control and Prevention

SUBJECT: Vaccine Safety Datalink—INFORMATION

PURPOSE

To provide information concerning Representative Don Burton's (R-IN) plans to subpoena the Vaccine Safety Datalink (VSD) database and to share a proposal by the Centers for Disease Control and Prevention's (CDC) National Immunization Program (NIP) to protect patient privacy while allowing independent verification of key VSD study results.

INFORMATION TEXT

The Vaccine Safety Datalink (VSD) was established in 1991 for the scientific study of the safety of vaccines. It currently includes information on medical events, laboratory utilization, demographics, and immunization histories on approximately 7.5 million individuals enrolled at eight health maintenance organizations (HMOs). This database permits the government to conduct research evaluating suspected side effects after immunizations in a sufficiently large population. There has been a recent increase in public interest to access the VSD data. This interest has prompted the VSD HMOs to seek further assurance from CDC that the privacy and confidentiality of their patients will be safeguarded.

Data sharing with external researchers has never been done with the VSD files; in fact, even the participating HMOs have not had access to the complete VSD data file. A staff person of Representative Dan Burton, Chair, House Government Reform Committee, has indicated she plans to subpoena this database. The participating HMOs have written that release of records that would compromise patient confidentiality or proprietary issues would cause them to withdraw from the VSD project. If this were to

occur, it would seriously impede the government's ability to study rare vaccine-related adverse events (e.g., rotavirus vaccine and intussusception). Additionally, the HMOs have stated that their ability to collaborate in other public health activities will depend on how the VSD issue is resolved.

Congressman Burton originally requested files used in an analysis of the relationship between infant exposure to thimerosal in vaccines and the risk of neurodevelopmental disorders. His staff person, Ms. Beth Clay, has requested that they be given access to VSD files so that other researchers may reanalyze the data and determine if their conclusions match those of CDC. Her initial request has evolved, and she is now requesting all of the "raw data" from the VSD so that it can be made available to non-VSD researchers. She has not put this request in writing nor identified to whom the data would ultimately be provided.

CDC is concerned about the privacy rights of involved patients and the proprietary rights of participating HMOs. The VSD contains enough detailed and dated information on each individual that the removal of names and addresses is insufficient to ensure that individual patients or HMOs would remain unidentified. It is possible to identify many patients by combining a birth date with the dates on which specific kinds of medical care are delivered, or by combining current VSD data with other public access data that are not under the control of CDC or VSD. This becomes problematic for individuals with rare conditions or those who are prescribed uncommon medications. Identification of individuals could have major negative consequences to the individuals as well as to the health plans.

CDC is aware that outside groups have strong scientific and personal interest in the results of VSD analyses conducted at CDC. When CDC results do not support their own theories and opinions, the desire to scrutinize what was done and to conduct a reanalysis is understandable. CDC supports the openness of research and the different perspectives and insights that can be gained when studies are repeated. However, CDC-supported data sharing should abide by accepted principles of human subjects research and scientific standards. CDC is proposing a means to allow some reanalysis be done with VSD files, and the outline of this proposed system is provided at Tab A.

Julie Louise Gerberding, M.D., M.P.H.

Attachment:
Tab A - Proposal

Information Memorandum—Sample 2

TO: The Assistant Secretary for Health

FROM: Deputy Director for Science and Public Health
Centers for Disease Control and Prevention

SUBJECT: Follow-up to January 30, 2002, Briefing on Tobacco-Specific Nitrosamines in Tobacco from U.S.- and Foreign-Brand Commercial Cigarettes Purchased Outside the United States—INFORMATION

PURPOSE

To provide answers to questions that were raised at the January 30, 2002, Departmental briefing regarding the Centers for Disease Control and Preventions (CDC) research on tobacco-specific nitrosamines (TSNAs) in tobacco from U.S.- and foreign-brand commercial cigarettes purchased outside the United States.

INFORMATION TEXT

Background:

CDC has completed a study that tested the hypothesis that U.S.-brand cigarettes purchased internationally have significantly higher TSNA levels than the locally popular non-U.S.-brand cigarettes purchased in the same country. The study examined cigarettes from the United States, the ten most populous countries in the world (in addition to the United States), and three additional countries that were selected so that each of the six World Health Organization regions were represented by at least two countries. These countries have a total population of approximately 3.8 billion (approximately 65 percent of the world total) and include an estimated 674 million smokers (approximately 60 percent of all smokers in the world).

Results from the study show that the level of TSNAs in cigarette tobacco vary widely among brands sold around the world. The TSNA levels were significantly higher in Marlboros than in the popular non-U.S. brands in 11 of 13 foreign countries studied. (Marlboros are the world's top-selling brand of cigarettes and the only transnational brand that could be purchased in all 13 foreign countries). Variations in TSNA levels most likely result from differences in tobacco blends and manufacturing processes.

Specific Issues:

Three key questions were raised at the January 30, 2002, Departmental briefing. A brief answer to each of these questions is provided below. Additionally, summaries of the scientific literature in support of these answers are provided in the attachment at Tab A, which also includes answers to specific questions regarding TSNA. Copies of key articles that provide additional reviews of scientific issues related to the carcinogens in tobacco and questions raised at the January 30 Departmental briefing also are provided at Tab B. In addition, Tab C contains Figure 11, which demonstrates that the induction of lung tumors in rodents by NNK follows a dose-response relationship across a range of total doses from approximately 10 mol/kg up to 10,000 mol/kg.

Question 1: What is the dose-response curve for NNK (the TSNA most closely linked to lung cancer risk) exposure and lung cancer inducement?

Response 1: The rate of induction of lung tumors in rodents by NNK follows a dose-response relationship across a range of doses from approximately 10 mol/kg up to 10,000 mol/kg.

Question 2: Are the levels of expected NNK exposure from cigarettes sufficient to saturate metabolic pathways relevant to this curve?

Response 2: No, concentrations of NNK in cigarette smoke would not be anticipated to saturate metabolic pathways involved in enzyme-mediated detoxication or bioactivation of NNK. The calculated lifetime NNK dose of a smoker is notably close to the lowest total dose of NNK shown to induce lung tumors in rats. As is typical of animal toxicology studies, high doses are employed in order to more rapidly induce high rates of tumors in a small number of animals. Lung tumor incidence continues to increase when rats are administered total doses of NNK that are 300-400 fold higher than the calculated total lifetime dose of NNK experienced by a smoker.

Question 3: If the NNK exposure levels from cigarettes are so much lower than the levels tested in animal toxicology studies, what is the evidence to suggest that lowering the level of NNK exposure from cigarettes might potentially reduce lung cancer risks?

Response 3: Compared with smokers, nonsmokers with prolonged exposure to environmental tobacco smoke (ETS) have 15-20 fold lower levels of exposure to NNK and proportionally lower but still significantly elevated risks of lung cancer. Thus, if

there is a threshold for risk from pulmonary carcinogens in tobacco smoke, it is below the exposure level of ETS-exposed nonsmokers. NNK is one of the most potent and highly concentrated of the pulmonary carcinogens in tobacco smoke. However, since TSNAs (including NNK) are only one of several classes of carcinogenic compounds found in tobacco and tobacco smoke, the potential magnitude of the impact of reducing TSNAs alone on overall cancer risk cannot be estimated.

Conclusion:

The 2000 U.S. Surgeon General's report, Reducing Tobacco Use, stated that manufactured tobacco products should not be any more harmful than necessary given available technology. The pattern of results in the recent CDC study indicate that manufacturers can and do produce cigarettes with lower TSNA levels compared with leading U.S. brands. Yet, even if manufacturers lower the levels of one group of carcinogens (such as TSNAs), it does not necessarily mean the cigarettes would be less toxic overall. Consequently, the only effective way to prevent tobacco-related illness is never to smoke or to quit smoking.

CDC will publish the results of this important study in the scientific literature and continue to conduct research on levels of harmful constituents in tobacco products, on smoke from tobacco products, and on blood and urine specimens from people who smoke and those exposed to secondhand tobacco smoke. If you have additional questions, CDC scientists would be happy to discuss the results from their research with you further or provide additional information from the scientific literature.

Julie Louise Gerberding, M.D., M.P.H.

cc:
Assistant Secretary for Health

3 Attachments:
Tab A - Biological Relevance of Tobacco-Specific Nitrosamines and NNK Exposure Levels to Lung Cancer in Smokers
Tab B - Selected Research Articles

Hecht SS. Tobacco Smoke Carcinogens and Lung Cancer. *Journal of the National Cancer Institute*, 1999;91(14):1194-1210.

Hoffmann D, Hoffmann I, El-Bayoumy K. The Less Harmful Cigarette: A Controversial Issue. *Chemical Research in Toxicology*, 2001;14(7):768-790.

Stellman SD, et al. Smoking and Lung Cancer Risk in American and Japanese Men: An International Case-Control Study. *Cancer Epidemiology, Biomarkers & Prevention*, 2001;10:1193-1199.

Tab C - Figure 11 "Relationship between dose of NNK and lung tumor incidence in male F-344 rats" from Hecht SS. 1998. Chem Res Toxicol. 11(6):580.

Information Alert

DATE: June 21, 2001

SUBJECT/LEAD COMPONENT: Human Plague/CDC

WHY THIS INFORMATION IS CRITICAL NOW: A plague-related die-off of a prairie dog colony and a suspected fatal case of bubonic plague in a 28-year-old male have occurred in Colorado Springs, Colorado. The *Colorado Springs Gazette* reported on Wednesday, June 20, that health officials are investigating the death of the man who lived near the prairie dog colony. This incident has also been reported to CNN.

SUMMARY OF ISSUE AND DEPARTMENT RESPONSE/ACTIONS:

- Plague epizootics (i.e., disease in animals) are common in prairie dogs along Colorado's Front Range, and the local health department has taken appropriate measures to reduce risk of human exposures to this disease.
- CDC is collaborating with local and state public health authorities to respond to this outbreak by providing epidemiologic follow-up and diagnostic assistance for the suspect human case.
- Autopsy samples for the suspect case patient will be sent to CDC in Atlanta for a pathology analysis; other diagnostic tests are pending.

CONTACT:

Mirtha Beadle, OS/ES, (202) 205-8943
Verla S. Neslund, CDC, (404) 639-7120

Information Advisory

DATE: March 15, 2002

SUBJECT/LEAD COMPONENT: Attendance of Dr. John Marburger, III at the Centers for Disease Control and Prevention's (CDC) Third International Conference on Emerging Infectious Diseases (ICEID 2002) on March 24–27, 2002.

WHY THIS INFORMATION IS IMPORTANT FOR THE SECRETARY: To ensure that the Secretary is aware that Dr. John Marburger plans to attend the ICEID 2002 Conference in Atlanta on March 24–27.

SUMMARY OF ISSUE, BACKGROUND, AND DEPARTMENT RESPONSE/ACTIONS:

- CDC invited Dr. John Marburger, III, Director, Office of Science and Technology Policy, Executive Office of the President, to attend and speak at the ICEID 2002 Conference in March. We understand from discussions with his staff that he plans to attend the Conference.

CONTACT:

Mirtha Beadle, OS/ES, (202) 205-9042
Verla S. Neslund, CDC, (404) 639-7120

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> "What is conceived well is expressed clearly."
>
> **Nicolas Boileau**

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Web Issues

CDC Website Redesign Project
http://intranet.cdc.gov/redesign/default.htm

HHS Web Page Guidance
www.hhs.gov/policy/internet/webcust.html

Jakob Nielsen's Website
www.useit.com/

Methods for Designing Usable Websites
www.usability.gov/methods/collecting_writing.html

The Sevloid Guide to Web Design
www.sev.com.au/webzone/design.asp

The Web Style Guide
http://info.med.yale.edu/caim/manual/contents.html

Writing for Online Reading
www.cdc.gov/od/hissb/docs/uisg-writing1.pdf

Writing for the Web
www.cdc.gov/nccdphp/cdnr/cdnr_sp0104.htm

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