EMERGING INFECTIOUS DISEASES®

Emerging Infectious Diseases Journal

Editorial Style Guide

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The following references were used in creating a style for Emerging Infectious Diseases journal:

American Medical Association Manual of Style. 10th ed. New York: Oxford University Press; 2007.

ASM Style Manual. 4th ed. Washington: American Society for Microbiology; 2001.

Chicago Manual of Style. 15th ed. Chicago: The University of Chicago Press; 2003.

Dorland's Illustrated Medical Dictionary. 31st ed. Philadelphia: Saunders; 2007.
Merriam-Webster's Collegiate Dictionary. 11th ed. Springfield (MA): Merriam-Webster, Incorporated; 2005.

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Use of trade names is for identification only and does not imply endorsement by the Public Health Service or by the U.S. Department of Health and Human Services.

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Types of Articles

Perspectives

Articles should not exceed 3,500 words or include more than 40 references. Use of subheadings in the main body of the text is recommended. Photographs and illustrations are encouraged. Provide a short abstract (not to exceed 150 words), a 1-line summary of the conclusions, and a brief biographical sketch of first author—both authors if only 2 authors. Articles in this section should provide insightful analysis and commentary about new and reemerging infectious diseases and related issues. Perspectives may also address factors known to influence the emergence of diseases, including microbial adaptation and change, human demographics and behavior, technology and industry, economic development and land use, international travel and commerce, and the breakdown of public health measures. If detailed methods are included, a separate section on experimental procedures should immediately follow the body of the text.

Synopses

Articles should not exceed 3,500 words or include more than 40 references. Use of subheadings in the main body of the text is recommended. Photographs and illustrations are encouraged. Provide a short abstract (not to exceed 150 words), a 1-line summary of the conclusions, and a brief biographical sketch of first author—both authors if only 2 authors. This section comprises concise reviews of infectious diseases or closely related topics. Preference is given to reviews of new and emerging diseases; however, timely updates of other diseases or topics are also welcome. If detailed methods are included, a separate section on experimental procedures should immediately follow the body of the text.

Research Studies

Articles should not exceed 3,500 words or include more than 40 references. Use of subheadings in the main body of the text is recommended. Illustrations are encouraged. Provide a short abstract (not to exceed 150 words), a 1-sentence summary of the conclusions, and a brief biographical sketch of first author—both authors if only 2 authors. Report laboratory and epidemiologic results within a public health perspective. Explain the value of the research in public health terms and place the findings in a larger perspective (i.e., “Here is what we found, and here is what the findings mean”).

Articles describing mathematical, economic, or statistical studies have some additional restrictions because readers of Emerging Infectious Diseases may not necessarily have extensive training in these areas. With the increase in submissions of these types of articles, we have developed the following editorial criteria to screen submitted papers.

Table. Editorial criteria for mathematical, economic, and statistical papers

Criterion
Overall content • Must provide information that our audience (public health officials) is likely to find of "immediate and practical" value. • Must reflect the realities of public health.* Writing style • Should be written in a style most likely to appeal to most of our intended audience. • In the main text, equations should be kept to a minimum, and those that are presented should preferably be written out in words rather than mathematical notation. • Mathematical, economic, and statistical jargon should be eliminated or used sparingly. • In the main text, and in diagrams and tables associated with the main text, mathematical notations should be kept to a minimum. Technical aspects • Where possible, mathematical, economic, and statistical articles should include a simple schematic diagram outlining the elements in the model(s) and how they are connected. • Models should contain detailed sensitivity analyses. Univariate (1 variable at a time) sensitivity analyses are generally considered inadequate. One goal of sensitivity analyses should be to define which inputs are, within the model, relatively most important. • All articles should contain sufficient description of the methods to allow independent replication of results by another researcher with suitable skills and interest. • The use of online-only appendixes is encouraged as means to provide technical details of methods used (e.g., equations in mathematical notation) and additional sets of results. However, word counts of online appendixes will be counted toward the overall word limit for the article (i.e., 3,500 words for a research article). • Figures should be as simple as possible. The use of color should be kept to a minimum. • It is insufficient to only report p values as evidence of statistical significance. Authors must also report some measure of dispersion (e.g., standard deviations, confidence intervals).

*Public health officials have to be practical. Purely conceptual modeling papers, for example, are unlikely to be of immediate and practical value to our intended audience.

Policy and Historical Reviews

Articles should not exceed 3,500 words or include more than 40 references. Use of subheadings in the main body of the text is recommended. Photographs and illustrations are encouraged. Provide a short abstract (not to exceed 150 words), a 1-line summary of the conclusions, and a brief biographical sketch of first author—both authors if only 2 authors. Articles in this section include public health policy discussions or historical reports based on research and analysis of emerging disease issues.

Dispatches

Articles should not exceed 1,200 words and need not be divided into sections, although general subheadings, e.g., "The Study" and "Conclusions," may help orient the reader and are encouraged. Provide a brief abstract (no more than 50 words), references (no more than 15), figures or illustrations (no more than 2), tables (no more than 2), and a

brief biographical sketch of first author—both authors if only 2 authors. Dispatches are updates on infectious disease trends and research. The articles include descriptions of new methods for detecting, characterizing, or subtyping new or reemerging pathogens. Developments in antimicrobial drugs, vaccines, or infectious disease prevention or elimination programs are appropriate. Case reports are also welcome.

Commentaries

Thoughtful discussions (500–1,000 words) of current topics. Commentaries may contain no more than 15 references and do not include figures or tables. Include a brief biographical sketch of the first author—both authors if only 2 authors.

Another Dimension

Thoughtful essays, short stories, or poems on philosophical issues related to science, medical practice, and human health. They should not exceed 3,500 words and should include references, if necessary. Topics may include science and the human condition, the unanticipated side of epidemic investigations, or how people perceive and cope with infection and illness. This section is intended to invoke compassion for human suffering and to expand the science reader's literary scope. Manuscripts are selected for publication as much for their content (the experiences they describe) as for their literary merit.

Letters

Letters commenting on recent articles as well as letters reporting cases, outbreaks, or original research are welcome.

Letters Commenting on Articles

Letters should contain no more than 300 words and 5 references; they are more likely to be published if submitted within 4 weeks of the original article's publication.

Letters Reporting Cases, Outbreaks, or Original Research

Letters should not exceed 800 words and include more than 10 references. They may have 1 Figure or Table (but not both) if it is necessary to understand the content; letters should not be divided into sections. All letters should contain material not previously published.

Books, Other Media Reviews

Short reviews (250–500 words) of recently published books, videos, CD-ROMs, or other media on emerging disease issues are welcome. The name of the work, publisher, and length should be included, as well as price and ISBN number (where applicable).

Announcements

Submit announcements to eideditor@cdc.gov. In 50–150 words, describe timely events of interest to our readers. Include the date of the event, the location, the sponsoring organization(s), and a website that readers may visit or a telephone number or email address that readers may contact for more information. Announcements may be posted on the journal website only, depending on the event date.

Conference Summaries

Summaries (500–1,000 words) of emerging infectious disease conference activities are published online only. Summaries should focus on content rather than process and may provide illustrations, references, and links to full reports of conference activities.

Online Reports

Reports on consensus group meetings, workshops, and other activities in which suggestions for diagnostic, treatment, or reporting methods related to infectious disease topics are formulated may be published online only. These should not exceed 3,500 words and should be authored by the group. EID journal does not publish official guidelines or policy recommendations.

Manuscript Preparation

Editorial Policy

For information about editorial policy, visit
http://www.cdc.gov/ncidod/eid/about/ed_policy.htm

Submitting Manuscripts

Submit manuscripts online through Manuscript Central only. Manuscripts (initial submissions as well as revisions) submitted by email will be returned.

Word Processing

For word processing, use Microsoft Word. The font should be 12 pt. Times New Roman and left justified. Use 1 space rather than 2 spaces after a period. See the Typeface section for additional information.

Parts of a Manuscript

Each manuscript should contain each of the following elements, in the following order.

Article Summary Line

For perspectives, synopses, policy reviews, and research studies, include a clear, 1-sentence summary of the article's conclusions; the summary will appear on the print table of contents. This sentence should highlight the bottom-line public health implications of the article and should be pithy, readable, and designed to entice someone to read the full article.

Running Title

Running title will appear on the top of each right-hand print page and along top of the online browser window. Running title should be no more than 50 characters long, including spaces. Some common abbreviations (*E. coli*) and acronyms (MRSA) are allowed in running titles, but these are discouraged and should be written out if the character limit allows.

Keywords

Include no more than 10 keywords; use terms listed in the Medical Subject Headings from Index Medicus. Do not use formatting (boldface or italics) in keywords (note that they are only used for indexing and are not viewable by readers).

Title

The title should be brief, concise, and call attention to the main point of the article. With a few exceptions, abbreviations and acronyms must be written out in full in titles.

Authors

Provide, at minimum, first and last names of each author. Middle names or initials and academic degrees are optional, although academic degrees will not appear in the published article. (*Note:* there are periods but no spaces between initials)

Use the following format:

> Dana C. Crawford, Shanta M. Zimmer, Craig A. Morin, Nancy E. Messonnier, Ruth Lynfield, Qian Yi, Cynthia Shephard, Michelle Wong, Mark J. Rieder, Robert J. Livingston, Deborah A. Nickerson, Cynthia G. Whitney, and Jairam Lingappa

If 2 or more authors contributed equally to an article, this contribution may be acknowledged with a footnote that states "These authors contributed equally to this study." However, a biographical sketch will be printed for only the first author (unless the article has only 2 authors).

Affiliations

Authors may list multiple affiliations, but provide only the overall institutional affiliation for each, not departments or other subunits. Identify city, state or province (for USA, Canada, Australia only), and country.

> *Incorrect:* National Immunization Program, Coordinating Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia, USA
>
> *Correct:* Centers for Disease Control and Prevention, Atlanta, Georgia, USA

> *Incorrect:* Department of Epidemiology and Biostatistics, School of Public Health, University of North Carolina, Chapel Hill, North Carolina, USA
>
> *Correct:* University of North Carolina, Chapel Hill, North Carolina, USA

Author's full initials and last name will appear after their respective institutions.

> Centers for Disease Control and Prevention, Atlanta, Georgia, USA (J. Doe, A.-E. Smith); and University of North Carolina, Chapel Hill, North Carolina, USA (J. Doe, B. Jones)

Use heading of "Author affiliations:" (>1 affiliation) or "Author affiliation" (1 only). No possessive (i.e., not Authors').

Drop redundant material after first mention, unless something changes from city on.

> Author affiliation: Centers for Disease Control and Prevention, Atlanta, Georgia, USA; Emory University, Atlanta
>
> Author affiliations: University of Massachusetts, Amherst, Massachusetts, USA; EviMed Research Group, LLC, Goshen, Massachusetts, USA
>
> Author affiliations: Columbia University, New York, New York, USA; The Consortium for Conservation Medicine, New York; University of California, Santa Cruz, California, USA; New York State Department of Health, Slingerlands, New York, USA
>
> Author affiliations: Queensland Health, Brisbane, Queensland, Australia; University of Queensland, Brisbane; Auckland University of Technology, Auckland, New Zealand; OzFoodNet, Canberra, Australian Capital Territory, Australia; OzFoodNet, Wallsend, New South Wales, Australia; and Australian National University, Canberra

Universities with multiple campuses:

Write campus (city) location as city, so it appears only once.

> *Incorrect:* University of California, Los Angeles, Los Angeles, California, USA
> *Correct:* University of California, Los Angeles, California, USA

Names of institutions (including geographic designations that are part of the name) need not be translated into English. However, the city, state or province, and country listed in the affiliation should be given as the common English preferred designation in the Getty Thesaurus of Geographic Names.

> *Incorrect:* Università degli Studi di Firenze, Firenze, Italia
> *Correct:* Università degli Studi di Firenze, Florence, Italy

Institut Pasteur (Pasteur Institute in English) should list the city separately, not as part of the name.

> *Incorrect:* Institut Pasteur de Morocco, Casablanca, Morocco
> *Correct:* Institut Pasteur, Casablana, Morocco

Countries

Abbreviate USA and UK within affiliations in all cases. Include the state or province only for the USA, Canada, and Australia. Do not list the country for cities in England (only UK); do specify Wales, Scotland, or Northern Ireland with UK for cities in these countries.

List China as People's Republic of China; abbreviate as PRC on subsequent mention. For Taiwan, it is up to the author's discretion whether or not to use "Republic of China."

On second mention within affiliations, abbreviate DRC (Democratic Republic of the Congo)

List Hong Kong, People's Republic of China, at first mention, then just Hong Kong at subsequent mention. Special Administrative Region is not the preferred usage, according to Getty.

Mention Singapore (city/country) only once.

According to Australia postal convention, the suburb, not the city, is used in an address.

Abstract

An abstract is a brief, comprehensive summary of the contents of the article; it allows readers to survey the contents of an article quickly, and like a title, it enables abstracting and information services to index and retrieve articles. An abstract should briefly summarize the research question and any relevant background information, methods, results, and conclusions. Avoid vague or promising phrases such as "…implications of these findings are discussed"; instead, state public health implications of the results.

Do not use structured abstracts (i.e., subheadings). Do not cite references in the abstract. Abstracts for perspectives, synopses, policy reviews, and research studies should not exceed 150 words. Abstracts for dispatches should not exceed 50 words. Letters, book reviews, and conference summaries do not have abstracts.

Text

Keep formatting simple. After a period, leave only 1 space before beginning the next sentence. Use 12-point Times New Roman font and format with ragged right margins (left align). Italicize (rather than underline) scientific terms when needed.

Acknowledgments

Full names only, not titles (e.g., Doctor, Professor) and affiliations, are listed for persons acknowledged. Acknowledgments for materials supplied belong as a parenthetical citation in the text where materials are mentioned.

Disclaimers

A disclaimer is placed on the inside front cover of the published journal and used periodically throughout the publication. It states, “The opinions expressed by authors contributing to this journal do not necessarily reflect the opinions of the Centers for Disease Control and Prevention or the institutions with which the authors are affiliated.” Additional disclaimers are discouraged.

Biographical Sketch

For all article types, excluding letters, media reviews, and conference summaries, include a short (2–3 sentences) biographical sketch of only the first author—both authors if only 2 authors. Include affiliations (city but not state and country if same as in author affiliation list) and primary research interests.

References

Follow Uniform Requirements style. Place reference numbers in parentheses (do not use superscript style), and italicize numbers. Number citations in order of appearance, including references in figures and tables. Consult List of Journals Indexed in Index Medicus for accepted journal abbreviations; if a journal is not listed, spell out the journal title in full. List the first 6 authors followed by “et al.” For juniors and subsequent sequels, include the designation (with no punctuation) after the first initial: “von Hoffman J Jr” or “Snowden CM III.”

For organizations as author, spell out the full name of the organization (World Health Organization, not WHO) if it is the author, or just put title with no author. Never use “Anonymous” or "No author given."

For publisher location, place US states or country names in parentheses.

Adelaide (Australia): Adelaide University
Ames (IA): Iowa University Press

Cite personal communications and unpublished data (including manuscripts in preparation or submitted for publication but not yet accepted) in parentheses in text:

(D.E. Berg, pers. comm.)

(D. Stantio, unpub. data)

Articles in press (accepted for publication but not yet published) should include publication name and current year (no comma).

Authors. Article name. Publication name. In press 2008.

Note: Update the year to reflect the year it will appear in the EID Journal. A citation that says "In press 2007" should be changed to "In press 2008" if it will appear in a 2008 issue.

The following cities should be used without the state or country name when listed in references, meeting or publisher locations (references only; provide state or country name in text, e.g., for manufacturer locations):

Atlanta	Cincinnati	Madrid	Pittsburgh
Amsterdam	Cleveland	Mexico City	Prague
Baltimore	Copenhagen	Miami	Rome
Basel	Dallas	Milan	San Francisco
Beijing	Denver	Minneapolis	Seattle
Belgrade	Detroit	Montreal	St. Louis
Berlin	Dublin	Moscow	Stockholm
Bonn	Edinburgh	Munich	Tokyo
Boston	Frankfurt	Naples	Toronto
Brussels	Geneva	New Orleans	Turin
Budapest	Houston	New York	Uppsala
Buenos Aires	Kiev	Oslo	Vienna
Cairo	Leningrad	Oxford	Warsaw
Cambridge*	London	Paris	Washington
Chicago	Los Angeles	Philadelphia	Zurich

*Cambridge, Massachusetts, should be listed with the state.

Abstracts can be cited in the references. If the abstract has only a number, cite the name of the booklet (e.g., Program and Abstracts).

> Galil K, Singleton R, Levine O, Fitzgerald M, Ajello G, Bulkow L, et al. High prevalence of *Haemophilus influenzae* type b (Hib) carriage among Alaska Natives despite widespread use of Hib-conjugate vaccine. In: Abstracts of the 35th Infectious Diseases Society of America; San Francisco; 1997 Sep 13–16; Abstract 421. Alexandria (VA): Infectious Diseases Society of America; 1997.

Dissertations, Theses

Dissertations can be used as references; theses cannot. Cite theses in the text, giving all information that would normally be included in a reference. International variations in terminology occur; the primary distinction is whether or not the work is published.

Electronic Citations

If a URL is provided, use "Available from [URL].", not "Also available from [URL]." Do not give a URL for articles that have a Medline link. Include the date cited for each URL listed in references. Use the URL for the specific page where information can be found, not to the main page of the website.

Wikipedia information should be cited in text (see www.wikipedia.org/wiki/....), not as a numbered reference.

Below are some examples of references that may not be listed in Uniform Requirements.

Electronic Journal Citations

> Ben Amor Y, Nemser B, Sing A, Sankin A, Schluger N. Underreported threat of multidrug-resistant tuberculosis in Africa. Emerg Infect Dis [serial on the Internet]. 2008 Sep [*date cited*]. Available from http://www.cdc.gov/EID/content/14/9/1345.htm

Note: If the citation references an e-published ahead of print article, do not update the reference. The reference needs to reflect the source used at the time the reference was cited.

Other Electronic Citations

> World Health Organization. Outbreak encephalitis 2005: cases of Japanese encephalitis in Gorakhpur, Uttar Pradesh, India. 2005 Oct 21 [cited 2006 Jul 11]. Available from http://w3.whosea.org/en/Section1226/Section2073.asp

ProMed Citations

Lipkin I. West Nile–like virus: PCR primers and protocols. ProMed. 1999 Oct 13. Available from http://www.promedmail.org, archive no. 19991013.1826.

Foreign Language Citations

References published in a foreign language but translated into English should indicate the original language in brackets, after the article title.

Pablos-Mendez A, Lessnau K. Clinical mismanagement and other factors producing antituberculosis drug resistance [in Dutch]. Journal name;2000:159–76.

References that appear in a foreign language should be translated to English, if possible.

Address for Correspondence

Include a full mailing address and email address for designated corresponding author. A phone and fax number may be included, but these will not be published. Only 1 author may be designated as corresponding, and only 1 address may be published for that author (i.e., corresponding author may not list 2 email addresses). Use American form of country names.

Mexico, not México
Peru, not Péru
Brazil, not Brasil

For CDC addresses, list CDC only (spelled out), not CIOs; provide mailstop; include NE after Clifton Road.

John Doe, Centers for Disease Control and Prevention, 1600 Clifton Rd NE, Mailstop X55, Atlanta, GA 30333, USA

Tables

Tables must be created with Microsoft Word's table tool. Using any other program, or tabs and spaces within the word processing program to align columns, is never acceptable, and the tables will be returned to the author for proper formatting. See section Formatting Tables and Figures for additional instructions.

Figures

Use color only as needed. Submit high-resolution JPEG or TIFF files; mail slides, photographs, or prints only if electronic format is unavailable. Be prepared to provide graphics in the native, editable format (e.g., Microsoft Excel, PowerPoint) during final production editing. Figures should be uploaded to Manuscript Central as separate files and should not be included within the word processing file. Use Arial font for figure

lettering. Figures, symbols, lettering, and numbering should be clear and large enough to remain legible when reduced. Place figure keys within the figure. See Formatting Tables and Figures for additional instructions.

Appendixes

Generally, avoid using appendixes. However, sometimes they serve a useful purpose for data that cannot be presented easily as a table or a figure.

Appendixes, including appendix tables and appendix figures, will be presented online only, except in special cases approved by the Editor-in-Chief. In some instances, tables and figures that are too large for print publication may be converted to online appendix tables and figures by the manuscript editor.

Appendix tables and figures should be numbered sequentially, separately from tables and figures that will appear in print (e.g., Appendix Table 1, Appendix Table 2). All word and total table and figure counts in appendixes are included in the manuscript maximum counts (e.g., no more than 2 tables and 2 figures total for a dispatch). A separately numbered reference list may be provided for appendix materials if necessary, but the total reference count for the article including the appendix must fit within the article maximum (e.g., 40 references total for a research article).

For supplemental materials, including extended reference lists, readers may be referred to the corresponding author. Alternatively, authors may post supplemental material on a separate website and provide a link to that site in their article. In some instances, authors may submit a Technical Appendix that will be presented online only. Technical Appendixes will be formatted but not edited; these materials are not included in the manuscript maximum word and reference counts. A link to the Technical Appendix will be provided in the text of the article where the materials are cited. Technical Appendixes that are surveys written in a language other than English may be printed in their original language.

Formatting Tables and Figures

Tables

Tables must be created by using the Microsoft Word table editor (not by using tabs and spaces or in Microsoft Excel). Number tables consecutively in the text; if an article has only 1 table, do not number it. Tables may not be separated into subdivisions (Table 1A and Table 1B); instead, split into 2 tables. References in tables are ordered according to the first citation of the table in text.

Table Formatting

Tables are set in 8-point Arial font and may be no wider than 6.7” (17 cm). Tables wider than 6.7” should be truncated or included for online publication only.

Tables should be arranged with like data (e.g., organism name, antibody titer) in columns. If a table cell contains text, only the first word should begin with a capital letter. Horizontal rules are used to set off column heads. If necessary for readability, horizontal rules may also be used to group categories of information within the body of the table. Vertical rules are never used, and tables are never displayed in landscape (sideways) orientation.

Table Titles

Table titles should be brief but self-explanatory. Place the title above, not below, the table. Capitalize the first letter of the title and do not include a period at the end. Titles should contain enough information to stand alone (e.g., populations, dates, locations) but should not repeat information in column or row heads. Avoid using abbreviations in titles, but when necessary to do so, explain abbreviation in footnote, not in title itself.

Table Headers

Use abbreviations as needed for space (see below). Capitalize only the first word of each column header. Capitalize the first word after a symbol (e.g., 95% Confidence interval).

Abbreviations in Tables

Tables should be self-explanatory; therefore, spell out terms even if they have been introduced in the text. Terms may be abbreviated within the table and defined in a footnote; all abbreviated terms may be defined in the same footnote.

M and F do not need to be defined when used to mean male and female.

Use no. (%), not n (%).

Use no. patients, not no. of patients

Do not use virgules; e.g., NA, ND, not N/A, N/D.

Footnotes

Use the following symbols, not superscript, in the order shown, to indicate footnotes:

*, †, ‡, §, ¶, #. If the table requires >6 footnotes, use double (e.g., **, ††) symbols. No space is used between a footnote symbol and the footnote. Place a period at the end of each footnote.

Units of Measure in Tables

Units should not be repeated in every cell but should be noted once in the column head. The unit of measure usually appears after the thing it measures, not necessarily at the end of the boxhead. Use SI units or other common units of measure.

Weight (kg) during treatment

Figures

Figures should be submitted for review as high-resolution (600 dpi) JPEG or TIFF files. Be prepared to submit final figures in the native, editable format (e.g., Excel files for figures created in Microsoft Excel) during production editing (after the article has been accepted for publication). Figure revisions may be required during review or production editing. Number figures consecutively in the text; if an article has only 1 figure, do not number it. References in figures are ordered according to the first citation of the figure in text.

Figure Formatting

Figures are usually printed at 1 column width, or 3.3” (8.4 cm); text should be set in Arial at a size that will be legible at that width (do not use boldface). Rarely, if a figure is wide and short, it may be presented at the width of 2 columns (6.7”).

Omit unnecessary boxes and borders in graphs. Capitalize only the first letter of the first word of an axis title, label, or key entry, and omit unnecessary words (%, not “Percent of total”). Align all text horizontally except labels on vertical axes.

Use of Color in Figures

Graphs and line art should be set in black and white (or grayscale). If color is essential to the meaning of the figure, additional colors may be used in the following order: red, blue, green, gold, purple, orange, brown, dark pink. Avoid light or pastel colors. Color can never be used in letters; however, a color version of a black-and-white print figure may be provided online.

Legends

Figure legends should be self-explanatory and should stand alone. Capitalize the first letter of the legend and include a period at the end. Place a minimum of text in the figure and use the legend for lengthier explanations. Place the legend in the article’s text file, after references and tables. Spell out terms even if they have been introduced in the text. Terms may be abbreviated in the figure if they are defined in the legend.

General Style Guidelines

Typeface

Boldface

Avoid using boldface for emphasis in running text. Boldface may be used judiciously in tables, if necessary, to highlight significant values or isolates described in a given study, for example. Similar uses are permitted in figures. Usage should be defined in table footnote or figure legend (i.e., "**Boldface** indicates a significant result.").

Italics

Do not use italics for emphasis.

For use of italics with organisms, see Scientific Nomenclature.

Do not italicize coined terms. If necessary, set off in quotation marks at first occurrence only.

Single-letter variables are italicized. However, R0 (basic reproductive number) is not italicized to avoid confusion with R (correlation coefficient in multivariate analysis).

Do not use italics to format article headings, subheadings, table titles, or figure legends.

Do not use italics in keywords.

Do not italicize titles of books or journals, either in text or in references.

Italicize reference numbers in text but not in reference list.

Commas, colons, and semicolons that immediately follow italicized text should not be italicized.

Use the format p = 0.05 or p>0.05 (lowercase p, no italics; put zero before decimal, note spaces around =, no spaces around > and <).

Some foreign words and phrases have become part of standard English usage and do not need to be italicized, unless not using italics would be confusing. These terms include

in vivo
in vitro
in situ

falciparum (in falciparum malaria)
et al.

Underlining

Do not underline for emphasis or to indicate book or journal titles. Do not underline URLs or email addresses. Underlining may be used to indicate nucleotide or amino acid substitutions.

Capitalization

Avoid unnecessary capitalization. Follow Chicago Manual of Style (http://www.chicagomanualofstyle.org/cmosfaq.html).

Accession Numbers

Do not capitalize accession number, and use the abbreviation no. instead of number when a specific number is provided.

GenBank accession numbers were recorded.
The isolate was deposited into GenBank under accession no. AA00000.

Other Capitalization Preferences

AM, PM, BC, AD: format in small caps
Arctic (when referring to region), arctic when referring to cold temperature. American Heritage says “arctic or Arctic fox”; “arctic or Arctic tern,” in that order.
BioSafety Level. Abbreviate with hyphen (e.g., BSL-2).
California encephalitis virus
chikungunya virus
ClustalW, ClustalX
Eastern equine encephalomyelitis
Ebola (named after the Ebola River in Zaire)
federal
formalin
Guinea worm disease
Gulf Coast
Internet
Legionnaires’ disease
Mercurochrome
o’nyong-nyong virus
Pacific Coast
QIAGEN
Sin Nombre virus
Southeast Asia
Saint Louis encephalitis virus
Suramin
Teflon
the Gambia, the Netherlands, The Hague
Gram stain, gram-negative, gram-positive
Venezuelan equine encephalomyelitis virus
website

West Africa
Western equine encephalomyelitis virus
Western Hemisphere
Western blot
x-ray

Specific Designations

Do not capitalize words used as specific designations (case, group, series, patient), unless they begin a sentence or are part of a title or heading.

Trade names should generally be capitalized. Do not use ™ or ® with trade names.

Most words derived from proper nouns are not capitalized. Follow the Chicago Manual of Style (http://www.chicagomanualofstyle.org/cmosfaq.html).

plaster of paris, parkinsonian, roman numeral

Do not capitalize titles, such as chairman, president, professor, or director unless the term directly precedes a name; e.g., Professor Smith.

Titles and Headings

Capitalize the first letter of all words except articles, coordinating conjunctions, and prepositions (regardless of length).

Never capitalize "to" in a title or a heading, either as a preposition or infinitive.

Lowercase "that" as a subordinating conjunction but capitalize as a relative pronoun.

Evidence that Penicillin-Resistant Strains Are Common
Strains That Are Resistant to Penicillin

Capitalize resistant, susceptible, sensitive, and words with equal weight. Do not capitalize related, associated, or acquired.

Penicillin-Resistant Gonorrhea
Methicillin-Susceptible Staphylococcus aureus
Bite-associated Infection
Community-acquired Infection

Capitalize hyphenated or dashed words of equal weight.

Case–Control Study
Human–Animal Interactions
Cat-Scratch Fever, Rat-Bite Fever

If a word in a title (or other word that would ordinarily be capitalized, as at the beginning of a sentence or the first word in a table cell) begins with a lowercase Greek letter, capitalize the first non-Greek letter after it.

β-Lactamase–Inhibitor Combinations

Titles of books and journals are neither italicized nor placed within quotation marks.

Lowercase specific epithets in the scientific names of organisms in titles as you would in running text: *Escherichia coli,* not *Escherichia Coli.*

If a symbol begins a heading (e.g., column heading in table), capitalize the next word.

% Infected
95% Confidence interval

Lowercase all letters in email addresses. Lowercase all letters in URLs unless necessary for the URL to work properly (e.g., PDF file names).

Spelling

British versus American Spelling

Change British spelling to American.

ameba, amebae, not amoeba, amoebae

analog, not analogue
analyze, not analyse
anesthesia, not anaesthesia
color, not colour
estradiol, not oestradiol
homolog, not homologue
orthopedics, not orthopaedics
titer, not titre

Exceptions: aerobic, anaerobic, proper names (The XYZ Programme, *S. faecalis*, *N. gonorrhoeae*)

Use the United States adopted name rather than the international nonproprietary name for drugs.

rifampin not rifampicin
acetaminophen not paracetamol

Other Spelling Preferences

See also Hyphens and Other Capitalization Preferences.

acknowledgment not acknowledgement
Beijing/W genotype
Cameroon not Cameroun
Côte d'Ivoire not Ivory Coast
Dhaka not Dacca
Escherichia coli O157 (use the letter O, not the number 0)

extensively drug-resistant tuberculosis (XDR TB)
Haemophilus influenzae type b (Hib)
helminthic not helmintic
hemorrhage
inoculation
judgment not judgement
leukocyte not leucocyte
mucus (n), mucous (adj)
multidrug-resistant tuberculosis (MDR TB)
occurred, occurrence
omit, omitted
precede
proceed
protozoon (n, s), protozoa (n, pl) protozoan (adj)
repellent
Réunion Island, but Reunion (state)
Robert Koch Institute (not Koch-Institute)
supernatant not supernate
villus (n), villous (adj)

Grammar

Restrictive and Nonrestrictive Clauses

Set nonrestrictive clauses (extra information) off with commas and introduce them with "which."

> The samples, which James analyzed, had been stored for 2 weeks.
> (Only 1 set of samples is being discussed; therefore, the clause "which James analyzed" is not necessary for defining the samples.)

Do not place commas around restrictive clauses (necessary information) and introduce them with "that."

> The samples that James analyzed had been stored for 2 weeks.
> (More than 1 set of samples is being discussed. The clause "that James analyzed" defines the noun "samples," telling which samples were analyzed.)

Subject–Verb Agreement

Use a singular verb with a singular subject and a plural verb with a plural subject, even if a plural phrase follows the subject.

> Our analysis of all patients with *E. coli* infections shows…

Collective nouns (e.g., number, total, staff, faculty) take a singular verb when the noun is regarded as a group and a plural verb when individual members of the group are emphasized. A good rule of thumb is to use a singular verb when the article is "the" and a plural verb with "a."

The number of patients was unclear.
A number of patients were quarantined. [patients were quarantined individually]
The number (total, group) reported is 25.
A number (total, group) of persons are…
Seventy-eight percent is the largest percentage reported.
The Centers for Disease Control and Prevention is...

In a noncount noun in a prepositional phrase with "none," the verb plurality is determined by the object of the preposition.

None of the blood was...
None of the patients are participating.

Verbs

dialyze blood, not animals or humans
transfuse blood, not animals or humans

A quantity indicated by a unit of measure is singular, even when the units are spelled out (ASM).

Twelve milliliters was injected.
...10 mg was added
...5 mL was injected
...220 cpm of radioactivity was detected

Exceptions:
Nonabsolute or informal units

...10 drops were added

Do not allow a mathematical symbol to stand for the main verb in a clause (ASM).

Incorrect: When p <0.005...
Correct: When p was <0.005...

Medical jargon often uses nouns as verbs. Avoid.

Incorrect: was electrophoresed
Correct: underwent electrophoresis

Incorrect: The patient was biopsied.
Correct: A biopsy was performed.

Possessives

See also Apostrophes. [Link]

Year indications are not possessive.

1960s, not 1960's

Organization names vary:

American Medical Writers Association
Department of Veterans Affairs

Preferred Usage

affect, effect

affect (v), to influence
affect (n), subjective aspect of an emotion (psychological studies)
effect (v), to bring about or initiate
effect (n), result or outcome

Alaska Native, Alaska native

Alaska native: anyone who was born and raised in Alaska, regardless of cultural background.

Alaska Native: a person who has origins in any of the original peoples of the area that is now Alaska and who maintains cultural identification through tribal affiliation or community recognition

American Indians, Native Americans

Both terms are acceptable [source: Indians Are Us? Culture and Genocide in Native North America by Ward Churchill, 1994], although Native Americans is preferred. Usage of either term is at the author's discretion.

among, between

Among always applies to >2 objects.

Between literally applies to only 2 objects but may be used with >2 when each is treated individually, as in "a treaty between 3 powers."

and/or

Avoid. In most cases, either *and* or *or* is correct. When a choice cannot be made, use "X, Y, or both."

Antibodies to, antibodies against

Although somewhat redundant, use antibodies against.

age designations

Term	Age
neonate or newborn	birth to 1 month of age
infant	1 month to 2 years
child	2–13 years
school-age	5–18 years
teenage	13–19 years
adolescent	13–17 years
adult	>18 years
childbearing age	15–44 years
elderly	(determined by the author)

based on, on the basis of

Based on is often erroneously used to mean on the basis of. Correctly used, it follows forms of the verb to be.

The calculations were based on the following results.

biopsy

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

black, African American

Use of either term is acceptable at the author's discretion. However, black is not capitalized. Follow author for most terms regarding race/ethnicity.

brevity

Use as few words as possible to make a point

Instead of…	Use…
the majority of	most or many
prior to	before
at the present time	now
at the time that	when
in terms of	in, of, for
the truth is	is
the facts are	are
in order to	to
large in size	large
period of time	period
very unique	unique

case, patient

A case is a particular instance of disease, illness, injury, or asymptomatic disease. Distinguish between a case (a situation or set of circumstances) and a patient (a human being). Cases do not show symptoms, experience side effects, recover, or die; patients do. Do not dehumanize persons into cases. ("Case-patient," however, is an acceptable term.)

> *C. perfringens* was isolated in a case of diarrhea. or …from a patient with diarrhea.
> Erythromycin is recommended for treating patients with legionellosis.

Avoid use of case except for cases of disease. Phrases like *in this case* or *in any case* may be changed to *in this instance* or *in any event,* unless referring to a case of disease.

compare to, compare with

Use compare to for items that are very different. Use compare with for items that are similar. In scientific writing, compare with is most often used.

> The sodium levels of the patients in the control group were compared with those of the patients in the study group.
>
> Shall I compare thee to a summer's day?

compose, comprise

Compose: to total, form, to go together, to make up (an object); always takes the passive voice.

The district is composed of 3 counties.

Comprise: to include, to contain, to be made up of (always takes the active voice; do not say is comprised of). The whole comprises the parts; the parts do not comprise the whole.

The district comprises 3 counties.

continual, continuous

Continual means to recur at regular and frequent intervals. Continuous means to go on without pause or interruption.

The patient with emphysema coughed continually.

His labored breathing was eased by a continuous flow of oxygen through a nasal cannula.

dehumanizing terms

Describe a person as having a condition, not being the condition.

person with diabetes, not a diabetic
person with arthritis, not an arthritic
person with asthma, not an asthmatic

Note that patient refers to someone receiving treatment for a particular condition. In, for example, a seroprevalence study of persons with HIV infection, person with HIV is preferable to AIDS patient, unless the sample is being evaluated or receiving treatment for the clinical condition of AIDS.

Do not refer to a person as a subject. Use patient or participant.

develop

Diseases develop in patients. Patients do not develop diseases.

developed country, industrialized country

Use industrialized, not developed.

developing country

Use developing or resource-limited, not undeveloped, not developed, not Third World.

diagnose

To evaluate, identify. Conditions, syndromes, diseases, and pathogens are diagnosed. Patients are not diagnosed.

die of, die from

Patients die of, not from, specific diseases or disorders.

different from, different than

Use different from, not different than.

dosage, dose

Dosage implies a regimen; dose implies a quantity. Dosage is the amount of medicine to be taken by a patient in a given period; dose is the amount taken at one time.

due to, owing to

These terms are not synonymous and can be vague. Whenever appropriate, replace with caused by or because of.

ecologic, ecological

Follow author preference.

e.g., i.e.

Place a comma after these abbreviations. Abbreviated phrase should be introduced by a semicolon if the clause is independent and by a comma otherwise. Do not use etc. in an e.g. or i.e. clause.

e.g. = for example, such as
i.e. = that is, in other words

Examples may be introduced by e.g. but should not be followed by e.g.

Correct: In evaluating an IQ score, several factors, e.g., socioeconomic level, must be considered.

Incorrect: Socioeconomic level, e.g., is a factor to be considered.

eliminate, eradicate

Disease is eradicated from the entire world, eliminated from a country or region.

-emia

This suffix indicates in the blood and should not be used in the plural.

Parasitemia or levels of parasitemia, not parasitemias

epidemic, endemic

A disease is endemic to an area; the area is not endemic.

endemic malaria, disease-endemic areas

Epidemic, a disease that occurs suddenly and in numbers in excess of what would be expected (because it was introduced from outside)

Endemic, belonging or native to a particular people or country, indigenous. Use "to" with a place and "in" with a population.

Diseases endemic to the tropics

Infections endemic in European wild rodents

erythrocytes, red blood cells

Use erythrocytes, when possible.

etc.

Avoid in scientific writing; it is vague and frequently redundant, easily replaced with e.g.

etiology, cause

Etiology is the study or description of causes (agents) of a disease. Do not use etiology as a synonym for a cause. Etiology encompasses all the possible causes of a disease.

expire, die

Patients do not expire or have fatal outcomes; they die. Medications expire.

feel, believe

Use feel to express physical sensations; use believe to express personal conviction, accepting something as true.

The patient felt cold.
The author believed that the theory was sound.

fever, temperature

Fever is a rise of body temperature above normal. If a patient has a temperature of 37.8°C, he has a fever of 0.8°C. Also correct: The patient was febrile (37.8°C).

Please use the Times New Roman degree symbol; do not use a superscript lowercase o.

few, less (fewer, less; fewest, least)

Few refers to units or people that can be counted.

Less refers to quantities of mass, bulk, or volume.

gram

Gram should be capitalized and never hyphenated when used as Gram stain; gram negative and gram positive should be lowercase and only hyphenated when used as a unit modifier.

Gram staining
gram negative
gram-positive bacteria

Greek letters

Greek letters are preferred to words in most circumstances. In some chemical names, however, the approved nonproprietary name uses the word.

tumor necrosis factor α, β-blocker, interferon-γ, betamethasone, beta carotene

Chi square should always be written as χ^2. If the symbol begins a sentence, rewriting the sentence may be desirable.

homosexual, bisexual, gay

Any of these terms are acceptable and dependent on the author's discretion. Sometimes the phrase "men who have sex with men" or MSM is used because some of these men do not label themselves as gay, homosexual, or bisexual.

-ic, -ical

Dispense with most -al endings. For example, use epidemiologic, geographic, serologic, logistic, immunologic, toxicologic, anatomic.

However, check dictionary and consider author's preference, e.g., biological warfare, ecological, psychological.

immunize, vaccinate

Immunize means to confer immunity; vaccinate means to administer vaccine.

impact

This trendy word is a red flag for editors. Editors tend to avoid it because it is overused and imprecise and to reserve its use for physical collision or global effect. Whenever possible, a more specific word should be used; otherwise, effect (noun) and affect (verb) are good alternatives.

> *Avoid:* Combination therapy with metronidazole impacted colonization rates.
> *Better:* Combination therapy with metronidazole affected colonization rates.
> *Preferred:* Combination therapy with metronidazole decreased colonization rates.

important

This word is vague and should be avoided. In most cases, it can be deleted without affecting meaning or changed to a more specific adjective.

> *Avoid:* These data suggest important abnormalities…
> *Preferred*: These data suggest abnormalities…

in, among

Conditions usually occur in, not among, persons.

> The 25 cases of measles were in school-aged children.
> infection in patients, not infection among patients

incidence, prevalence

Incidence (a rate) refers to the number of new cases per unit of population per unit of time. Prevalence refers to the number of existing cases per unit of population at a given time (point prevalence) or in a given time (period prevalence). Refer to cases per unit, not incidence or prevalence per unit.

> *Correct:* cases per 100,000 population
> *Incorrect:* incidence (or prevalence) per 100,000 population

includes

This word indicates that a partial list follows. Do not use it if your list is complete.

> *Correct:* The alphabet includes the letters a, b, and c.
> *Correct:* The first 3 letters of the alphabet are a, b, and c.
> *Incorrect:* The first 3 letters of the alphabet include a, b, and c.

individual, person

Person is a noun; individual is an adjective (e.g., an individual student). Avoid using individual as a noun to refer to persons (animals okay).

influenza season

Truncate second year for influenza season, when the range is no more than 1 year, and when first 2 digits are the same.

> 2000–01
> but
> 2000–2002 and 1999–2000

Truncation may be used for other periods that do not follow a calendar year; e.g., school years, fiscal years.

inject, inoculate

Inject a fluid; inoculate an animal or person. Liquid cannot be inoculated into an animal or a petri dish; it is injected into or spread on.

> We used a 0.5-mL aliquot to inoculate each mouse.
> We injected a 0.5-mL aliquot into each mouse.

injection, intravenous drug user(s)

Be aware of the difference between an injection (not injecting) drug user (IDU) and an intravenous drug user (IVDU). The former includes other forms of drug use such as intramuscular injection.

insure, ensure, assure

Insure means to guarantee life or property against risk (e.g., to underwrite; to give, take, or procure insurance). Ensure means to make certain or guarantee. Assure means to make safe, to give confidence to.

in vitro

Do not hyphenate foreign phrases that are printed without a hyphen in other circumstances (e.g., in vitro translation, in situ protein synthesis, in vitro–stimulated growth, in situ–synthesized proteins).

last, past

Although last is not wrong, most recent or past is often more precise. Last can mean final.

Patients were included if they were symptomatic for the last 10 days. (These are only their last 10 days if they died; past is better.)

Patients reported condom use at their last sexual encounter. (May not be their last; most recent is better.)

leukocytes, white blood cells

Use leukocytes, when possible.

male, female

As nouns, these terms can be considered dehumanizing and are best reserved for laboratory animals. They can be used as adjectives (male adolescents, female participants), but as nouns referring to humans, they should be replaced by men and women or boys and girls.

molecular weight

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 Da.
Correct: The molecular weight of the protein is 30,000.
Correct: The molecular mass of the protein is 30,000 Da.

morbidity, morbidity rate

Morbidity refers to the condition of being diseased, the rate of illness or disease. Do not use morbidity if illness or disease would work; use morbidity only to refer to the rate of illness in a specified population during a specified time (morbidity rate).

mortality, mortality rate

Mortality refers to the number of deaths from a particular condition. Death is preferred over mortality. Mortality rate is the number of deaths in a particular population divided by the size of that population at the same time.

negative, normal

Examinations and most laboratory tests are neither negative nor normal in and of themselves; interpretations of the test results, however, may be negative or within normal limits.

Observations, results, or findings from examinations and tests are within normal limits or abnormal.

Incorrect: Urinalysis was normal.

Correct: Urinalysis results were within normal limits.

Cultures, tests for microorganisms, tests for specific reactions, and reactions to tests may be negative or positive (reactive, for some).

Electroencephalograms, electrocardiograms, isotope scans, and radiographs are pictures and are, therefore, not negative or positive.

offspring

Use children, not offspring, for humans.

-ology

This suffix means a branch of knowledge, science, or study of something. Terms ending in -ology (e.g., etiology, pathology, serology) should not be used to describe particular items. All "ology" words refer to the study of something. For example, the *methodology* of a research study would be a study of the methods used within the study, while the *methods* would include the study design and other information about how the study was conducted by researchers.

Incorrect: The pathology was located in the upper part of the gastrointestinal tract.
Correct: The pathologic lesion was located in the upper part of the gastrointestinal tract.

Incorrect: The histology was small-cell carcinoma of the lung.
Correct: The histologic diagnosis was small-cell carcinoma of the lung.

Incorrect: The patient's serology showed…
Correct: The patient's serologic test results showed…

Incorrect: We used the following methodology.
Correct: We used the following methods.

parameter

Parameter has a specific statistical meaning and should not be used to mean measurement, value, or number. Ordinarily, except when a descriptive quantity for a statistical population is meant, parameter should be changed to measurement, value, quantity, variable, number, or a comparable term.

patient

An ill person who is receiving or has received medical care. Do not use the term normal patient.

person, persons, people

Person is preferred over individual as a noun. The plural of person is persons, not people. The latter term refers to a group of persons who share particular characteristics (e.g., the American people).

population, sample

Population refers to the set of entities from which statistical inferences are to be drawn. Sample is that portion of the population that is under study.

present, present with

As a synonym for seeking treatment, present is jargon and should be avoided.

> *Incorrect:* The patient presented with…
> *Correct:* The patient sought treatment for…
> *Correct:* The patient had…

preventative, preventive

Preventative is becoming obsolete; preventive is preferred.

rate, ratio

Rate is the incidence of a disease (or number of deaths) in a specified population in a specific time period. If no time period is specified, ratio is preferred.

> The overall case-fatality ratio for SARS is ≈12%
> The rate of West Nile virus infection in Canada is ≈300 per 100,000 population per year.

react, test

A substance is tested for a reaction with another substance; it is not reacted with another substance.

resolve

Symptoms are resolved; patients do not resolve their symptoms.

risk of, for, from

What is my risk of getting AIDS?
Men who have sex with other men are at highest risk for AIDS.
The most serious risk from AIDS is death.

To avoid categorization by group, do not use high-risk as an adjective. Similarly, replace *high-risk groups* with *groups at high risk.*

Incorrect: high-risk youth
Correct: youth at high risk

sacrifice

A euphemism for killing laboratory animals after an experiment. Preferred terms are humanely kill or euthanize.

serum, sera

Serum and the names of other body fluids should not be singular if they mean samples collected from different patients. Change serum of patients to serum samples or serum specimens. Be sure to use the word samples or specimens if a specific number is given: 14 serum samples, not 14 sera.

sex partner

Use the term *sex partner,* not *sexual partner;* however, the term *sexual behavior* is correct.

since, because

Using since when you mean because can create ambiguity (causal vs. temporal).

Vague: Since they began treatment, the patients were more active.

More clear (meaning #1): Because they began treatment, the patients were more active.

More clear (meaning #2): After they began treatment, the patients were more active.

significant

Significant has a specific statistical meaning. If that is not the meaning intended, substitute a synonym, e.g., marked, noteworthy, substantial. When using in the statistical sense, the modifier *statistically* is redundant.

Incorrect: We included all statistically significant variables in the multivariate model.
Correct: We included all significant variables in the multivariate model.

subject

Do not refer to human participants as subjects. Substitute participant, patient, or person.

survival

Be sure to clarify whether survival refers to times or rates.

target

This term is dehumanizing and often misused. Targeting people is like painting a bulls-eye on them. If you must target something, be sure you do not confuse it with aim.

Dehumanizing: Our program targets low-income women.
Better: Our program serves low-income women.
Better: Our program addresses the needs of low-income women.

Incorrect: We targeted the program to low-income women.
Better: We focused the program on low-income women.

Incorrect: We targeted the intervention to rural areas.
Better: The intervention targeted rural areas.

test positive

Samples, but not patients, can test positive.

time designations

From March to August (excludes August)
From March through August (includes March and August)
Between March and August (excludes March and August)
1960s, not 1960's
once a day, not daily or qd
twice a day, not twice daily or bid
1986 to 1987 (1-year period). Between 1986 and 1988 is also a 1-year period [1987]).
1986 through 1987 (2-year period)
1986–1987 (2-year period)
AM, PM (small caps)
BC, AD (small caps)
3:00 PM, not 15:00

titer

Use only as a noun, not a verb, and use American spelling.

Incorrect: were titered
Correct: titers of… were determined

Titer reflects dilution, not optical density. For optical density, state the optical level that determines positivity.

Use a colon to express a ratio or dilution. Titers are expressed as the reciprocal of the dilution.

(length:width, 2:1)
The end IgG titer was 256 after a serial 1:2 dilution.

tracking

The use of the word *tracking* is considered jargon when used in place of proper English.

Incorrect: tracking people
Correct: analyzing trends among persons

treatment

Avoid anti-[disease] treatment.
Preferred: TB treatment
Avoid: anti-TB treatment

using

The word *using* probably causes more dangling participles than any other word.
Incorrect: Using inhalation anesthesia, the dogs were splenectomized.
Correct: Using inhalation anesthesia, we splenectomized the dogs.

Using requires the word *by* when the actor is not specified.

By needed: Age was determined by using body mass and/or reproductive characters.
By not needed: We calculated age-specific hospitalization incidence rates and fitted linear models, using the χ^2 test.

while, although

Although is more precise when you mean in spite of the fact that. While also has a temporal meaning of during the time that.

Vague: While a vaccine is not yet available, many candidate vaccines are being tested. (Either meaning could apply.)

More precise: Although a vaccine is not yet available, many candidate vaccines are being tested. (Has only 1 meaning.)

US citizens

Preferred to the term Americans.

vaccinate for/vaccinate against

Use of either term is acceptable depending on the context of how it is used.

varying, various

Varying means that which is changing (adjective) or causing to change (verb).

Various means of different kinds or aspects.

versus

Use versus in running text and titles, vs. in parenthetical expressions and tables, and v. in legal citations. Do not use vs. without periods.

Kirby-Bauer disk diffusion versus serial dilution
(3.9 for case-patients vs. 7.2 for controls)
Roe v. Wade

white, Caucasian

Caucasian technically refers to people from the Caucasus region of Eurasia and should be avoided. Due to the international audience of the Journal, the use of the term *white* is preferred unless referring to persons from the Caucasus region.

Punctuation

Accents

Do not use accents for words that can be correct without them; e.g., naive, debride (not naïve, débride).

Apostrophes

Use an apostrophe to indicate possession. If the possessor is plural, the apostrophe comes after the plural –s.

the patient's symptoms
6 months' gestation
woolsorters' disease

Pronominal possessives (his, hers, yours, theirs, ours, its) do not take an apostrophe. (It's is a contraction of it is.)

Year indications are not possessive.

1960s not 1960's

Diseases, syndromes, tests, or compounds that are named after a person or place are not possessive. Official animal names, however, may retain apostrophes (see http://www.itis.gov/ for animal names).

Bright disease
Chagas disease
Down syndrome
Hodgkin disease
Kaposi sarcoma
Kawasaki syndrome
Lyme disease
Marfan syndrome
Minimata disease
Reye syndrome
Student *t* test
Bonferroni adjustment
Eagle minimal essential medium

Exceptions: Legionnaires' disease, woolsorters' disease

Avoid the following eponyms:

Reiter syndrome (use reactive arthritis)
Wegener's granulomatosis (use vasculitis or ANCA-associated granulomatous vasculitis)
Note: ANCA = antineutrophil cytoplasmic antibodies

Colons

A colon may be used, sparingly, to introduce a list or series. Do not capitalize the first word after a colon (unless it would be capitalized for other reasons, such as beginning a sentence or a subtitle). Do not use a colon to introduce a series of complete sentences; change the colon to a period or edit the list so that it is no longer made up of complete sentences.

Incorrect: Cells were prepared as follows: Strain 12B was grown in G broth. Cells were harvested by centrifugation. The pellet was dissolved in solution Y.

Correct: Cells were prepared as follows. Strain 12 B was grown in G broth. Cells were harvested by centrifugation. The pellet was dissolved in solution Y.

Correct: Cells were prepared as follows: strain 12B was grown in G broth, cells were harvested by centrifugation, and the pellet was dissolved in solution Y.

If any item in a list includes a complete sentence that gives information about that item only, either edit out the colon or put the additional information in parentheses.

> *Incorrect:* This conclusion is based on the following results: 1) The mapping of the mutations between 0.13 and 0.23 map unit. This finding indicates that they lie within a 1.2-kbp region. 2) The presence of the Nif phenotype in all the mutants.
>
> *Correct:* This conclusion is based on the following results: 1) the mapping of the mutations between 0.13 and 0.23 map unit (this indicates that they lie within a 1.2-kbp region) and 2) the presence of the Nif phenotype.

Do not use a colon if the items in the list complete the sentence grammatically.

> *Incorrect:* XYZ medium contained: A, B, and C.
> *Correct:* XYZ medium contained A, B, and C.

Commas

Commas are required in all of the following situations:

- before the conjunction in a compound sentence if both clauses are independent.

  Incorrect: All culture results were negative for *S. pneumoniae*, and were omitted from multivariate analysis.

  Correct: All culture results were negative for *S. pneumoniae* and were omitted from multivariate analysis.

  Correct: All culture results were negative for *S. pneumoniae*, and they were omitted from multivariate analysis.

- after all items linked by *and* or *or* in a series, including the item before the conjunction.
- after state when city is mentioned in text.

  in Dallas, Texas, in 1995

- after date that gives month, day, and year in text.

  Comma needed: The test given January 1, 1997, showed that…

  Comma not needed: The test given in January 1997 showed that

- after an introductory phrase of >5 words; a comma can be used after fewer words if necessary to clarify the meaning.
- after i.e. and e.g.
- in numerals >999 (e.g., 100,000)

Dashes

Avoid em-dashes (—) in scientific writing. Their use is for sudden breaks in thought that change the sentence structure or amplify and expand a phrase in the main clause. Try parentheses instead.

Use an en-dash (–) to connect numbers in a range. Use a hyphen, not an en dash, between numbers that are not inclusive (e.g., phone numbers and grant numbers).

Use an en-dash to indicate negative values (–70°C).

Use between compound adjectives when 1 element is an open compound, when >2 elements are hyphenated compounds, or in complex modifying phrases that include suffixes and prefixes and hyphens.

New York–Boston connector
Trypanosoma cruzi–infected
Triatoma infestans
Reverse transcription–PCR

In complex modifying phrases that include suffixes or prefixes, hyphens and en-dashes are sometimes used to avoid ambiguity.

non-group–specific blood
manic-depressive–like symptoms

Hyphens

Terms formed by combining >2 words or elements of words may be open (with a space between them), hyphenated, or solid (as 1 word). If in doubt about how to treat a compound, consult Merriam-Webster's or Dorland's dictionaries. Below is a list of common terms.

acute-phase serum samples	age group (2 words)
airborne	
antibody-capture ELISA	antibody-positive children
Antimicrobial drug-resistant [noun]	Antimicrobial drug resistance
basepair	
bed net (n), bed-net (adj)	bedbug
birthweight	blood-borne
breast-feed, breast-fed	case-patient, control-patient/participant
chickenpox	child care (n), childcare (adj)
childbearing	ClustalW
co-infection	co-trimoxazole
co-worker	
cut off (v), cutoff (adj)	database, dataset
day care (n), daycare (adj)	email
Epi Info	Etest
fingerstick	follow-up (n), follow up (v)
foodborne	foot-and-mouth disease
fresh water (n), freshwater (adj)	groundwater
hand, foot, and mouth disease	handwashing

healthcare	Insect-borne
life cycle	
live-born	long term (n), long-term (adj)
longstanding	managed care (n, adj)
maximum-likelihood (as adj only)	maximum-parsimony (as adj only)
needlestick	neighbor-joining (as adj only)
	plaque-reduction neutralization test
postmortem	postpartum
pulsed-field gel electrophoresis	
real-time reverse transcription–PCR	reemerge
restriction fragment length polymorphism	
Robert Koch Institute (not Koch-Institute)	sandfly
short term (n), short-term (adj)	ST5 (no hyphen with sequence types)
stand by (v), standby (adj)	
T cell (n), T-cell (adj)	tick-borne
under way	USA300
variable number tandem repeat	
vector-borne	
waterborne	website, Web page
well-being	well-known person, but he is well known
work-up (n), work up (v)	worldwide

Common and unambiguous compound adjectives need not be hyphenated. Ethnic designations are never hyphenated, even when used adjectivally.

food safety issues, foodborne illness study, public health nurse
African American patients, French Canadian ancestry, Asian American participants

Prefixes

Below is a list of common prefixes. They should always be solid except as noted below.

ante	inter	over	sub
anti	intra	post	super
co	macro	pre	supra
counter	micro	pro	trans
de	mid	pseudo	ultra
extra	multi	re	un
infra	non	semi	

Exceptions:

- before a capital letter (un-American, sub-Saharan)

- before an abbreviation or acronym (non-mRNA)
- before a numeral (pre-1970)
- to avoid confusion with a similar unhyphenated word (re-cover, re-creation)
- to avoid a confusing meaning, as in immunologic terms such as anti-rabbit, anti-goat, anti-mouse, anti-human. Goat anti-rabbit IgG means goat antiserum against rabbit IgG, not goat IgG that is antirabbit.

Even if letters are doubled, common prefixes are usually not joined by hyphens.

antiinflammatory
intraabdominal
nonnegotiable
posttraumatic

Always hyphenate the prefixes self- and cross-.

self-aware, self-sticking, cross-react

Suffixes

Similarly, most common suffixes are joined without a hyphen, such as -fold, -hood, -less, -like, -wide, and -wise, unless doing so creates an unclear or excessively long word, triples a consonant (bell-like), follows a proper noun (Whitman-like), or follows a number (10-fold, 2.5-fold).

Exception: Hyphenate –like for words with >1 syllable, unless the word ends with L.

Doglike
Canine-like
Bell-like

Hyphenate all words with the –borne suffix. Exceptions are those listed in Merriam-Webster dictionary as 1 word (airborne, foodborne, waterborne).

For words with a prefix that modifies a hyphenated term, use hyphen for primary construction and en-dash for secondary construction. In the following example, non- modifies mosquito-borne, not just mosquito so the en-dash is used.

Non–mosquito-borne, not nonmosquito-borne

Do not hyphenate after an adverb ending in –ly, even when used in a compound modifier preceding the word modified.

The rapidly rising temperature caused…

Do not hyphenate foreign phrases that are printed open in other circumstances (e.g., in vitro translation, in situ protein synthesis, in vitro–stimulated growth, in situ–synthesized proteins).

Do not hyphenate CDC mailstops.

Mailstop C12

Parentheses and Brackets

Nested parentheses sometimes appear in chemical names, usage is dependent on the author's discretion as to how to best use them.

(x(yy)x)

If a designation that already contains parentheses must be enclosed within parentheses, do not change the designation. Instead, use brackets in place of the outer set of parentheses.

Incorrect: another strain (strain 123[pXYZ])
Incorrect: another strain (strain 123(pXYZ))
Correct: another strain [strain 123(pXYZ)]

If a reference falls inside a parenthetical statement, separate it from other material with a semicolon. Do not enclose the reference number in brackets.

The procedure we used (the Lowry method; *12*)…

(*21*; Table 1)

When multiple tables or figures are enclosed within the same parentheses, use commas, not the word *and.*

(Tables 1, 2), not (Tables 1 and 2)
(Table 3, Figure 2), not (Table 3 and Figure 2)

Exception: use a semicolon between print and online tables and figures (with or without URL) or between figure panels and another graphic (figure or table).

(Table 3; online Appendix Figure 2)
(Figure 3, panel B; Table 4)

Avoid numbered lists if possible. If a numbered list is necessary for clarity, use a single parenthesis to avoid confusion with references. Separate elements with commas, unless commas are used within elements, in which case semicolons should be used.

Three procedures were instituted hospitalwide: 1) handwashing, which is associated with fewer nosocomial infections; 2) isolation precautions, according to established guidelines; and 3) mandatory screening of staff.

Periods

Periods are omitted from some abbreviations…

US citizens
Washington, DC

Dr Tannenbaum
PhD

…but not others.

et al.
e.g., i.e.
Joseph E. Filmore
S. aureus
St. Louis

Email addresses or URLs in references are not followed by a period.

For an ellipsis, use the Microsoft Word character (…) rather than 3 periods separated by spaces.

Use a period for a decimal (23.7), not a comma (European style).

Semicolons

Semicolons are used to separate 2 independent clauses when no conjunction is used.

Guadalupe is a young community; 81% of houses were built in the past 20 years.
but
Guadalupe is a young community, and 81% of houses were built in the past 20 years.

Semicolons are also used to separate items in a series if internal punctuation is present.

Exclusion criteria included tobacco use; history of asthma, COPD, or lung cancer; pregnancy or intent to become pregnant; and inability to give informed consent.

Virgules

Use of a virgule implies duality.

The physician/patient experience implies that the physician and patient are one and the same.

The physician–patient relationship implies 2 different persons.

Correct: HIV/TB co-infection (because they equally describe the co-infection)
Avoid: HIV/AIDS (because they are not the same)

He or she, not he/she
Father and son bowling league, not father/son bowling league

Avoid and/or; most of the time simply *and* or *or* is appropriate.

Medical Journal Style Preferences

Abbreviations, Acronyms, and Initialisms

An abbreviation is a truncated word; an acronym is made up of parts of the phrase it stands for and is pronounced as a word (ELISA, AIDS, GABA); an initialism is an acronym that is pronounced as individual letters (DNA, RT-PCR). For the purposes of this section, "abbreviation" will refer to all of these.

Avoid excessive abbreviations. Use standard abbreviations only; do not make up abbreviations. Spell out on first mention and use only if it occurs a substantial number of times (subject to editorial discretion).

Use STI for sexually transmitted infection but not for soft tissue infection (SSTI okay for skin and soft tissue infection).

Avoid SOB (shortness of breath, sulfur-oxidizing bacteria), if possible.

In text, use "number" when followed by a word, "no." when followed by a numeral.

We assigned Genbank accession numbers.
We submitted it under GenBank accession no. ABC123.

Do not introduce an abbreviation in a heading. Abbreviations can, however, be used in a heading if previously established.

Abbreviations should be written out in Affiliations and Acknowledgments (unless abbreviated in text). Affiliations may be abbreviated at the author's discretion in the Address for Correspondence.

When writing out affiliations, use the official spelling, which may or may not be American spelling. Words to look for are Programme vs. Program, Centre vs. Center, Organisation vs. Organization.

WHO, World Health Organization
OIE, World Organisation for Animal Health

SI units used with a numeral are never spelled out. The following are used without spelling out on first mention (list not comprehensive).

AM, PM (time; small caps, no periods)
AMP, ADP, ATP
AIDS
BCG (but at first mention specify *Mycobacterium bovis* BCG)
BLAST
bp, kb, kbp (when used with a numeral, but spell out when not used with a numeral)
CFU, PFU
CSIRO
DDBJ (DNA Data Bank of Japan)
DNA, RNA, cDNA, mRNA, tRNA, or rDNA (*Note:* c, complimentary; m, messenger; t, transfer; r, ribosomal)
dNTPs (deoxynucleotide triphosphates)
ELISA, PCR

EDTA
EMBL (European Molecular Biology Nucleotide Sequence Database)
HEPA filter
HEPES buffer
ICD
IU, U
M, F (in tables and figures only; write out male and female in text)
MDCK
MIC, MIC_{50}
N (concentration)
Pers. comm., unpub. data
ppb, ppm, ppt
rpm
SD, SE, SEM
sp., spp., sp. nov (with organism name), subsp. (preferred over ssp.)
Tris
UV
vol/vol, wt/vol, wt/wt

In instances when an abbreviation has become the de facto name, spelling out may cause confusion, particularly if the term appears only once. In these instances, write the abbreviation then spell out in parentheses, even if it appears only once in the article. On subsequent occurrences, use the abbreviation.

VDRL (Venereal Disease Research Laboratory) test

The article "a" or "an" should match the sound of the abbreviation or acronym, not the word for which it stands.

an HMO report, a MRSA infection (usually pronounced Mersa), a NICU (usually pronounced nick-you]

However, articles are often omitted in front of abbreviations.

CDC, not the CDC

Abbreviate the following in tables, figures, and in the Methods section of research articles. Exception: Write out in research articles if not preceded by number or if used alone; i.e., not part of a "recipe."

days	d
weeks	wk
months	mo
seconds	s
minutes	min
years	y

If CLSI is used in a reference name, then "formerly NCCLS" is not needed. But if the reference has only NCCLS, then add "CLSI (formerly NCCLS)."

Abbreviate Street when part of address, with no period.

265 Peachtree St, Atlanta, GA

Abbreviate Saint, with period.

St. Louis encephalitis

Abbreviate UK and USA when used as part of an address, e.g., affiliations and address for correspondence.

Define ICD code revisions as follows:

International Code of Diseases, 10th revision (ICD-10)

Use a capital H for human virus abbreviations, unless otherwise directed by author or precedent, e.g., HMPV, not hMPV.

Geographic Designations

Use the preferred English spelling indicated in Getty Thesaurus of Geographic Names (http://www.getty.edu/research/conducting_research/vocabularies/tgn/index.html).

Spell out names of states and US territories and possessions when they stand alone or follow a county name. Use postal abbreviations in references, addresses, or product identification.

SAS for Windows version 9.2 (SAS Institute Inc., Cary, NC, USA)

Abbreviate US and UK as adjectives; write out as nouns. When using in a location or address (e.g., affiliations), use USA and UK.

US citizens, citizens of the United States

Use accent for Réunion Island, no accent for Reunion state (Getty Thesaurus of Geographic Names)

United Kingdom: For England, list only "City, UK." For other countries, list "City, Country, UK"

London, UK
Cardiff, Wales, UK
Glasgow, Scotland, UK

For manufacturer locations, abbreviate state/province for all countries.

NSW (New South Wales)
QLD (Queensland)
WA (Western Australia)

See References for a list of cities that can be used without the state or country name in reference lists.

Scientific Nomenclature

Italics are used for bacterial and viral taxa at the level of family and below. All bacterial and many viral genes are italicized. Serovars of *Salmonella enterica* are not italicized.

For organisms other than bacteria, fungi, and viruses, scientific names of taxa above the genus level (families, orders, etc.) should be in roman type.

Because abbreviations for restriction endonucleases are derived from the name of the organism (usually bacteria) from which they are isolated, they should be italicized.

> *Sma*I was isolated from *Serratia marcescens*.
>
> *Taq* polymerase, which is used in PCRs, was isolated from *Thermus aquaticus*.

Use italics for genus and species in virus names.

> A/*Cygnus cygnus*/Germany/R65/2006

Italicize species, variety or subspecies, and genus when used in the singular. Do not italicize or capitalize genus name when used in the plural.

> *Listeria monocytogenes* is
>
> …listeria are; salmonellae; mycobacteria

The genus *Salmonella* consists of only 2 species: *S. enterica* (divided into 6 subspecies) and *S. bongori*. Most salmonellae encountered in EID will be serotypes (serovars) belonging to *S. enterica.* Put the genus and species in italics, followed by initially capped serotype in Roman (e.g., *Salmonella enterica* serotype Paratyphi. The genus shorthand "*S.*" should never be used without a species name

> Correct: S. enterica
>
> Correct: S. enterica serovar Typhimurium
>
> Correct: S. enterica ser. Typhimurium
>
> Incorrect: S. Typhimurium

Serotypes belonging to other subspecies are designated by their antigenic formulae following the subspecies name (e.g., *S. enterica* subspecies diarizonae 60:k:z or S. IIIb 60:k:z

For an article about 1 genus, can use abbreviation to introduce new species.

> We studied *Pseudomonas aeruginosa*, *P. putida*, *P. fluorescens*, and *P. denitrificans*.

For an article about multiple genera that each have a different abbreviation, can use abbreviation to introduce new species.

> We studied *Pseudomonas aeruginosa*, *Streptococcus pyogenes*, *P. putida*, and *S. felis*.

For an article about multiple genera, some of which have the same abbreviation, write out first mention of new species. Abbreviate later.

> We studied the relationship between *Trypanosoma cruzi* and *Triatoma infestans*.
> We found the relationship between *T. infestans* and *T. cruzi* to be...

For an article about several species of the same genus, the genus must be spelled out only in the title and at first use in the abstract, text, tables, and figures. It may subsequently be abbreviated for other species.

> We studied *Pseudomonas aeruginosa*, *P. putida*, and *P. fluorescens*.

However, if >1 genus begins with the same letter in an article, the full genus name must be spelled out the first time it is used with a new species. On subsequent mentions of a species, the genus may be abbreviated.

> Ticks were discovered on *Canis lupus*, *Canis latrans*, *Cerdocyon thous*, and *Chrysocyon brachyurus*, but *C. lupus* hosted the greatest number of ticks.

Bacteria

Italicize family, genus, species, and variety or subspecies. Begin family and genus with a capital letter. Kingdom, phylum, class, order, and suborder begin with a capital letter but are not italicized. If a generic plural for an organism exists (see Dorland's), it is neither capitalized nor italicized.

> *Mycobacterium tuberculosis*
> family *Mycobacteriaceae,* order Actinomycetales
> mycobacteria

Binary genus-species combinations are always used in the singular. Genus used alone (capitalized and italicized) is usually used in the singular, but it may be used in the plural (not italicized) if it refers to all species within that genus.

> *Salmonella typhi* is…
> Salmonellae are ubiquitous…

Do not use spaces for MRSA isolates.

> *Preferrred:* USA300
> *Avoid:* USA 300

Genes

Gene symbols are generally italicized, which helps clarify whether the writer is referring to a gene or to another entity that might be confused with a gene. Style for genes varies according to organism.

There is no real consensus on style of depicting acronyms for *Plasmodium* genes except when referred to as genes they are italicized; when referred to as proteins, they are not. The style is more dependent on the particular journal. In molecular microbiology the gene and species abbreviation, i.e., *pf,* is italicized and all of the term is in lowercase; *pfmdr1*, *pfatp6*, *pvdhfr*. This particular gene was presented in The Lancet as *PfATPase6*. The main idea is to be consistent thoughout the manuscript.

Acronyms for *Plasmodium* genes are italicized when referring to a gene. When referring to a protein they are not italicized.

Many virus gene names are written in italics and are traditionally 3 letters, lowercase, although some will be written in all caps, roman. No definitive rules exist for naming such genes, and you will see them described in a variety of different ways.

> *src* gene, *myc* gene, HA, NA

Bacteria gene names are always written in italics.

> *lac*Z gene

Fungus gene names are generally treated the same as virus gene names (i.e., 3 italicized letters, lowercase). With a multigene family, a numeric notation is included. When different alleles of the same gene are noted, the terminology allows for a superscript. Mitochondrial genes add an "mt" prefix to the 3- or 4-letter gene, which may or may not be in lowercase. Drug target genes are all capped, no italics.

> *msg*1, *msg*2, *msg*3 (multigene)
> *xyz*1 (different alleles of same gene)
> mt*LSU* (mitochondrial genes)
> DHPS and DHFR (drug target genes)

Insertion sequences are written as "IS" plus an italicized number (IS*6110*).

Human gene names are all caps, no italics. May be all uppercase Latin letters or a combination of uppercase letters and Arabic numbers, ideally no longer than 6 characters. Initial character is always a letter. No subscript, superscript, roman numerals, or Greek letters are used.

Similar gene names may exist for humans and mice. For example, AMA Manual of Style lists the following genes:

> β_2-microglobulin: B2m (mice) and B2M (humans)
> CD5 antigen: Cd5 (mice) and CD5 (humans)

A list of human gene names is available at http://www.gene.ucl.ac.uk. Underlining of names at this site does NOT indicate italics.

Proteins

Proteins, the combinations of amino acids that make up plants and animals, including humans, often have the same name as a gene but are not italicized and always begin with a capital letter. For example, 1 of the outer surface proteins of *Borrelia burgdorferi* is named outer surface protein A. It is encoded by *osp*A (the gene), and the protein is OspA.

Proteins often have common names, e.g., β-galactosidase is the gene product of *lac*Z.

How to tell difference between proteins and genes? If a term is combined with 1 of the following words, it is probably describing a gene:

> Promoter (e.g., P2 core promoter [of myc gene]); promoters are parts of genes, not proteins
> Terminator, operator, attenuator sites

If term is combined with one of following words, it is probably describing a protein.

> Repress—a protein represses, a gene doesn't.
> React—a protein reacts, a gene doesn't
> Heterodimerization
> Elevated levels of ____ [A common usage error is for authors to write "elevated myc" when they mean: "elevated levels of myc."]

Italicizing MMR is another common usage error. This term, which means "mismatch repair," is never a gene, just an abbreviation for a process. But you may see "Mice with specific alterations in a number of MMR genes have been developed…"

Restriction Enzymes

Restriction enzymes are identified with a 3-letter designation of the bacterium from which they are isolated, plus a single-letter strain designation (as needed) and a roman numeral showing the order in which it was identified. The 3-letter bacterium designation should begin with a capital letter and is italicized; the rest of the enzyme name is set roman.

> *Sma*I, *Eco*RI, *Bam*HI

Viruses

Italics

A virus is not a species; a virus belongs to a species. Italicize species, genus, and family of a virus when used in a taxonomic sense. Note however, that it is fine to not mention taxonomy of a virus, especially one like dengue or polio that is well known.

Do not italicize a virus name when used generically. If you capitalize a virus name (other than one that has a proper name in it so that you must capitalize it), then you need to italicize it.

> bovine kobuviruses, a kobuvirus, kobuviruses, but *Kobuvirus* spp.

The presence of West Nile virus was confirmed in mosquitoes and dead crows. (AMA Style Guide, p. 758).

Epidemic transmission of West Nile virus (WNV)…prompted aerial application.

West Nile virus is a member of the genus *Flavivirus.* (AMA Style Guide p. 758)

We present a potential exposure to an Ebola virus that occurred in a BSL-4 laboratory.

Recent attention has been drawn to Toscana virus (family *Bunyaviridae*, genus *Phlebovirus*, species *Sandfly fever Naples virus*) in countries…

Acronyms

It is permissible to use an acronym for a virus, e.g., WNV for West Nile virus, after defining it. However, do not abbreviate a species (including the species *West Nile virus*). In short, if you do italicize, don't use an acronym.

Correct: West Nile virus (WNV; family *Flaviviridae*, genus *Flavivirus*) is transmitted to humans [here the virus is being transmitted, not the species name; so West Nile virus is roman type and may be abbreviated].

For viruses that begin with a Greek letter, write it out and close up space between the letter and the rest of the word.

Betaherpesvirus

Influenza

For influenza virus isolates, include the virus subtype, write out in full the host of origin (omit if human), include the site of isolation and strain number, and use the 4-digit year if the virus was isolated in 2000 or later. For viruses isolated during the 1900s, use the 2-digit year.

Incorrect: dk/Laos/3295/06
Correct: A/duck/Laos/3295/2006

Italicize genus and species in virus names.

A/*Cygnus cygnus*/Germany /R65/2006

The formal nomenclature for the designation of influenza viruses was revised and published by the World Health Organization (WHO). (WHO. A revision of the system of nomenclature for influenza viruses: a WHO memorandum. Bull.World Health Organ. 1980;58;585–9). The full and correct nomenclature includes the type of virus (A, B, or C), the host of origin (except for human), the geographic site of isolation, the strain

number, the year of isolation (4-digit year for viruses isolated in 2000 or later; 2-digit year for viruses isolated during the 1900s), and the subtype (16 possible H and 9 possible N subtypes).

> Thus a type A virus isolated in 1995 from a Mallard duck in Memphis Tennessee with a strain number of 123 and an H5N1 subtype is designated:
> Influenza A/mallard/Memphis/123/95 (H5N1).

Site can be abbreviated in human viruses, as in the following for which PR (Puerto Rico) and FM (Fort Monmouth) are well known and not written out.

> Influenza viruses used were A/PR/8/34 (H1N1), A/FM/1/47 (H1N1), and A/Thailand/SP-83/2004 (H5N1).

The H and N subtype should always be in parentheses when it follows "influenza."

> Influenza virus A (H5N1)

When used alone, subtypes do not need parentheses but must be accompanied by the word "subtype."

> The H5N1 subtype is…
> Different subtypes, such as H5N1…

Note: H5N1 is neither a virus, nor a disease; it is merely a subtype designation of influenza virus type A. If you want to drop anything later in the article, you may leave out the subtype designation. If only 1 virus is being studied you can say in the Methods that influenza virus means influenza virus A subtype H5N1, and leave the subtype out from then on.

Influenza virus (H5N1) can have high or low pathogenicity. It is not redundant to include "highly pathogenic" in the title.

For information on this virus nomenclature style, adopted by several international organizations, see International Committee on Taxonomy of Viruses (www.ncbi.nlm.nih.gov/ICTVdb/Ictv/index.htm).

Units of Measure

A quantity indicated by a unit of measure is singular, even when the unit is spelled out, except in the case of nonabsolute or informal units.

> 10 mg was added
> 5 mL was injected
> 220 cpm of radioactivity was detected
> Twelve milliliters was injected, but 10 drops were added

Change mM to mmol/L.

Change µM to µmol/L

Change micron (outdated term) toµm.

Confidence Intervals

Confidence intervals (CIs) are preferred over confidence limits. Use an en-dash in a confidence interval unless the range includes a negative number; for negative confidence intervals, use the word "to."

(95% CI 0.8–1.6)
(95% CI –1.3 to 4.5)

Currency

Currency may be converted to US dollars or given in local units. The symbols $, £, and € may be used without defining (although specify US $, Can $, or Aus $). Other symbols or abbreviations should be defined; inclusion of a conversion factor should be at the author's discretion.

The approximate cost per case of disease prevented was US $150.
We analyzed expenses in Japanese yen (¥). The cost of treatment was ≈ ¥10,000.
The unit used in our calculations was the Chinese renminbi (RMB) (RMB 1 ≈ US $0.13).

Dates

Spell out months in text. In tables, figures, and references, abbreviate months with the first 3 letters.

In running text, write the date as Month DD, YYYY. Set the year off in commas only if it is used with both month and day.

We conducted a study in January 2003 on the prevalence…
We began a study on January 3, 2003, on the prevalence…

In tables and figures, avoid the constructions MM/DD/YYYY and DD/MM/YYYY (because usage is not consistent worldwide and they can be confused with each other). In references and in the body of tables, dates should be written as YYYY Mon DD (e.g., 2006 Sep 1).

Digits versus Spelled-out Numbers

Numerals, including values <10, should be used to express numbers in most circumstances. However, do not use numerals for

- numbers that begin a sentence, title, subtitle, or heading

- common fractions
- idiomatic expressions
- numbers used as pronouns
- other uses of the number "one" in running text
- ordinals first through ninth
- numbers spelled out in quotations or published titles

The relative risk of exposed participants was 3 times that of the controls.

In the second phase of the study, 3 of the investigators administered the 5 tests to the 7 remaining participants.

Five species were identified. (In this instance, rewording the sentence may be preferable: We identified 5 species.)

The investigators compared a new laboratory method with the standard one (not 1).

In titles, use numerals unless the number is the first word.

Comparison of 2 Methods to Detect publication Bias in Meta-analyses

If 2 numbers appear adjacent to each other, try to rewrite the sentence. If this occurrence is unavoidable, write out one of them.

We sterilized five 50-mL test tubes.

When a unit of measure follows a number that begins a sentence, it too must be written out, even if the same unit is abbreviated elsewhere in the same sentence.

Two micrograms was administered on day 1, followed by 1 µg on day 2.

Equations

In equations, single-letter abbreviations and variables (except for p values) are italicized; surrounding parentheses are not.

Displayed equations should be used only for complex equations that cannot be clearly run into the text. Displayed equations and text are not separated with punctuation.

The value is calculated as follows:

$$n = \frac{\ln 1 - \pi\,(\Sigma 1y\ 3x + 1)}{y}$$

Simpler equations should be run into text and set off with a comma.

Distance is calculated as $D = x(y)$, where D = distance…

Text equations use initial capital letters for each element and no end punctuation.

(No. new cases/No. persons at risk)

Fractions

Although decimals are preferred (and required with SI units), for less precise measurements, mixed fractions may be used.

The patient was hospitalized for 5½ days.

Common fractions are expressed with words. Hyphens are used only if the fraction modifies a noun.

approximately one fourth of the population
a two-thirds majority

Mathematical Symbols

Unless the meaning is obscured, symbols are preferred to text in mathematical expressions. Note: Do not automatically substitute ≤ for "up to" or "as high as" because it could obscure author's emphasis on the highest value.

>12 persons, not more than 12 persons
≤4 days, not no more than 4 days
≥80 mm Hg, not at least 80 mm Hg
≈70 geese, not approximately 70 geese

Use words rather than symbols for nonmathematical expressions (disregard this rule for tables and parenthetical expressions), and do not allow symbols to stand for the main verb in a clause.

ribavirin plus interferon, not ribavirin + interferon
where p was <0.05…, not where p<0.05…

Symbols (except for <, >, <, and >) are written with a space on either side when they indicate mathematical equations. In all other contexts, the symbol should be closed up with associated numbers or variables.

$14x + 27y = z$
45% ± 2%
p<0.01
–70°C
G+C content
densities of $<10^3$ cells per cm^2
magnification ×200, 4×10^6
the MIC was <8.0 g/mL

If a symbol begins a heading (e.g., column heading in table), capitalize the next word

% Infected

95% Confidence interval

Numbers

Use commas in all numbers with >4 digits, except in dates and in numbers that represent a position (as with a page number or amino acid)

2,000 people by 2002
We found a Leu→Phe substitution at amino acid 1242.

Use a combination of numerals and words to express rounded large numbers and consecutive numerical expressions.

The disease affects 5 million to 6 million persons.
Study participants were given twenty 5-mL syringes.

For all decimals between –1 and 1 (≠0), use a leading zero to the left of the decimal.

$p<0.05$ not $p<.05$

Ordinals

Ordinals generally express order or rank rather than quantity. Ordinals first through ninth are spelled out. Ordinals greater than ninth are expressed as numerals, except at the beginning of sentence, title, or heading.

In a series that includes an ordinal greater than ninth, all ordinals are expressed as numerals.

Samples were taken during the 2nd, 4th, 8th, and 16th weeks after illness onset.

Percentages

Always use a digit and the % symbol with percentages, unless it is the first word in a sentence.

Forty-three percent of our sample tested positive.

Percentages should immediately follow the number, not the phrase.

The disease was found in 12 (50%) of the 24 children.

Ranges

Limit to specific statistical meaning. Connect ranges with an en-dash, unless introduced by the preposition "from," in which case use a joining conjunction is needed, e.g., "from… to" or "from… through." Be careful with "between… and" constructions because they exclude both endpoints.

> Participants were 18–20 years of age.
> from 5% to 10%
> from 1984 through 1990 (not between 1984 and 1990, unless 1984 and 1990 are not included)

The "from… to" construction may also be used for clarity if one or both of the limits in a range are negative.

> from –70° to –40°

In ranges of time, particularly years, prepositions and conjunctions are critical in determining the actual amount of time included.

> Between 1999 and 2001 = 1 year
> From 1999 to 2001 = 2 years
> From 1999 through 2001 = 3 years

When the range of years is not necessarily a calendar year and indicates only 1 year (e.g., flu season, fiscal year, school year), can truncate the second year.

> 2005–06 flu season
> 2004–05 school year

Repeat units in ranges if the unit is set closed up with the digit, but do not repeat units that are separated with a space.

> from 40ºC to 70ºC
> 25%–50%
> 50–100 μL
> from 80 to 89 mm Hg

Ratios

Use a colon to express a ratio or dilution. Titers are expressed as the reciprocal of the dilution.

> (length:width, 2:1)
> The end IgG titer was 256 after a serial 1:2 dilution.

A ratio may also be expressed as a percentage. Note that a ratio becomes a rate only when an element of time is involved (such as number of deaths per population per year).

> Seven of the 12 patients died; death ratio was 58.3%.
> During 2000–2004, the average death rate was 12.7% per year.

SI Units

Use SI units for units of measure, for example:

Unit name	SI symbol
centimeter	cm
cubic millimeter	mm^3
dalton	Da
deciliter	dL
gram	g
kilodalton	kDa
kilogram	kg
liter	L
meter	m
microgram	µg
microliter	µL
milligram	mg
milliliter	mL
millimeter	mm
mole	mol
molar	mol/L

However, some medical measurements follow other conventions, e.g., blood pressure (mm Hg), oxygen pressure (cm H_2O), temperature (°C). To report both SI and conventional units, repeat the number in parentheses along with the unit of measure.

20 mmol/L (20 mEq/L)