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Welcome to your Ethics Toolkit from Elsevier.

Whether you are just starting out in your career or are a more seasoned researcher, you are no doubt very much aware of the importance of ethical conduct.

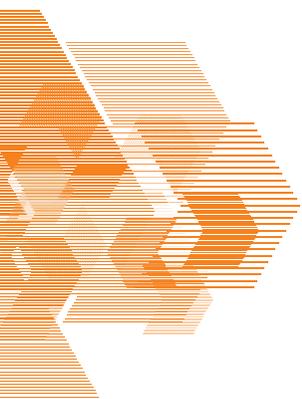
Plagiarism, research fraud, undisclosed conflicts of interest... these are just a few of the violations that can threaten not only the integrity of the science, but also one's standing in the scientific community. An understanding of the ethical boundaries and "rules" is paramount to ensuring your work and career get off to the best start possible.

It is with this in mind that the **Ethics in Research & Publication Program** was created for early-career researchers by Elsevier and an independent panel of experts, well-versed in ethical issues and how to solve them. The program offers resources to help you navigate sensitive and challenging situations, including a rare glimpse into what it's like to be a victim of misconduct, from those who have experienced it first-hand.

Elsevier's Ethics Toolkit contains introductory materials to help you get started, and you can visit the **Ethics in Research & Publication** website at ethics.elsevier.com and download the files mentioned in this Toolkit. Plus you will also find more tools including: webinars hosted by the experts, in-depth personal interviews, topical videos, white papers and timely articles on ethics, and an expanded interactive, self-assessment version of the Ethics Quiz. You can also find Spanish and Chinese translations of the factsheets there.

We hope you'll find this program useful as you build your own body of work and reputation in the scientific community, and we wish you all best in your endeavors.

Sincerely,



Catriona Fennell

Catriona Fennell

Director of Publishing Services for STM Journals at Elsevier

Authorship

Naming authors on a scientific paper ensures that the appropriate individuals get credit, and are accountable, for the research. Deliberately misrepresenting a scientist's relationship to their work is considered to be a form of misconduct that undermines confidence in the reporting of the work itself.¹

While there is no universal definition of authorship,¹ an "author" is generally considered to be an individual who has made a significant intellectual contribution to the study.²

According to the guidelines for authorship established by the International Committee of Medical Journal Editors (ICMJE), "All persons designated as authors should qualify for authorship, and all those who qualify should be listed."

Three basic criteria must collectively be met to be credited as an author:²

- Substantial contribution to the study conception and design, data acquisition, analysis, and interpretation.
- Drafting or revising the article for intellectual content.
- Approval of the final version.

The following are some general guidelines, which may vary from field to field:

- The order of authorship should be "a joint decision of the coauthors".²
- Individuals who are involved in a study but don't satisfy the journal's criteria for authorship, should be listed as "Contributors" or "Acknowledged Individuals". Examples include: assisting the research by providing advice, providing research space, departmental oversight, and obtaining financial support.^{2,3}
- For large, multi-center trials, the list of clinicians and centers is typically published, along with a statement of the individual contributions made. Some groups list authors alphabetically, sometimes with a note to explain that all authors made equal contributions to the study and the publication.^{1,2}

Three types of authorship are considered unacceptable:

- "Ghost" authors, who contribute substantially but are not acknowledged (often paid by commercial sponsors);
- "Guest" authors, who make no discernible contributions, but are listed to help increase the chances of publication;
- "Gift" authors, whose contribution is based solely on a tenuous affiliation with a study.^{1,3,4}

When not appropriately addressed, authorship issues can lead to dispute. Some disputes are based on misconduct (such as lying about one's role); some stem from questions of interpretation, such as the degree to which a person's contribution can be considered "substantial," and if authorship is justified.¹

Other potential issues could include: being involved in a study, but not listed as an author or contributor; someone taking your idea and publishing a paper claiming full authorship; and finding your name on a publication without your permission.

If a complaint is filed over a dispute, an investigation may be conducted with the journal editor and author's institution to reach a resolution.

Because of the potential for ambiguity and confused expectations, it is strongly advised that before the research begins, a meeting take place to document how each person will be acknowledged.¹

Issues around authorship can be complex and sensitive. Early career researchers who encounter such situations may fear they will jeopardize their reputation and career if they speak up.¹ Take the time to fully understand each journal's guidelines for authorship, and industry requirements. If you find yourself in a challenging situation that you are not sure how to handle, consult with a trusted mentor or supervisor.

Guide to Authorship Disputes and How to Prevent Them*

| Action | What is it? | Is it unethical? | What should you do? |
|---|---|---|--|
| Misrepresenting a scientist's relationship to their work | <p>Listing names of people who took little or no part in the research, omitting names of people who did take part,¹ or the ordering of a byline that indicates a greater level or participation in the research than is warranted.³</p> <p>This includes submitting a manuscript without the permission of an author/contributor.¹</p> | <p>Yes. According to ICMJE: "All persons designated as authors should qualify for authorship, and all those who qualify should be listed."¹</p> <p>Misrepresentation also includes "ghost," "guest" and "gift" authors.²</p> | <ul style="list-style-type: none"> ■ Review the journal's Instructions for Authors before submitting a paper and be forthright about all contributors. ■ This includes "substantial" contributions, paid writers, and any others who contributed to the study. ■ To avoid disputes, set clear expectations from the outset about who is doing what and how authorship will be handled. ■ If you feel you have been treated unfairly in regards to authorship, seek the counsel of a trusted advisor. |
| Ghost Authorship | <p>This usually refers to professional writers (often paid by commercial sponsors) whose role is not acknowledged.</p> <p>Unattributed contributions to data analyses may also constitute ghost authorship.³</p> | <p>Yes. Not acknowledging a writer's contribution is considered dishonest.</p> | <ul style="list-style-type: none"> ■ Professional writers who participated only in drafting of the manuscript and did not have a role in the design or conduct of the study or the interpretation of results should be identified in the acknowledgements section along with information about potential conflicts of interest, including whether they were compensated for the writing assistance and, if so, by which entity(ies).³ ■ Consult the authorship guidelines of the journal. ■ Consult other helpful resources including: ICMJE,² World Association of Medical Editors (WAME),⁴ European Medical Writers Association (EMWA),⁵ and the American Medical Writers Association (AMWA).^{6,3} |
| Gift and Guest Authorship | <p>Authorship based on a tenuous affiliation with the study or solely on an expectation that inclusion of a particular name will improve the chances that the study will be published.</p> | <p>Yes. Guest and gift authors make no discernible contributions.³</p> | <ul style="list-style-type: none"> ■ Any "gift" and "guest" contributions should be vetted prior to submitting a paper. ■ If in doubt about whether a contribution is acceptable or not, consult the authorship guidelines of the journal and the editor. |

*When in doubt, always consult with your professor, advisor, or someone in a position of authority who can guide you to the right course of action.

References

1. Committee on Publication Ethics (COPE). Committee on Publication Ethics (COPE). How to handle authorship disputes: a guide for new researchers. 2003. Available at: publicationethics.org/files/2003pdf12.pdf. Accessed on September 12, 2012.
2. International Committee of Medical Journal Editors. Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Ethical Considerations in the Conduct and Reporting of Research: Authorship and Contributorship. Available at: icmje.org/ethical_1author.html. Accessed on September 12, 2012.
3. Scott-Lichter D and the Editorial Policy Committee, Council of Science Editors. CSE's White Paper on Promoting Integrity in Scientific Journal Publications, 2012 Update. 3rd Revised Edition. Wheat Ridge, CO: 2012. Available at: councilscienceeditors.org/wp-content/uploads/entire_whitepaper.pdf. Accessed on September 14, 2012.
4. World Association of Medical Editors (WAME) policy statement on ghost writing initiated by commercial companies. Available at: wame.org/policies-and-resources-ghost. Accessed on September 14, 2012.
5. Jacobs A, Wager E. European Medical Writers Association (EMWA) Guidelines on the role of medical writers in developing peer-reviewed publications. *Curr Med Res Opin.* 2005;21:317-321. Available at: emwa.org/Mum/EMWAguidelines.pdf. Accessed on September 14, 2012.
6. American Medical Writers Association (AMWA). Position statement on the contribution of medical writers to scientific publications. Available at: amwa.org/about_med_communications. Accessed on September 14, 2012.

Conflict of Interest

Transparency and objectivity are essential in scientific research and the peer review process.

When an investigator, author, editor, or reviewer has a financial/personal interest or belief that could affect his/her objectivity, or inappropriately influence his/her actions, a potential conflict of interest exists. Such relationships are also known as dual commitments, competing interests, or competing loyalties.^{1,2}

The most obvious conflicts of interest are financial relationships such as:

- **Direct:** employment, stock ownership, grants, patents.
- **Indirect:** honoraria, consultancies to sponsoring organizations, mutual fund ownership, paid expert testimony.²

Undeclared financial conflicts may seriously undermine the credibility of the journal, the authors, and the science itself.² An example might be an investigator who owns stock in a pharmaceutical company that is commissioning the research.

Conflicts can also exist as a result of personal relationships, academic competition, and intellectual passion.² An example might be a researcher who has:

- A relative who works at the company whose product the researcher is evaluating.
- A self-serving stake in the research results (e.g. potential promotion/ career advancement based on outcomes).
- Personal beliefs that are in direct conflict with the topic he/she is researching.

Not all relationships represent a true conflict of interest—conflicts can be potential or actual.^{1,2} Some considerations that should be taken into account include: whether the person's association with the organization interferes with their ability to carry out the research or paper without bias; and whether the relationship, when later revealed, make a reasonable reader feel deceived or misled.³

Full disclosure about a relationship that could constitute a conflict—even if the person doesn't believe it affects their judgment—should be reported to the institution's ethics group and to the journal editor to which a paper is submitted. All publishers require disclosure in the form of a cover letter and/or footnote in the manuscript.

A journal may use disclosures as a basis for editorial decisions and may publish them if they are believed to be important to readers in judging the manuscript. Likewise, the journal may decide not to publish on the basis of the declared conflict.

According to the U.S. Office of Research Integrity, having a conflict of interest is not in itself unethical, and there are some that are unavoidable.¹ Full transparency is always the best course of action, and, if in doubt, disclose.

Guide to Conflict of Interest and How to Prevent It*

| Action | What is it? | Is it unethical? | What should you do? |
|--|---|---|--|
| An undisclosed relationship that may pose a conflict of interest. | Neglecting to disclose a relationship with a person or organization that could affect one's objectivity, or inappropriately influence one's actions. | Yes. Some relationships do not necessarily present a conflict. Participants in the peer-review and publication process must disclose relationships that could be viewed as potential conflicts of interest. ² | <ul style="list-style-type: none"> ■ When submitting a paper, state explicitly whether potential conflicts do or do not exist. ■ Indicate this in the manuscript on a conflict-of-interest notification page, with additional detail. If necessary, include a cover letter with the manuscript. ■ Investigators must disclose potential conflicts to study participants and should state in the manuscript whether they have done so. ■ Reviewers must also disclose any conflicts that could bias their opinions of the manuscript.² |
| An undisclosed funding source that may pose a conflict of interest. | Neglecting to disclose the role of the study sponsor(s), if any, in study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. | Yes. Undeclared financial conflicts may seriously undermine the credibility of the journal, the authors, and the science itself. ² | <ul style="list-style-type: none"> ■ When submitting a paper, a declaration (with the heading 'Role of the funding source') should be made in a separate section of the text and placed before the References. ■ Describe the role of the study sponsor(s), if any, in study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. ■ Editors may request that authors of a study funded by an agency with a proprietary or financial interest in the outcome sign a statement, such as "I had full access to all of the data in this study and I take complete responsibility for the integrity of the data and the accuracy of the data analysis."² |

*When in doubt, always consult with your professor, advisor, or someone in a position of authority who can guide you to the right course of action.

References

1. Office of Research Integrity U.S. Department of Health and Human Services. A brief overview on Conflict of Interests. Available at: ori.hhs.gov/plagiarism-35. Accessed on September 3, 2012.
2. International Committee of Medical Journal Editors. Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Ethical Considerations in the Conduct and Reporting of Research: Conflicts of Interest. Available at: icmje.org/conflicts-of-interest/. Accessed on September 2, 2012.
3. Committee on Publication Ethics (COPE). Committee on Publication Ethics (COPE). Guidelines on Good Publication Practice. 1999. Available at: publicationethics.org/resources/guidelines/. Accessed on September 6, 2012.

Plagiarism

One of the most common types of publication misconduct is plagiarism—when one author deliberately uses another's work without permission, credit, or acknowledgment. Plagiarism takes different forms, from literal copying to paraphrasing some else's work and can include:

- Data
- Words and Phrases
- Ideas and Concepts

Plagiarism has varying different levels of severity, such as:

- How much of someone's work was taken—a few lines, paragraphs, pages, the full article?
- What was copied—results, methods, or introduction section?

When it comes to your work, always remember that crediting the work of others (including your advisor's or your own previous work) is a critical part of the process. You should always place your work in the context of the advancement of the field, and acknowledge the findings of others on which you have built your research.

Guide to Plagiarism and How to Prevent It*

| Action | What is it? | Is it unethical? | What should you do? |
|----------------------------|---|---|--|
| Literal Copying | Reproducing a work word for word, in whole or in part, without permission and acknowledgment of the original source. | Yes. Literal copying is only acceptable if you reference the source and put quotation marks around the copied text. | <ul style="list-style-type: none"> ■ Keep track of sources you used while researching and where you used it in your paper. ■ Make sure you fully acknowledge and properly cite the original source in your paper. ■ Use quotation marks around word-for-word text and reference properly. |
| Substantial copying | This can include research materials, processes, tables, or equipment | Yes. "Substantial" can be defined as both quantity and quality of what was copied. If your work captures the essence of another's work, it should be cited. | <ul style="list-style-type: none"> ■ Ask yourself if your work has benefited from the skill and judgment of the original author? ■ The degree to which you answer "yes" will indicate whether substantial copying has taken place. If so, be sure to cite the original source. |
| Paraphrasing | Reproducing someone else's ideas while not copying word for word, without permission and acknowledgment of the original source. | Yes. Paraphrasing is only acceptable if you properly reference the source and make sure that you do not change the meaning intended by the source. | <ul style="list-style-type: none"> ■ Make sure that you understand what the original author means. ■ Never copy and paste words that you do not fully understand. ■ Think about how the essential ideas of the source relate to your own work, until you can deliver the information to others without referring to the source. ■ Compare your paraphrasing with the source, to make sure you retain the intended meaning, even if you change the words. |
| Text-recycling | Reproducing portions of an author's own work in a paper, and resubmitting it for publication as an entirely new paper. | Yes. See our separate factsheet on duplicate submission. | <ul style="list-style-type: none"> ■ Put anything in quotes that is taken directly from a previously published paper, even if you are reusing something in your own words. ■ Make sure to reference the source accordingly. |

*When in doubt, always consult with your professor, advisor, or someone in a position of authority who can guide you to the right course of action.

References

1. Committee on Publication Ethics Guidelines on Good Publication Practice. Committee on Publication Ethics (COPE). 1999. Accessed: June 15, 2012.
2. Elsevier. Publishing Ethics Resource Kit (PERK). Available at: elsevier.com/wps/find/editorshome.editors/Introduction. Accessed: June 11, 2012.

Simultaneous submission

Authors have an obligation to make sure their paper is based on original—never before published—research. Intentionally submitting or re-submitting work for duplicate publication is considered a breach of publishing ethics.

- Simultaneous submission occurs when a person submits a paper to different publications at the same time, which can result in more than one journal publishing that particular paper.
- Duplicate/multiple publication occurs when two or more papers, without full cross-reference, share essentially the same hypotheses, data, discussion points, and/or conclusions.¹ This can occur in varying degrees: literal duplication, partial but substantial duplication, or even duplication by paraphrasing.²

One of the main reasons duplicate publication of original research is considered unethical, is that it can result in "inadvertent double-counting or inappropriate weighting of the results of a single study, which distorts the available evidence".³

There are certain situations in which the publishers of two journals might agree in advance to use the "duplicate work".³ These include:

- Combined editorials (e.g. about a plagiarism case involving the two journals).
- (Clinical) guidelines, position statements.
- Translations of articles—provided that prior approval has been granted by the first Publisher, and that full and prominent disclosure of its original source is given at the time of submission.²

The main rule of thumb: articles submitted for publication must be original and must not have been submitted to any other publication. At the time of submission, authors must disclose any details of related papers (also when in a different language), similar papers in press, and translations.

While the boundaries around duplicate publication may vary from field to field, all publishers have requirements for submitting papers. It's a good idea to make sure you fully understand them to avoid violating the process.

Guide to Duplicate Submission/Publication and How to Prevent It*

| Action | What is it? | Is it unethical? | What should you do? |
|--|---|--|---|
| Simultaneous submission | Submitting a paper to two or more journals at the same time. | Yes. Submission is not permitted as long as a manuscript is under review with another journal. | <ul style="list-style-type: none"> ■ Avoid submitting a paper to more than one publication at a time. ■ Even if a submitted paper is currently under review and you do not know the status, wait to hear back from the publisher before approaching another journal, and then only if the first publisher will not be publishing the paper. |
| Duplicate publication | When an author submits a paper or portions of his or her own paper that has been previously published to another journal, without disclosing prior submission(s). | Yes. | <ul style="list-style-type: none"> ■ Avoid submitting a previously published paper for consideration in another journal. ■ Avoid submitting papers that describe essentially the same research to more than one journal. ■ Always provide full disclosure about any previous submissions (including meeting presentations and posting of results in registries) that might be regarded as duplicate publication.³ ■ This should include disclosing previous publication of an abstract during the proceedings of meetings.¹ |
| Duplication by Paraphrasing or "Text-recycling" | When an author writes about his or her own research in two or more articles from different angles or on different aspects of the research without acknowledgment of the original paper. | Yes. Creating several publications from the same research, is considered manipulative. See our separate factsheet on plagiarism/text recycling . | <ul style="list-style-type: none"> ■ Put anything in quotes that is taken directly from a previously published paper, even if you are reusing something in your own words. ■ Make sure to reference the source accordingly. |
| Translations of a paper published in another language | Submitting a paper to journals in different languages without acknowledgment of the original paper. | Yes. Translated articles are acceptable when all necessary consents have been obtained from the previous publisher of the paper in any other language and from any other person who might own rights in the paper. | <ul style="list-style-type: none"> ■ If you want to submit your paper to journal that is published in a different country or a different language, ask the publisher if this is permissible. ■ At the time of submission, disclose any details of related papers in a different language, and any existing translations. |

*When in doubt, always consult with your professor, advisor, or someone in a position of authority who can guide you to the right course of action.

References

1. Committee on Publication Ethics Guidelines on Good Publication Practice. Committee on Publication Ethics (COPE). 1999. Accessed: June 15, 2012.
2. Elsevier. Publishing Ethics Resource Kit (PERK). Available at: elsevier.com/wps/find/editorshome.editors/Introduction. Accessed: June 15, 2012.
3. International Committee of Medical Journal Editors. Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Publishing and Editorial Issues Related to Publication in Biomedical Journals: Overlapping Publications. Available at: icmje.org/conflicts-of-interest/. Accessed: June 8, 2012.

Research fraud

Research fraud is publishing data or conclusions that were not generated by experiments or observations, but by invention or data manipulation. There are two kinds in research and scientific publishing:

- **Fabrication.** Making up research data and results, and recording or reporting them.¹
- **Falsification.** Manipulating research materials, images, data, equipment, or processes. Falsification includes changing or omitting data or results in such a way that the research is not accurately represented.¹ A person might falsify data to make it fit with the desired end result of a study.

Both fabrication and falsification are serious forms of misconduct because they result in a scientific record that does not accurately reflect observed truth.²

Certain instances of fraud can be easy to spot—for example if a referee knows for a fact that a particular laboratory does not have the facilities to conduct the research that was published. Or, if it's obvious an image looks manipulated or is made up from several different experiments. The data from the control experiments might be "too perfect". In such situations, an investigation would be conducted to determine if an act of fraud was committed.³ Digital image enhancement is acceptable. However, a positive relationship between the original data and the resulting image must be maintained to avoid creating unrepresentative data or the loss of meaningful signals. If a figure has been significantly manipulated, you must note the nature of the enhancements in the figure legend or in the 'Materials and Methods' section.

What about unintentional error that comes across as misconduct?

According to the U.S. Office of Research Integrity, research misconduct does not include honest error or differences of opinion.¹ But it's best never to have the integrity of your work come into question. As a researcher and author, it is essential to understand what constitutes appropriate data management (including data collection, retention, analysis and reporting) in accordance with responsible conduct of research.⁴

To help prevent fraud, most publishers have strict policies on manipulation of images and access to the reported data. It's a good idea to familiarize yourself with them before you submit a paper.

Some general guidelines (which may vary from field to field, publisher to publisher) **include:**⁵

Manipulation of images

- Images may be manipulated for improved clarity only.
- No specific feature within an image may be enhanced, obscured, moved, removed, or introduced.
- Adjustments of brightness, contrast, or color balance are usually acceptable as long as they do not obscure or eliminate any information present in the original.

Data access & retention

- Authors may be asked to provide the raw data in connection with a paper for editorial review. Therefore all data for a specific paper should be retained for a reasonable time after publication. There should be named custodian for the data.
- Studies undertaken in human beings, e.g. clinical trials have specific guidelines about the duration of data retention.

Guide to Fraud and How to Prevent It*

| Action | What is it? | Is it unethical? | What should you do? |
|---------------------------------|---|---|--|
| Manipulating data | Intentionally modifying, changing, or omitting data. | Yes. Comprehensive guidelines on data management and ethical handling of digital images, can be found at The Office of Research Integrity. http://ori.hhs.gov/images/ddblock/data.pdf | <ul style="list-style-type: none"> ■ Never tamper with or change data. Keep meticulous records of your data. ■ Records of raw data should be accessible in case an editor asks for them-even after your paper has been published. ■ Understand the publisher's policies on data before you submit a paper. |
| Manipulating data images | This can include research materials, processes, tables, or equipment. | Yes. Your manuscript may be rejected if the original data are not presented or misrepresented. | <ul style="list-style-type: none"> ■ If you need to adjust an image to enhance clarity, make sure you know what is considered acceptable before submitting your paper. ■ Even if the image manipulations are considered acceptable, report it to the publication prior to submitting your paper.² ■ Review any data images used to support your paper against the original image data to make sure nothing has been altered.² |

*When in doubt, always consult with your professor, advisor, or someone in a position of authority who can guide you to the right course of action.

References

1. Office of Research Integrity U.S. Department of Health and Human Services. Definition of Research Misconduct. Available at: ori.hhs.gov/definition-misconduct. Accessed: June 12, 2012.
2. Scott-Lichter D and the Editorial Policy Committee, Council of Science Editors. CSE's White Paper on Promoting Integrity in Scientific Journal Publications, 2012 Update. 3rd Revised Edition. Wheat Ridge, CO: 2012. Available at: councilscienceeditors.org/resource-library/editorial-policies/white-paper-on-publication-ethics/acknowledgments/. Accessed: June 11, 2012.
3. Elsevier. Publishing Ethics Resource Kit (PERK). Available at: elsevier.com/wps/find/editorshome.editors/Introduction. Accessed: June 11, 2012.
4. Office of Research Integrity U.S. Department of Health and Human Services. Guidelines for Responsible Data Management in Scientific Research. Available at: ori.hhs.gov/images/ddblock/data.pdf. Accessed: June 12, 2012.
5. Rossner M, Yamada K. What's In a Picture: The Temptation of Image Manipulation. *Journal Cell Biology* 2004;166:11-15.

Salami Slicing

The “slicing” of research that would form one meaningful paper into several different papers is called "salami publication" or "salami slicing".¹

Unlike duplicate publication, which involves reporting the exact same data in two or more publications, salami slicing involves breaking up or segmenting a large study into two or more publications. These segments are referred to as "slices" of a study.²

As a general rule, as long as the "slices" of a broken up study share the same hypotheses, population, and methods, this is not acceptable practice. The same "slice" should never be published more than once.³

The reason: according to the U.S. Office of Research Integrity, salami slicing can result in a distortion of the literature by leading unsuspecting readers to believe that data presented in each salami slice (i.e., journal article) is derived from a different subject sample.² This not only skews the "scientific database" but it creates repetition that wastes readers' time as well as the time of editors and reviewers, who must handle each paper separately. Further, it unfairly inflates the author's citation record.

There are instances where data from large clinical trials and epidemiological studies cannot be published simultaneously, or are such that they address different and distinct questions with multiple and unrelated endpoints. In these cases, it is legitimate to describe important outcomes of the studies separately.^{1,4,5} However each paper should clearly define its hypothesis and be presented as one section of a much larger study.³

Most journals request that authors who either know or suspect a manuscript submitted for publication represents fragmented data should disclose this information, as well as enclose any other papers (published or unpublished) that might be part of the paper under consideration.^{2,5}

Guide to Salami Slicing and How to Prevent It*

| Action | What is it? | Is it unethical? | What should you do? |
|--|---|---|--|
| Breaking up or segmenting data from a single study and creating different manuscripts for publication | Publishing small 'slices' of research in several different papers is called 'salami publication' or 'salami slicing'. | Yes. Salami slicing can result in a distortion of the literature by leading unsuspecting readers to believe that data presented in each 'slice' is derived from a different subject sample. ² | <ul style="list-style-type: none"> ■ Avoid inappropriately breaking up data from a single study into two or more papers. ■ When submitting a paper, be transparent. Send copies of any manuscripts closely related to the manuscript under consideration. ■ This includes any manuscripts published, recently submitted, or already accepted.⁵ |

*When in doubt, always consult with your professor, advisor, or someone in a position of authority who can guide you to the right course of action.



References

1. Abraham P (2000). Duplicate and salami publications. *Journal of Postgraduate Medicine*, 46: 67.
2. Office of Research Integrity. Salami Slicing (i.e., data fragmentation). Available at: ori.hhs.gov/plagiarism-16. Accessed on September 21, 2012.
3. Committee on Publication Ethics (COPE) (2005). Cases: Salami publication. Available at: publicationethics.org/case/salami-publication. Accessed on August 26, 2012.
4. Angell M, Relman AS. Redundant publication. *N Engl J Med* 1989; 320:1212-1214
5. Kassirer JP, Angell M. Redundant publication: a reminder. *N Engl J Med* 1995; 333:449-450

Top 5 reasons to publish ethically



1

It ensures scientific progress

Truth is the foundation of science and the progress of ideas. The scientific community thrives only when each participant publishes with integrity.



5

It's the only way

A good reputation and acting with integrity opens the door to opportunity. Your work represents not only you but the research institution, the funding body, and other researchers.

It protects life and the planet

Publishing ethically ensures that we have trusted information on which to build future therapies, technologies, and policies. Published work based on fraudulent data can form an inappropriate basis for follow up studies leading to waste of resources and harmful effects to patients, communities, or habitats.

2



It promotes ethical behavior

Doing the right thing sets an example and reinforces our responsibility to our peers and society at large (who generally pay for our work). Believing our actions won't make a difference or are above the law can lead those who don't know better into believing the same.

3



4

It's good for your reputation

There's nothing like getting published and being able to accept credit and accolades for a job well done. Do it the right way. A published paper is a permanent record of your work. Don't become part of the minority who end up with a retracted paper and a tarnished reputation.



Make your research count.
Publish ethically.

ethics.elsevier.com



Ethics
Quiz



Q1

You are preparing a paper that involves a complex concept but you're having difficulty putting into words precisely how this concept works. You see an excellent explanation in another published paper. Is it okay to use this explanation word for word in your paper without referring to the other paper?

YES NO?

NO: It is not acceptable. If you use another source to explain a concept, you should reference where that explanation came from and also make clear that you are quoting someone else. Using someone else's work as your own, is plagiarism. [For more information, see the Plagiarism Fact Sheet](#)

YES: Your answer is correct. It is not acceptable. If you use another source to explain a concept, you should reference where that explanation came from and also make clear that you are quoting someone else. Using someone else's work as your own, is plagiarism. [For more information, see the Plagiarism Fact Sheet](#)

Q2

Let's say you don't copy someone's original work word for word - instead you paraphrase it. Is it acceptable to use someone else's concept, idea, or description of an idea - but in your own words?

YES NO?

NO: The correct answer is Yes and Not Paraphrasing is acceptable but is only permitted if you credit the other's work. Without such credit paraphrasing can constitute a form of plagiarism. [For more information, see the Plagiarism Fact Sheet](#)

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Q3

You plagiarized someone's work and you're caught, what's the likely consequence?
Select ALL that apply.

- a) The article is retracted with public documentation explaining why
- b) The institute funding your research takes disciplinary action - and could ask you to leave
- c) Your judgment and reputation come into question

That's right - All of the above. The severity will depend on the specific circumstances. If you're not clear on the boundaries of publishing ethics, seek the counsel of your principal investigator, editor, or someone in charge of research integrity at your institution. [For more information, see the Plagiarism Fact Sheet](#)

Q4

A team of four students worked together on a research paper, and while each person made contributions to the study, some had greater involvement and responsibility for the manuscript than others. Two team members did everything from developing the study concept and design, data acquisition and interpretation, to writing and finalizing the draft for publication. The other two helped with the research, such as assisting with the lab experiments, but had no input into the manuscript. Do all these authors fit the definition of authorship, regardless of the journal?

YES NO?

YES: Your answer is incorrect. While there is no universal definition of authorship, an author is generally considered to be someone who has made significant intellectual contribution to the study. However, definitions of authorship can vary from journal to journal. To ensure those involved are credited appropriately for their role in a paper, make sure you know the journal's definition of an author. It is also strongly advised that before the research begins, a meeting take place to document how each person will be acknowledged.

NO: Your answer is correct. When you work with others to write a paper, you should make sure to credit each individual involved, indicating his or her contribution. If the paper is truly a collaborative effort, all authors should be credited.

Q5

You have completed a paper and want to give it your best shot at publication. What's your best strategy:

- a) Submit your paper to several journals at the same time, such as Science, Nature, and Cell, and see who accepts it - maybe all three!
- b) Submit it to Science, Nature, and Cell all at the same time, but once you find out one of the journals has accepted the paper, withdraw all other submissions.
- c) Submit your paper to one journal - Science, Nature, or Cell, and wait to hear if it is accepted. If it isn't, then submit it to another journal.

A or B: No. Your answer is incorrect. Authors should only submit to one journal at a time and wait to hear a decision from the editor before submitting to another journal. Submitting a paper to multiple journals simultaneously presents potential ethical issues because several journals may unknowingly publish the same article-risking duplication. Multiple submissions also waste referees' time. Finally, if your paper is rejected and you submit it to another journal, you should take referees' advice for improvement seriously, and implement these changes into the new submitted paper. **For more information, see the Duplicate Submission Fact Sheet**

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Q6

Let's say Cell accepts your paper for publication. Is it always okay to submit a version of that paper in a language other than English to a journal in a different country or does that count as duplicate submission?

- YES, it's okay. It does not count as duplicate submission.
- NO, it's not okay. It counts as duplicate submission.

YES: Your answer is incorrect. Submitting a paper to a journal or journal in different languages without acknowledgment of the original paper is considered unethical. Translated articles are only acceptable when all necessary consents have been obtained from the previous publisher of the paper and from any other person who might own rights in the paper. A translated paper that is submitted in another publication, without prior approval is considered a duplicate submission. However, there are instances where an article might be published in local language in a local publication, which might be considered for re-publication in an international journal. This would only happen with an agreement between the two journals, and if the editor-in-chief believes the article is significant and will reach a new or different community of readers. In such cases a notice about the prior local publication would be issued. [For more information, see the Duplicate Submission Fact Sheet](#)

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Q7

You have worked long and hard on a study. You feel your research is applicable to a variety of disciplines and you can envision the paper appealing to a range of audiences. Is it ok to 'slice up' the same core results into smaller individual papers that can be submitted to a variety of journals in different fields, even if the manuscripts all share the same hypotheses, population, and methods?

- YES NO?

YES: No. It's not OK. The 'slicing' of research that would form one meaningful paper into several different papers is called 'salami publication' or 'salami slicing'. As a general rule, as long as the 'slices' of a broken up study share the same hypotheses, population, and methods, this is not acceptable practice. The same 'slice' should never be published more than once. There are instances where data from large clinical trials and epidemiological studies cannot be published simultaneously, or are such that they address different and unrelated endpoints. In these cases, it is legitimate to describe important outcomes of the studies separately. However each paper should clearly define its hypothesis and be presented as one section of a much larger study.

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Q8

You are working on a study and the results are not coming out the way you want them to. You just cannot confirm the hypothesis no matter how many times you rerun the tests. You're the one conducting the research and the only one managing the data analysis. You want to successfully resolve this. What are your options?

- a) You make very minor modifications to the data and slightly alter the images to keep it consistent. The likelihood of anyone challenging the results are slim.
- b) You leave out the problematic data and only use findings that support your hypothesis.
- c) You consult with your supervisor and/or lab team to troubleshoot, even if it means going back to the drawing board. There are no short cuts in science.

C: That's right. Your answer is correct. There are no short cuts. Even if no one suspects an omission or manipulation of data now, it can come back to haunt you. A published paper is a permanent record of your work. And, if you are caught, it can cost your reputation. More important, falsifying results can have repercussions, especially for studies involving therapies that will ultimately be used to treat patients. Unproven or false data can be harmful to patients, and can have far reaching consequences, especially in situations where researchers try to replicate or build on the data. **For more information, see the Research Fraud Fact Sheet.**

A or B: No. Your answer is incorrect. There are no short cuts. Even if no one suspects an omission or manipulation of data now, it can come back to haunt you. A published paper is a permanent record of your work. And, if you are caught, it can cost your reputation. More important, falsifying results can have repercussions, especially for studies involving therapies that will ultimately be used to treat patients. Unproven or false data can be harmful to patients, and can have far reaching consequences, especially in situations where researchers try to replicate or build on the data. **For more information, see the Research Fraud Fact Sheet.**

Q9

What situation might be considered a conflict of interest? A researcher who (select all that apply):

- a) Owns stock of the pharmaceutical company commissioning the research work.
- b) Is also a consultant to the company commissioning the research work.
- c) Is asked to review a manuscript submitted by a colleague.
- d) All of the above.

D: That's right. All of the above are potential conflicts of interest. But just because a potential conflict of interest exists does not automatically imply wrong-doing. Authors should disclose potential conflicts to the journal editor when they submit their cover letter with their manuscript to avoid potential conflicts becoming an issue.

A, B or C: No. All of the above are potential conflicts of interest. But just because a potential conflict of interest exists does not automatically imply wrong-doing. Authors should disclose potential conflicts to the journal editor when they submit their cover letter with their manuscript to avoid potential conflicts becoming an issue.

Q10

You are a university researcher conducting research on the effects of a new shingles vaccine. Your father works at a pharmaceutical company - in fact at one of the leading vaccine manufacturers. Is this okay?

YES NO?

YES: Your answer is correct. It's ok as long as you declare the potential conflict of interest to your institute's ethics group and also to any journal you submit a resulting paper to.

NO: Your answer is incorrect. Actually, it's ok as long as you declare the potential conflict of interest to your institute's ethics group and also to any journal you submit a resulting paper to.

Q11

You are a researcher wanting to publish a study undertaken in human beings. Do you need to provide detail about which organization gave ethical approval and how consent was obtained?

YES NO?

YES: Your answer is correct. It is unethical to undertake a study without evidence of ethical approval and informed consent, and journals will reject your manuscript. As regulations vary worldwide about what type study requires ethical approval, this needs to be specified clearly in your submission letter with supporting documentation. Also undertaking a study without ethical approval can lead to sanctions by institutions and professional bodies. For more information, see the Research Fraud Fact Sheet.

NO: Your answer is incorrect. It is unethical to undertake a study without evidence of ethical approval and informed consent and journals will reject your manuscript. As regulations vary worldwide about what type study requires ethical approval, this needs to be specified clearly in your submission letter with supporting documentation. Also undertaking a study without ethical approval can lead to sanctions by institutions and professional bodies. For more information, see the Research Fraud Fact Sheet.



Make your research count. Publish ethically.



Top 5 reasons to publish ethically

- 1 It ensures scientific progress
- 2 It protects life and the planet
- 3 It promotes ethical behavior
- 4 It's good for your reputation
- 5 It's the only way

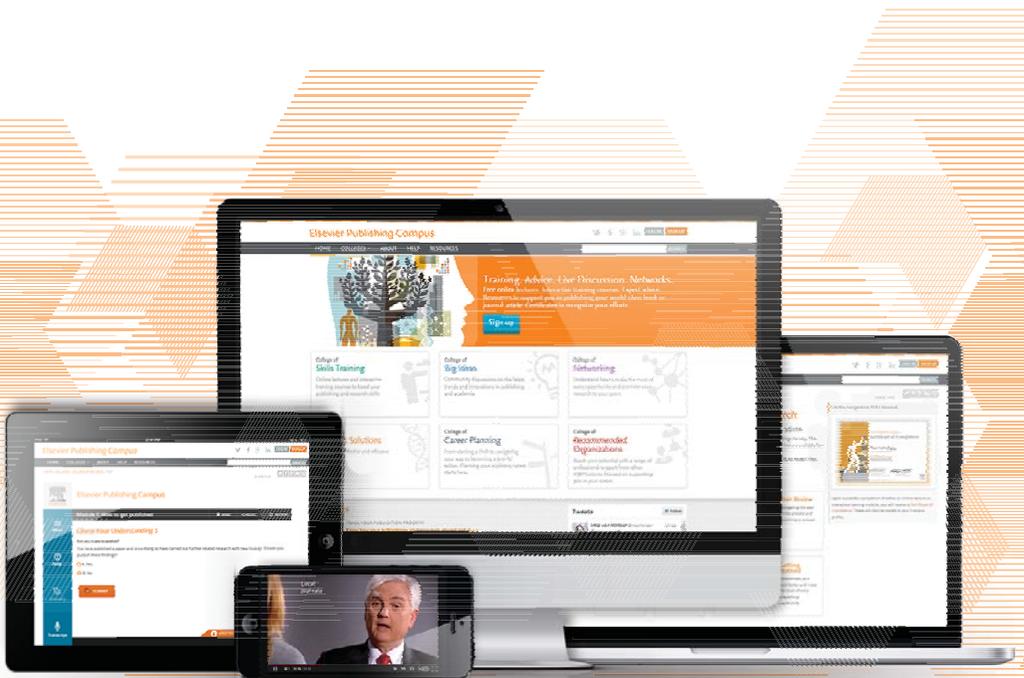
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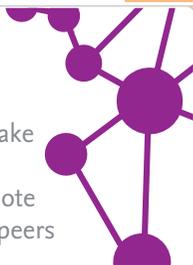
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