Responsible Conduct of Research: A Guide for Faculty
Responsible Conduct of Research: What is it and how do I do it?

Integrity and the highest ethical standards are at the core of being a responsible teacher and investigator. Training in the responsible conduct of research has rarely been part of our formal training yet we are often called upon to deal with related problems as they arise with respect to students and, at times, with colleagues. It can be challenging to know exactly what the right thing to do is in any given situation. To facilitate such discussion and awareness, this guide was developed as a resource for faculty concerning the most commonly encountered issues: supervision of research personnel; authorship; publication and ethical writing practices; and data management. In addition there is a section on research misconduct, an infrequent but often devastating situation to all involved.

Elements of responsible conduct of research are inextricably tied to practices of scientific management. Essentially, principal investigators run small – and sometimes quite large - businesses. This is something that few of us knew we were signing up for when we selected a career in science. With it come issues in which few of us have received any training at all, ranging from personnel and staffing issues to creating archival data repositories. Much of what we learn is through trial, error, and, if we are fortunate, good mentorship.

This guide is not designed to cover the regulatory issues that accompany research. Human subjects research is the purview of the JHSPH Institutional Review Board (IRB), directed by Joan Pettit, JD and can be accessed through the my.jhsph.edu portal. Review and approval of animal research protocols is conducted through a central University committee – the Institutional Animal Care and Use Committee (ACUC), also accessible through the portal.

The information contained in this guide has been adopted and extracted from various sources, which are referenced within each section. This guide is only meant to provide general information as a starting place. Many of the issues discussed herein have fairly clear answers [“My post-doc is leaving under bad terms and is insisting on taking data with him. Can he do that?” (Answer: No, the university owns the data and you can prevent him from taking it)]. Other problems are not so straightforward [“My colleagues have not included me as an author on a paper for which I believe I made a substantial contribution – what should I do?” (Answer: It depends)]. At times getting advice from colleagues, more senior faculty, or your departmental chair can help you decide how to proceed on problems as they arise. Finally, my door is always open to discuss and try to help you resolve these issues.

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Resources

A number of University and School policies outline specific requirements for research conduct, including detailed policies and procedures for conflicts of interest and research involving humans, animal, and hazardous materials and biological agents. Because they are covered in excruciating detail elsewhere, they will not be covered here. The following links will take you to the appropriate sites:

Conflict of Interest: COI FacultyHandbook.pdf
Institutional Review Board: http://www.jhsph.edu/irb
Animal Care and Use Regulations and Policies: http://web.jhu.edu/animalcare
Johns Hopkins Biosafety: http://www.hopkinsmedicine.org/hse/biosafety/index.html

Responsible research is an expansive and constantly evolving area, so a document library which includes teaching materials, subject to updating, can be found at https://my.jhsph.edu/Offices/OfficeGraduateEducation/rcr/Pages/default.aspx

An interesting website, www.principalinvestigators.org, poses common responsible conduct of research questions and follows them with an “expert” commentary and a series of responses by readers. While sometimes I disagree with either the commentary and/or some (many) of the responses, they provide good illustration of the multifaceted and complicated regulatory and ethical world that we inhabit and sometimes can provide a series of options relevant to your situation. These can be found by searching within the “e-Alerts” under the subjects listed on the left.
Does your study involve data about individual living people? [see Note #1]

Does the entire dataset already exist?

YES

Are all the data publicly available? [see Note #2]

YES

STOP: Do Not submit to IRB
Not HSR! [see Note #4]

NO

STOP: Do Not submit to IRB
Not HSR! [see Note #4]

NO

Submit to IRB

NO

STOP: Do Not submit to IRB
Not HSR! [see Note #4]

Submit to IRB

Could being part of the study put the informants at any risk?

YES

STOP: Do Not submit to IRB
Not HSR! [see Note #4]

NO

Submit to IRB

GO

STOP: Do Not submit to IRB
Not HSR! [see Note #4]

Did you or a co-investigator originally collect the data AND does the original dataset now contain identifiers or links to identifiers?

YES

GO

Submit to IRB

GO

Submit to IRB

! Not HSR (Human Subjects Research) also means that you can answer “No” on grant applications to the question “are human subjects involved?”
Notes: Is it human subjects?

1. “About” means the data provide information about individual living people, not simply collected from individual living people. Key informant data about agencies or other entities (e.g., asking a hospital administrator about wait times in the ER, asking a drug manufacturer about dispensing patterns) or from experts or opinion leaders about their areas of expertise does not constitute data about individual living people.

2. “Publicly available” means the information is available to anyone, without prior clearance or qualification. Examples of publicly available data include census data, state court records, openly available national household surveys, or data available on the web. If you need a Data Use Agreement, it is not publicly available.

3. Identifiers provide the possibility of linkage to specific individuals. Examples include names, social security numbers, addresses, hospital IDs, or any HIPAA-defined identifiers. Identifiable can also mean that you can reasonably link to a specific individual based on an ensemble of variables. If you retain records that link an individual to a study ID, even if those records are kept in a separate location, then those individuals remain identifiable as long as you keep those records.
4. Can I still submit something I think is NHSR to the IRB for review?

- Yes! There is some element of risk in making this determination yourself, should you ever be challenged on the decision not to submit by a journal editor or other source. You are welcome to submit any research protocol to the IRB and you will receive a statement with a determination following review. We urge you to do so to protect yourself if the topic is particularly socially or politically sensitive.

- If you elect to use the flow chart with attached clarifications, then we recommend printing it out, with notations regarding how you made you ultimate decision, and retain it in your files.
Navigating the JHSPH Institutional Review Board (IRB):

A Primer for Students and Postdoctoral Fellows

Institutional Review Board Office
Johns Hopkins Bloomberg School of Public Health
615 North Wolfe Street / Suite E1100
Baltimore, MD 21205

Office: 410-955-3193
Fax: 410-502-0584
Toll free: 1-888-262-3242
Email: irboffice@jhsph.edu

On the web: www.jhsph.edu/irb

PHIRST Help Line: 410-502-5780
PHIRST email: phirsthelp@jhsph.edu
Navigating the JHSPH Institutional Review Board (IRB)
A Primer for Students and Postdoctoral Fellows

The JHSPH IRB Office is charged with assuring that human subject research studies conducted in the school comply with internal school policies and external regulations designed to protect human subjects. The process can seem overwhelming to individuals new to it so the goal of this document is to help students and post-doctoral fellows understand and navigate the system.

Most of this process, which can often seem arbitrary and excessively time-consuming, is a direct result of the School’s obligation to comply with the regulations implemented by the federal Office for Human Research Protections (OHRP) in the Department of Health & Human Services (DHHS). Masters and doctoral students who plan to do human subjects research must have IRB approval before working with human data or samples and/or before contacting human subjects. “Human subjects research” is broadly defined to include any activity involving living humans that seeks to test a hypothesis or answer a scientific question. This can include both secondary data analysis as well as research involving direct contact with subjects.

As a student, you cannot submit your own IRB research application; instead, your advisor or other faculty member must agree to serve as the Principal Investigator on the research application you submit to the IRB. This means that they accept the full responsibility for compliance with IRB requirements. Since you can prepare the application yourself, it’s to your advantage to understand as much about the process and issues that you can so that your research application can move smoothly and quickly through the system. The best way to ensure a rapid review is to prepare your research application so that it answers all of the questions the JHSPH IRB Office is required to ask.

If you are listed as a study team member on a human subjects research application at a different institution, the PI of that research application and the approving IRB of that institution are responsible for your involvement in the research. The JHSPH IRB does not need to review the research application.

Types of review:

There are three main categories of review for a research application. Much of the research done in the JHSPH fall into the first two categories. Underlined words reflect key elements of the definitions:

1. **Exempt.** Research may be designated as “exempt” if it involves the prospective collection of information, including the use of testing, surveys, interviews, or observation of public behavior without collection of identifiers or involves existing data, documents, records, specimens that do not contain identifiers. “Identifiers” include information such as social security numbers, names, addresses, hospital IDs, or other information that can link an individual subject. You cannot make the determination that a project is exempt. Instead you must submit an application and await a communication from the IRB that will inform you of its decision.

Analysis of datasets that are publicly available, such as census data, state court records, and National Households Survey of Drug Abuse are designated as “not Human Subjects Research” and therefore does not require IRB approval. However, as a student, we require you to submit your research application to us and we will provide you with a final determination. This protects you in the event that your project is challenged as being human subjects research further along in your degree program.
2. Expedited. Research qualifies for expedited review if the data that are collected contain identifiers but involve no more than minimal risk. Minimal risk is defined by federal guidelines as:

“the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.”

The list of research activities considered to be minimal risk include such procedures as blood draws, collection of anthropometric or physiological data such as height and weight or electrocardiogram, behavioral assessments, interviews and psychological questionnaires.

3. Full committee. Research that involves greater than minimal risk (physical, medical, psychological, social, or legal/economic), or focuses on particular vulnerable populations (e.g., prisoners). Research in this category includes clinical trials involving therapeutic or behavioral interventions as well as other types of studies with elevated risk. Interview, focus group, or questionnaire studies which ask about sensitive topics (domestic abuse, sexual or drug use behavior, etc.) may qualify for the category of risk.

How the JHSPH IRB operates

Research application reviews are conducted by JHSPH faculty or representatives of the local community who serve as members of one of two JHSPH IRBs. IRBX reviews protocols that are determined to qualify for expedited review; IRBFC reviews protocols that are considered to involve “greater than minimal risk”. New applications are submitted through an electronic system, PHIRST. Both expedited and full committee protocols are evaluated during weekly meetings. The JHSPH IRB Office is located near the East Monument Street entrance.

Getting approval to do your research

The easiest approach for students whose research falls within the general scope and aims of an active, on-going IRB approved research project conducted by a full-time faculty member in the JHSPH is to be added to an existing IRB research application as a student investigator. This addition requires an amendment application to the ongoing study. The amendment application is submitted on paper (as opposed to electronically) using the amendment application posted on the IRB website at www.jhsph.edu. The Principal Investigator must submit the amendment application to the JHSPH IRB Office email address at irboffice@jhsph.edu. Please remember that amendment applications are not considered approved until the Principal Investigator hears back from the IRB and receives an official Amendment Approval Notice.

If you are adding an additional activity involving human subjects contact to an already approved research application (e.g., some new questionnaires, an additional blood draw), the PI needs to submit an amendment application with a revised research plan describing this addition and adding you as a student investigator. Again, such amendment applications are not considered approved until the Principal Investigator hears back from the IRB and receives an official Amendment Approval Notice.

If you are initiating a new human subjects research project, the normal research application submission procedures, with a full-time faculty member as the PI and yourself as a student investigator, must be followed.
If you are using human subjects data generated through a study by a faculty member at another academic institution and that research application has received approval from that institution’s Institutional Review Board, you may ask the PI of that research application to add you to that study. However, depending on the nature of your involvement, it may be necessary to submit a new application. Check with the JHSPH IRB Office.

All student-initiated projects involving humans or information about humans must be submitted to the IRB for a determination as to whether they qualify as “Not Research” (NR), “Not Human Subjects Research” (NHSR), “Human Subjects Research” (HSR) Exempt from IRB Review, or HSR requiring IRB review. Students may use the IRB Worksheet or the IRB guidance flowchart that are available on the IRB website www.jhsph.edu/irb under the link “Student Projects” to give them some idea as to what that determination is likely to be, but the determination itself must be made by the IRB. The IRB office will provide the student documentation of its determination or advise the student if the submission of a new PHIRST application is required.

The IRB Worksheet is a survey-monkey tool which will assist in directing students towards the correct IRB-related outcome. It may direct the student to complete one of the “IRB Office Determination Request forms” that are available on the IRB website www.jhsph.edu/irb under the link “Student Projects.” These forms may be used for all student- or post-doc initiated projects when it is helpful to have the IRB’s preliminary opinion on whether a project requires a PHIRST submission and IRB review. Specific timelines for submission are provided for MPH students in both forms. The IRB Determination Forms operate as follows:

- If the worksheet indicates that you are using secondary data for analysis, complete the “IRB Office Determination Request Form: Secondary Data Analysis” from the IRB Office and submit it to irboffice@jhsph.edu. The IRB Office will review the form and let you know whether or not you must submit a PHIRST application for the research project.

- If the worksheet indicates that you are collecting primary data, complete the “IRB Office Determination Request Form: Primary Data Collection” and submit it to irboffice@jhsph.edu. The IRB Office will review the form and make a determination as to whether or not your project requires IRB review.

Regardless of whether IRB review is required, all students should apply ethical principles in their interactions with humans and/or their data.

Special considerations by degree type

The general procedures for evaluation of student research projects are the same, regardless of degree. However, some special degree-specific considerations apply.

**MPH Capstones**

MPH capstones typically fall into one of four categories.

- Simulated grant proposal or research plan. This is not research and does not need IRB approval.
• Public health program proposal that is not conducted. Again, not research/no approval needed.

• Research report: data collection and/or analysis. By definition, this is research and requires IRB approval. See sections above for information.

• Analysis of a public health problem. This is a more complex issue because some activities that involve program evaluation require IRB approval while others do not. The rule of thumb is to submit the project to the IRB for consideration. The IRB reviewers will determine whether or not your project is “public health practice” or “human subjects research”. In general, public health practice means that: 1) your activity will not generate knowledge that would be useful beyond the specific program you are evaluating, and 2) you do not plan to ever publish or otherwise disseminate this information to groups that do not include the agency. The JHSPH IRB Office will provide you with documentation of a determination.

To facilitate the timetable of the capstones, two IRB liaisons have been established within the MPH office to expedite and assist in the process for MPH students. Please direct your initial questions to Janet Carn (jcarn@jhsph.edu) if you are a full-time student or to David Earle (dearle@jhsph.edu) if you are a part-time student. They will work with the JHSPH IRB Office to provide guidance based on your particular circumstances. If you have IRB approval for your project from another IRB, submit a copy of the IRB approval letter and any other relevant documentation of your participation to:

MPH Program Office
615 N. Wolfe Street, Room W1015
Baltimore, MD 21205
mphprog@jhsph.edu

Doctoral Research

The Office of Graduate Education and Research (OGER) facilitates adherence to the School’s policies and procedures for satisfactory degree completion. In fulfillment of this mission, one of OGER’s tasks is to track IRB and/or ACUC approval for doctoral students to ensure that doctoral degree students conduct dissertation research under proper institutional approvals. Once you have a final research application for your dissertation research project, you should initiate the appropriate steps to obtain those approvals. OGER will send doctoral students an email approximately 3 months after passing their preliminary oral exams and forming a thesis advisory committee. The email reminds students of the requirement to obtain IRB and/or ACUC approval for student dissertation projects, if applicable. Also, the email will contain an attached thesis documentation form that students must complete. This form documents their IRB/ACUC approval and is signed by both the student advisor and the academic coordinator. The form must either be returned to OGER in W1033, or sent electronically to Angelica Watts (awatts@jhsph.edu) so that it may be placed in the student’s academic file.

Please don’t put your ability to graduate or ever publish your results in jeopardy by not seeking IRB approval for the work, which must be done before you begin your research. In order to graduate, certification that you are a student on an IRB approved research application that is the basis for your dissertation (either on a new application or listed via an amendment application to an existing research application) MUST be on file in the Office of Graduate Education and Research at the address below. If your work will not be conducted through JHSPH, you may provide documentation of an approval letter granted by another institution’s IRB and any other relevant documentation of your participation on the research team to Angelica Watts at the address below:
Finally, there has been some confusion in the past as to whether a copy of your dissertation is required; it is not even after you have completed the work. For questions concerning these requirements, please contact Angelica Watts at 410-614-5367 or awatts@jhsphs.edu.

What you need to do to get started

1. Complete CITI, the on-line human subjects training module. This takes approximately 1 hour and you can do this at any time. Instructions are provided in the CITI FAQs document.

2. Register in the JHSPH electronic application system. Instructions are provided in the PHIRST FAQs document.

3. Start preparing your research plan. Go to the JHSPH IRB website at www.jhsph.edu/irb and click on the link for “Forms and Templates” to get the Research Plan template. Your research plan should answer the questions provided in the template that pertain to your study.


**Student FAQs**

1. **If I am doing data analysis only that does not involve contact with human subjects, do I have to submit to the IRB?**

   All student-initiated research projects that include information collected from or about humans must be submitted to the IRB for a formal determination as to whether the project is or is not human subjects research.

2. **Do I need IRB approval if the results of my project are not going to be published, presented at an academic conference, or otherwise disseminated beyond the classroom?**

   Federal regulations do not require IRB approval for activities that fall under the “practice” rather than “research” designation. But the distinction between “public health practice” and “public health research” is very difficult to define. You should submit your proposed project to the IRB for a formal determination.

3. **Do I need IRB approval if my project involves key informant interviews?**

   Yes, your proposed research requires IRB review.

4. **Do I have to submit my entire research application for IRB review if I have received IRB approval at another institution?**

   No, the submission of a new research application is not required. If you are listed on a pre-existing IRB-approved study at another institution that involves human subjects research, the PI of that research application and the approving IRB of that institution are responsible for your involvement as a student researcher in the research, and you do not have to submit a research application for IRB review at JHSPH. However, copies of the IRB approval letter and any other relevant documentation of your participation as a student researcher should be submitted to the MPH Program Office (for MPH students) or the JHSPH Graduate Education and Research Office (for other masters and doctoral students).

5. **Do I need to include researchers as co-investigators on my IRB application if they will not be involved in the data analysis?**

   If your project involves only existing data, and no further prospective data collection, you do not have to list the researchers who originally collected the data. You should explain the source of the data in your research plan.

6. **Can I tell people about the research if my application is pending IRB approval?**

   Yes, you can tell people about the study, but no recruitment, consenting, or data collection may take place.

7. **Can I be added to an active, ongoing IRB-approved study?**

   Yes, if the PI has agreed to add you as a student investigator on an active, ongoing IRB-approved study, the PI should submit an amendment application to the JHSPH IRB Office.
8. Do I have to submit a new application if my capstone project involves data analysis of pre-existing data with no identifiers or linkage?

Yes, all student projects that involve information collected from, or about humans, require IRB review.

9. Do I need a research plan for my dissertation research using secondary data analysis?

Yes, a research plan is required and must be uploaded into the PHIRST system when creating a new application. This should not be your proposal. Instead, make it clear that the data have already been collected, their source, whether you have access to identifiers if they exist, and so on. Include only a brief description of your rationale and analysis plans.

10. If I am listed as a student researcher on a study that was closed, can I still write manuscripts and make dissertation presentations?

Yes. However, the study would have to remain open if the data were still able to be linked to identifiers. If the study has been closed and you wish to do additional data analysis/dissemination then the PI can submit a new proposal for a secondary data analysis.

11. Do I need JHSPH IRB approval to submit a manuscript for publication for research conducted at another institution?

No. Because the research itself did not occur under the jurisdiction of the JHSPH IRB, you do not need JHSPH approval to publish the data. However, you should list your affiliation for the publication as the other institution because the convention is to link affiliation to the site of the work. You may list JHSPH as your affiliation in the publication if the data were used for your JHPSH thesis or dissertation.

12. What form is required for doctoral students who passed their oral exam and formed a thesis advisory committee?

Doctoral students must complete a thesis documentation form to document their IRB/ACUC approval. This form must be signed by both the student advisor and the academic coordinator, then returned to OGER in W1033 so that it may be placed in the student’s academic file. For questions concerning this requirement, please contact Angelica Watts at 410-614-5367 or awatts@jhsph.edu.
CITI FAQS

1. What is CITI?

The Collaborative IRB Training Initiative (CITI) is a web-based training program on issues relating to human subjects research (HSR). The CITI web site is maintained by the University of Miami, with content developed by a national consortium. CITI offers other training, for example Good Clinical Practices (GCP). The HSR training contains modules on topics such as informed consent, vulnerable populations, ethical principles and IRB regulations. Each module has a short quiz at the end to assess your understanding. All of our institutional requirements are listed on the IRB website at www.jhsp.edu/irb.

2. Who is required to complete the CITI HSR modules?

The HSR training is required of all faculty, staff and students who are engaged in HSR at JHSPH. A total score of at least 80% is required to pass.

3. Who is required to take the CITI GCP modules?

Faculty, staff, and students engaged in HSR involving clinical trials with medical interventions.

4. Do I have to take CITI HSR training again if I took it at another institution?

It depends upon when you completed the training. We require that faculty, staff and students renew their CITI HSR training every 5 years.

5. Am I required to refresh my CITI training?

Yes. The Basic Human Subjects Research (HSR) Course certification is good for 5 years. After 5 years, JHSPH faculty, staff, and students who are engaged in HSR must obtain recertification from CITI by taking one of the Refresher courses (1, 2, or 3) offered by CITI.

6. What will happen if my HSR certification expires?

You have 60 days following your certification expiration date to complete a refresher course. You need to print out the updated HSR certificate and upload it into your personal profile page in the PHIRST electronic application system. Once you enter your new completion date, you will retain full access to PHIRST. If you do not upload a new certificate in those 60 days and enter your new completion date into PHIRST, your access to PHIRST will be limited to your home page; you will not be able to submit a new application or access other PHIRST applications.

7. How do I access my Personal Page in PHIRST to upload my new training certificate and enter my new HSR training completion date?

When you log into PHIRST, you should see your personal folder page. If you do not see a mechanism for uploading the new certificate on that page, look at the upper right corner of your page and you should see “First Name, Last Name | My Home | Logoff.” Click on your name, and you should reach your Profile Page which has the upload mechanism for your HSR training certificate and a field for entering your new completion date.
8. How will I know if it has been more than 5 years since I completed my CITI HSR training?

Look at your CITI certificate and find the completion date. If you do not have a copy of your certificate, follow the instructions below to access CITI and print out a new copy.

9. Will I be reminded to refresh my CITI certification?

Yes. The CITI system will send out reminders 60 days prior to your certification expiration date, and at several other times up to the day before expiration. **These reminders will go to the email you have provided to CITI, so it is important that you keep this email address current.** After the certification expires, you will receive no further reminders.

10. Are non-JHSPH researchers/collaborators required to complete CITI?

Investigators from other institutions may use our CITI account to complete the CITI HSR training. Those non-JHSPH investigators who can provide the JHSPH IRB Office with documentation of human subjects training from their own institution, from NIH, or from Family Health International do not need to complete CITI.

11. Is CITI available in any languages other than English?

CITI allows users to select other languages. Here is the current list of offerings (as of February 2013):

- Chinese
- French
- Korean
- Japanese
- Portuguese
- Russian
- Spanish
- Thai

12. Where do I go for help?

If you are having problems with the CITI site or course, contact the CITI office at citisupport@med.miami.edu or at (305) 243-7970. If you have questions about JHSPH requirements, contact the office at irboffice@jhsph.edu or (410) 955-3193

13. How do I register for CITI training?

   a) Go to [http://www.citiprogram.org/](http://www.citiprogram.org/)

   b) Go to New Users “Register Here” Link

   c) On the next page, Complete Course Registration Steps 1-4
d) Select Johns Hopkins Bloomberg School of Public Health from the “Participating Institutions” drop down menu.

e) Select your Username and Password

f) Enter your name

g) Enter your email address

h) Click the submit button

i) Next, complete the required fields marked with an asterisk (*) and submit

j) Follow the instructions for selecting your Learner Group and submit

k) You will see that you have registered with the Johns Hopkins Bloomberg School of Public Health. At this point you can register with another institution. (If your studies are funded by the Dept. of Navy, you may want to follow this process to affiliate with the “DoN” account.)

l) Check "Yes" to affiliate with another institution.

m) Check "No" to continue with your current selection.

n) On the next page, you will see the Learner’s Menu.

o) Under Status, Click “Enter” Link to begin required training modules.

14. I have had training other than CITI at my old or another institution, am I required to take the modules through CITI?

Yes. If you are faculty, staff, or a student, you must take the JHSPH CITI training.

15. Which CITI modules do I have to take?

All individuals listed as PI, co-investigator, student investigator, or study contact should take the basic human subject research training course or a refresher. If you will be involved with an FDA regulated clinical trial, you should also take the GCP training.

16. How do I find a copy of my CITI HSR Certificate?

Access the CITI course site http://www.citiprogram.org with your username and password. Select the following link under the heading “Johns Hopkins Bloomberg School of Public Health Learner Utilities”:

   **View course completion history for Johns Hopkins Bloomberg School of Public Health and print completion certificates**

You will see a “print completion report” link to print your report.
PHIRST FAQs

1. What is PHIRST (pronounced FIRST)?

PHIRST stands for Public Health Institutional Review Submission and Tracking. It is a web-based system that allows investigators to submit and track their human subjects’ research projects wherever they are. Submission, review and approval of research studies involving human subjects are conducted online.

2. I am not a JHU employee, can I still register for PHIRST, and if so, how do I register? If I am a Hopkins employee, how do I add someone to my study who is not affiliated with Hopkins?

1. Visit our website: www.jhsph.edu/irb
2. Click ‘PHIRST Access Link” on the left side of the home page screen
3. Click ‘Home’ link at the top of the screen
4. Click ‘Registration” or ‘Registration – Non JHU” link and fill in the required fields.

Please contact the PHIRST Help Desk phirsthelp@jhsph.edu or 410-502-5780 if you have any problems with the PHIRST registration.

3. There is a required field on the application for a completion date for Human Subjects Training. What is that?

Effective March 11, 2008, all registered PHIRST users must upload a copy of a human subjects training certificate before a new application can be submitted to the JHSPH IRB office. This means that the IRB office cannot accept any new applications until all principal investigators, co-investigators, student investigators and study contacts listed on a new application have uploaded this information.

Account information will automatically be updated and users will not be asked to upload this information again. All new PHIRST registrants will be advised of this requirement via email at the time of registration. Failure to upload this information will affect the submission of new applications.

4. I still don’t see my role displayed on my screen.

When you register as a user, a PHIRST account is created for you with a “Personal Folder/My Home” workspace based on your user role. Study Staff/Investigator workspaces are designed for you to create new research applications, then monitor the progress of those applications through the IRB process. If you do not see any role other than “Registered User” listed, you have not yet been assigned your user role in the PHIRST system.

Once you select your user role as a PI, co-investigator, student investigator, or study contact for each new application, the IRB Office will verify it based on your JHSPH status (full-time faculty, student, outside collaborator, etc.), and JHED ID, and then will confirm the selected user role in the PHIRST system. You may be assigned one or more user roles in your PHIRST account if you are involved with more than one study, but the level and type of access you will have to a specific application depends on your assigned user role for that specific project.
When you log in to your personal folder/workspace, it will display both the role of “registered user” and “study staff.” Always click the role of “study staff” to allow you to create and/or access a new research application. If you are assigned the role of PI, you will be able to complete and submit an application through the role of “study staff.”

5. How do I create a new application in PHIRST?

Once you are assigned a study staff role as a PI, co-investigator, student investigator, or study contact, you can create a new study application by using the [NEW APPLICATION] button on your personal folder. By clicking on this button, you will be taken to a new application and asked to fill in the identifying information for your project. Your IRB number will be assigned once you complete the information on the first screen and save it.

6. How do I upload my documents to the registration server to complete my profile?

Please follow the instructions below:

1. Log-in to the PHIRST website using your user ID that you created and password.
2. Click on your name located at the top right hand corner of the study workspace (next to the My Home icon)
3. Scroll down the page to the 'Human Subject Training Certificate' section to upload your document, click the 'add' button to upload the required information.
4. Click Apply

Failure to upload this information will affect the submission of new applications.

7. Where can I find the comments or concerns to the study team from the IRB staff?

The email communication from PHIRST contains an IRB number that, if clicked, will reveal all the PHIRST activities available to you on the left side of the screen. Under “My Activities”, click on the link called “Respond to Concerns”. Next, click “Respond” to review the concern sent to you. Enter your response in the text box provided. When you have finished your response, select “Yes” under “Send to IRB”, then CLICK “OK”. If you fail to click “OK”, the response will not go to the IRB.

8. I’ve responded to the concerns, but haven’t heard anything back from the IRB. What’s wrong?

You may not have clicked the “submit” button that sends your response in to the IRB. Check to make sure that you have done that. If you still have problems, contact the IRB at irboffice@jhsph.edu.

9. How do I gain access to view my faculty member’s projects?

The answer depends on who you are and whether you are listed as a co-investigator, student investigator, or study contact in a PHIRST application. If you are listed as one of these three roles, you may access the PHIRST application. If you are not, you can’t. See guidance on Who Should be Listed on a Research Application?
10. What should I do if I cannot remember my password or JHED ID to log in to PHIRST?

You will be locked out of PHIRST if you have too many failed attempts to access your account. To avoid being locked out of PHIRST, make sure you keep your user name and password someplace accessible to you. If you have forgotten your password, click the "forgot password?" link under PHIRST Login. This will allow you to reset your password. If you are still having trouble or have forgotten your user name, feel free to contact the PHIRST Helpdesk at 410-502-5780 or email phirsthelp@jhsph.edu

11. Can a student investigator submit an online PHIRST application?

No, a student investigator cannot submit an online application. The new application must be submitted by the principal investigator. The principal investigator must be a full-time faculty member who is willing to take responsibility for the study. However, a student may complete the application then let the PI know that it’s ready for review and PI submission. At present, there is no activity built in the PHIRST system that would automatically notify the PI when a new application is ready for submission. We suggest you either email or call the PI to let him/her know when the new application is ready for PI review and submission.

12. Where and how can I submit electronic versions of documents that supplement my application?

As you move through the PHIRST application, there will be a number of places that allow you to upload documents. Please follow those instructions.

13. My advisor or the principal investigator’s name does not appear in the dropdown list, how can I add a principal investigator to my online application?

Your advisor or the principal investigator must be a registered user to be added to your application. If you have trouble adding them to your application from the dropdown list, contact the PHIRST helpdesk or the PI to be sure that registration has been completed.

14. How can I receive the role of principal investigator to submit an electronic PHIRST application?

A faculty member must have full-time status at the School of Public Health to be indicated as a principal investigator on an IRB application. Co-investigators may include other JHSPH faculty or staff, as well as collaborators from other institutions.

15. How can I add more than one study contact to the application?

Add the additional study contact(s) to the co-investigator section of the application. All other “study team members” who will have substantive responsibilities for the conduct of the study should be listed as “co-investigator” since we have no other roles to choose from. The study team member will still be able to access under his/her own login and make changes in the PHIRST system.
16. **What browser/operating system do we need for using PHIRST?**

There is no specific hardware or operating system requirement to access and use the PHIRST website. You are only required to have one of the following standard Internet browsers:

<table>
<thead>
<tr>
<th>Platform</th>
<th>Browser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows (all versions)</td>
<td>Microsoft Internet Explorer, version 5.5 or later</td>
</tr>
<tr>
<td></td>
<td>Netscape Navigator, version 7.1 or later</td>
</tr>
<tr>
<td></td>
<td>Mozilla, version 1.5X or later</td>
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<tr>
<td></td>
<td>Firefox 1.0X or later</td>
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<tr>
<td></td>
<td>Opera version 7.10 or later</td>
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<tr>
<td>Macintosh OS X or later</td>
<td>Netscape Navigator, version 7.1X or later</td>
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<tr>
<td></td>
<td>Safari 1.1 or later</td>
</tr>
<tr>
<td></td>
<td>Mozilla, version 1.5X or later</td>
</tr>
</tbody>
</table>

Every browser and version behaves differently. Though support for a particular browser is indicated, there will always be occasions when the presentation appears different on different browsers and platforms.

17. **Why can’t I save the PHIRST application to a disk?**

PHIRST is a web-based system that will not allow you to download and complete or save the application on your computer or a disk. The application must be completed within the system. However, you may complete sections to the application, save your answers, and come back to the application at a later time.

18. **Why can’t I submit my continuing review or amendment?**

PHIRST will only accept new application submissions. At this time, the system has not been designed to accept continuing reviews. This means that any study that is currently in review or approved by the IRB and was submitted via paper will remain paper until further notice. In other words, all current paper-based studies will remain paper and all activities on those studies (continuing reviews, amendments, adverse events) will still be submitted via paper or IRB Office email (irboffice@jhsph.edu).

19. **Who should I contact if I am locked out of the PHIRST system?**

If you have trouble accessing the system, phone the main JHSPH IRB Office number at (410) 955-3193 during normal business hours and your password will be reprogrammed. For all other PHIRST-related questions, or if you are locked out during non-business hours, contact the PHIRST helpdesk at phirsthelp@jhsph.edu or PHIRST helpline at (410) 502-5780. You will receive a response to your e-mail communication or phone message within 1 business day.

20. **How can I change my user role in the PHIRST system?**

Please email the PHIRST helpdesk at phirsthelp@jhsph.edu, and identify the change you are would like to make. Someone will respond to inform you of the change or to ask any questions regarding the change.
21. I am trying to register another user, but unable to do so, what am I doing wrong?

Please be sure that you are logged out of the PHIRST system under your account. If the problem continues, please contact the PHIRST helpdesk at phirsthelp@jhsph.edu.

22. How long does it take after registration for someone’s name to appear in the PHIRST dropdown menu so I can add them to an application?

Instantly! The name will appear once the user completes the registration process by uploading human subjects training certificate.

23. I am just a coordinator for a study; do I have to be listed on in the PHIRST application? If so, what role do I select?

There’s no such thing as “just a coordinator”. Study coordinators have significant responsibilities that affect the conduct of the study, and the protection of human subjects. Since PHIRST currently has no “study staff” option, you should be listed as a co-investigator.

24. How do I access approved study documents in PHIRST?

If you are listed on the Study Team, you have access to approved study documents. You should go to the Application section of your home page. Click the “Approved” tab. Select the study you are trying to access. All approved documents, including the approval letter and stamped consent forms can be found on the “Approved Documents” tab for any study in the active state.
Disclosure and Conflict of Interest (COI)

You must disclose any outside activity or financial interest listed below when it is related to your institutional responsibilities, including, but not limited to, research, teaching, clinical/practice, and administrative responsibilities.

Note that these requirements apply only to associations you have with organizations outside of JHU that are not handled through the university or sponsored projects (i.e., ORA).

You must disclose the following types of outside activities provided to ANY entity, whether non-profit or for-profit, regardless of whether you are paid for this activity:

- Consulting
- Publishing/editing/authoring*
- Clinical care/practice
- Board of Directors
- Founder
- Officer
- Manager

*only if remuneration is anticipated.

You must disclose the following financial interests in ANY entity, whether non-profit or for-profit:

- Inventor of licensed technology
- Receipt of income from licenses, whether equity, royalty, or other
- Entitlement to equity and/or royalty

You must disclose the following types of outside activities provided to ANY entity, whether non-profit or for-profit, with some exceptions:

- Service on Advisory Committees, Boards and Review Panels
  - Exceptions: except when provided to a U.S. state, federal or local government agency, teaching hospital, medical center or institution of higher education or related research institute no disclosure is needed
- Speaking, Teaching, Lecturing
  - Exceptions: except when provided to a U.S. state, federal or local government agency, teaching hospital, medical center or institution of higher education or related research institute no disclosure is needed

Disclosure of Reimbursed or Sponsored Travel

If you are an investigator on any PHS-supported grant or contract, you need to disclose each instance of travel that is reimbursed or sponsored by an outside entity, when the amount of travel during the preceding 12 months reaches or exceeds $5,000 in the aggregate for a particular entity. This aggregate value includes travel for family members. However, if the travel occurs in the course of your family member’s own activities with the entity, you do not need to report it and it does not count towards the aggregate. Disclosures must be made within 30 days of reaching the $5,000 threshold and of every instance of sponsored or reimbursed travel occurring thereafter.

- Exceptions to this requirement include travel that is reimbursed or sponsored by the grantee institution (e.g., JHU), a U.S. federal, state or local government agency, an institution of higher education, an academic teaching hospital, a medical center, or a research institute that is affiliated with an institution of higher education. Travel paid by foreign entities that reach this threshold must be disclosed.

COI Training

All faculty members need to take COI training now, and every 4 years. The link to the on-line training module is here: http://lms4.learnshare.com/l.aspx?CID=89&A=2&T=412863

(See the reverse for information about when to disclose, how to disclose, what happens to your disclosure after submission, and who to contact with questions.)

Revised 10-3-2013
When do I need to disclose?

**Disclose early and often!**

- Prior to undertaking an outside commitment
- Within 30 days of acquiring or discovering a financial interest related to your institutional responsibilities
- Whenever a disclosed interest or activity changes or ends (e.g., remuneration, type of services)
- When submitting a PHS grant application to ORA. ORA will provide COI certification forms you must sign that are project-specific.
- Certify annually that disclosures are accurate and up-to-date

**How to disclose...**

- Online disclosure system is called eDisclose: [http://edisclose.jhu.edu](http://edisclose.jhu.edu)
- Log in using JHED credentials

**What can eDisclose do for me?**

- Single portal for transactional disclosures and annual certifications
- Eliminates need to re-enter on-going activities every year
- Submit, update, terminate disclosures in one place
- Real-time access to each of your disclosures, status of review, outcome of review, and management plan/conditions
- Generate a single report of all your disclosures, for journals, conferences, etc.

**What happens to my disclosures?**

- Staff review disclosures for completeness and compliance with policies on conflict of interest, professional commitment, and the policy on interaction with industry
- Some disclosures are reviewed by the SPH committee on conflict of interest
- You will be notified of the outcome of the review by email that will direct you to your eDisclose account
- Conditions may apply and some arrangements may need to be modified

**Questions?**

Office of Graduate Education and Research
Elizabeth Peterson, JD
Research Compliance Officer
Email: epeterso@jhsph.edu
Telephone: 410-502-0433

Revised 10-3-2013
# Handbook on Reporting Conflict of Interest and Commitment

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## Appendix

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| Travel Expense Reporting Flowchart and Worksheet                       | |
| Conflict of Interest Comparison Chart                                   | |
| JHSPH Uniform Provisions for Private Agreements                         | |
Overview

University policies require that faculty report external activities, including those activities that potentially pose a conflict of interest and/or a conflict of commitment. **Conflicts of Interest** occur when a faculty member’s institutional responsibilities could be compromised by his or her external activities. For example, a common conflict of interest arises when a faculty member conducts research that is sponsored by, or involves a product of, an entity with which the faculty member has an external relationship. **Conflicts of Commitment** occur when faculty members’ time and attention devoted to external activities interferes with their ability to fulfill their obligations to the School. The existence of a potential conflict does not indicate that the activity is prohibited; most conflicts can be managed to protect both you and the School. The School has a standing committee that reviews and manages conflicts.

This handbook provides guidance on the types of external activities JHSPH faculty commonly engage in, and the disclosure requirements and procedures for those activities.

Guidelines for External Agreements

Conflicts of Interest may take many forms, but generally occur when a faculty member’s institutional responsibilities could be compromised by his or her external agreements. External activities include consulting, serving on a board of directors/scientific advisory board, or holding a paid position with an external entity. Activities to develop and translate new basic research into clinical and public health applications often involve complex collaborations between government agencies, research institutions, and the private sector that fall outside the typical sponsored research arrangement. The Policy on Interaction with Industry (PPM-10) covers circumstances separate from the types of industry-associated activities that are contractual arrangements with the School and processed through the Office of Research Administration, and is directed at interactions with industry that faculty members engage in on their own. These external activities usually require investigators to sign a private agreement or contract.

The School does not review these private agreements. Investigators are responsible for ensuring that private agreements are in compliance with all University policies, including the PPMs related to outside activities, PPM-4 and PPM-10. We recommend you contact your personal attorney to ensure that your interests are protected. However, below are some general guidelines to follow when entering into private agreements:

- Outside agreements should not interfere with your institutional responsibilities at the University.
- Private agreements should be entered into by you as an individual and the company; you are not allowed to enter into private agreements as a representative of the University.
- JHU and JHSPH are not a party to private agreements and will, therefore, have no liability under them. Consequently, JHU/JHSPH, or a representative thereof, will not sign any private
agreements. You cannot use any JHU/JHSPH facilities, resources or funds in the fulfillment of your responsibilities under the agreement.

- You are not allowed to engage any JHU or JHSPH employees, including students, trainees, and postdoctoral fellows to provide services under the Agreement.

- The outside entity is not allowed to use the name of JHU/JHSPH in any documents or marketing materials.

- You should not disclose, or be asked to disclose, any confidential information that is proprietary to JHU/JHSPH, including providing early or exclusive access to JHU/JHSPH research or disclosing inventions.

- You should make sure that the outside entity will only have rights to any intellectual property that is developed by you alone or in collaboration with others as a sole and direct result of the performance of services under this Agreement. The entity shall have no rights under the Agreement to any intellectual property that is developed as a result of a program financed in whole or in part by funds provided by or under the control of JHU/JHSPH.

- Do not participate in any activity that could constitute endorsement, promotion, or marketing of any product, technology or service.

- Your role should be limited to providing expert advice. You should not participate in, direct or conduct research for or on behalf of an outside entity.

- You should disclose your relationship to the outside entity in all publications and presentations of research supported by the outside entity. Disclosure is especially important in journal articles.

- If you want to make sure that your agreement is in compliance with JHU/JHSPH policies, you can ask the outside entity to add "The Johns Hopkins University School of Public Health Uniform Provisions" to the agreement. (See Appendix).

**Conflict of Commitment Reporting**

Faculty are responsible for seeking advice from their Chair prior to engaging in any activities that could conflict with their time devoted to research, teaching, and service responsibilities to the School. PPM-4 does not limit the number of days a faculty member can spend on external activities. The time a faculty member is allowed to spend on outside activities is determined by individual discussion between a faculty member and his or her Department Chair. Faculty members must notify their Chair prior to making any commitments that could conflict with their obligations to the School. In addition, if a faculty member reports external activities totaling 24 days or more or external teaching activities totaling more than 5 days, this information is provided to the Department Chairs for their consideration.
Conflict of Interest Training

In accordance with federal regulation, all faculty are required to receive training related to conflict of interest whenever the institution’s policy changes and every four years thereafter. The JHU course can be accessed here: http://lms4.learnshare.com/l.aspx?CID=89&A=2&T=412863 or through the faculty portal. Log in to the MyLearning system using your JHED ID and password.

The course can be accessed at the “Take Course” link. If the module does not come up in a separate window, check to make sure the internet browser’s pop-up blockers are switched off, or try holding down the control key while clicking the “Take Course” button. The training module will pop up in a separate screen.

After completing the training, close the course pop-up window. Then, select "My Learning History" from the menu on the far left side of the screen. The COI course will be included in your list of completed courses and certificates. Scroll over to the right side of the screen to the “Certificate” column and click “View PDF” to print/save the PDF of the completion certificate. Retain this, which includes the date of training, for your records.

Conflict of Interest Reporting

The University’s online reporting system is called eDisclose (http://edisclose.jhu.edu) and can also be accessed through the faculty portal. Reporting of external activities is based both on transactional disclosures of external activities as they happen or are about to happen, plus an annual certification that your external activities are up to date. It is essential that disclosures be made in a timely manner, typically within 30 days. Late disclosures may lead to serious consequences if a financial conflict of interest is detected. The Conflict of Interest staff reviews each disclosure, determines whether a potential conflict exists and if review by the Conflict of Interest Committee is required. The committee then develops an appropriate management plan to mitigate the conflict and notifies the faculty member of the plan.

To submit a new disclosure in eDisclose, log in at the link above using your JHED ID and password. On the “My Disclosures” home page, select the “Create Disclosure” button on the left. Answer questions pertaining to your activity using the smart form. If you have questions about using the system, select the eDisclose Help Desk button in the black tool bar at the top of the screen. It contains user guides to help you become acquainted with the eDisclose system. When you are done with your disclosure, make sure you click the green Submit button on the “Disclosure Workspace” page in order to finish the process.

Details about the types of external activities you need to disclose are provided in the Appendix under the following titles: When Do I Have to Disclose, COI Comparison Chart, and Travel Expense Reporting Flowchart and Worksheet. You should provide a disclosure prior to undertaking an outside commitment or when a disclosed interest or activity changes (e.g., the amount or type of remuneration, type of service, or time commitment). When an activity changes, or you have a new activity for the same outside interest or entity, select the “Edit Disclosure” button on the left and add the change or new activity to the existing entry. That is, if you provide both consulting and service on a DSMB for the same company, both should be disclosed under the single disclosure for that company.
Each year, full-time faculty and salaried part-time faculty will be asked via email to certify that their eDisclose information is up to date. The Annual Certification does not affect the obligation to disclose outside activities and interests as they arise and before proposing related research.

**Familial Conflicts**

Familial relationships may also give rise to potential conflicts of interest. A familial conflict can occur when a faculty member hires a spouse, domestic partner, child, or other relative to work on his or her projects. A familial conflict can also occur when the faculty member's spouse, domestic partner, child, or other relative has a financial interest related to the faculty member's research or institutional responsibilities. Such arrangements must be reported. Faculty members are prohibited from supervising relatives or determining salary or remuneration for relatives.

**Tech Transfer Activities**

Conflicts of interest can arise in tech transfer when a faculty member is conducting research involving a product for which the faculty member is a licensed inventor. Faculty should report conflicts arising out of tech transfer activities at the time the research activities are proposed and provide relevant updates in eDisclose as they arise.

**Conflicts of Interest in Human Subjects Research**

Conflicts of interest in human subjects research deserve special scrutiny because of the potential for such conflicts to affect the rights and welfare of human subjects. Faculty conducting human subjects research must indicate a potential conflict of interest on the IRB application and must report this through eDisclose. The COI Committee will review the report and make management recommendations to the IRB and the PI. A common management condition includes disclosure of the arrangement in the in the consent form.

The IRB can decide whether to a) accept the Conflict of Interest Committee recommendations, b) accept the recommendations with additional management measures prescribed by the IRB, or c) conclude that the human subjects research cannot proceed.

**NIH Conflict of Interest Reporting requirements**

In accordance with 42 CFR 50 Subpart F, the School must report to NIH those conflicts that are determined to be financial conflicts of interest (FCOI) related to Public Health Service (PHS) funded research. An outside interest becomes a reportable FCOI if the faculty member is entitled to receive more than $5,000 in remuneration from a publicly traded entity, including but not limited to salary, honoraria, and equity interest. The value of equity is determined by fair market value on the date of disclosure. Regarding a non-publicly traded entity, an outside interest becomes a reportable FCOI if the faculty member is entitled to receive more than $5,000 in remuneration and/or any equity interest. Intellectual property rights are also considered a reportable FCOI.

If the COI committee determines that a financial interest could directly and significantly affect the design, conduct or reporting of PHS supported research, the School will report this FCOI to the NIH.
However, this does NOT mean that the research cannot be done but, instead, that a management plan for avoiding biased research must be in place. Federal regulations also require that the school respond to requests from any member of the public for information regarding FCOIs reported to NIH that are associated with PHS-funded research.

Grant and contract submission requires disclosure of potential conflicts related to the research to the Office of Research Administration (ORA) and in eDisclose. The Conflict of Interest Committee considers these disclosures for review and management.

What constitutes a Conflict of Interest?

The questions posed below, when answered “yes”, are examples of potential conflicts of interest:

- Does your external activity involve the uncompensated use of facilities or resources belonging to Johns Hopkins University by or on behalf of another organization?
- Does your external activity involve the transfer of your intellectual or tangible property rights including patent ownership or licensing to an organization other than the University?
- Does your external arrangement or agreement restrict the public disclosure of the existence of the external arrangement?
- Does the external activity restrict your right to publicly disclose information developed by you through your involvement in the activity?
- Does your involvement in the external activity appear to influence either the conduct of the University’s business or the conduct of research within the University?
- Is your research and/or academic work sponsored by a company for which you consult or have a paid position?
- Is your research and/or academic work sponsored by a company for which you (or your spouse or your children) hold any ownership interest (stock, not including stock owned through a mutual fund) or from which you are entitled to receive royalties from a licensing agreement?
- Is your research and/or academic work sponsored by a company for which you serve on its scientific advisory board or board of directors?
- Are you (or your spouse or child) in a position to influence University decision making regarding purchasing products or services from an organization that you (1) hold an equity interest (not mutual funds) in the organization, (2) hold a position in the organization or on its governing board, and/or (3) serve as a paid or unpaid consultant to the organization?
- Is spouse/child involved in one of your sponsored projects, either directly or through a subcontract?
- Does your external activity involve use of the name of the Johns Hopkins University or any of
its schools or divisions by another organization?

This list is not exhaustive. There may be other instances when an external activity could pose a potential conflict and would need to be reported. Contact our office for guidance if you are unsure if an activity needs to be reported.

**Conflict of Interest Committee Review and Management**

The Conflict of Interest Committee reviews all reports of outside activities to determine whether a potential conflict of interest exists. If the Committee finds a potential conflict exists, the Committee informs the faculty member in writing of required conditions to manage the conflict. Common management conditions required by the Committee could include:

- Disclose relationship with external entity in relevant publications and presentations
- Limit of a faculty member's role in the research study (eg. Exclusion from consenting participants, data analysis, etc)
- Appoint an independent oversight committee for the study
- Require that the PI places equity in escrow account
- Transfer supervision of a spouse to another individual

If the Committee finds that the conflict cannot be managed, the Committee can prohibit the proposed external activity.

Changes in previously disclosed relationships with outside entities may require that the Conflict of Interest Committee re-review both the disclosure and any conditions in place to manage the conflict. For example, a consulting relationship with a company disclosed in eDisclose could pose a conflict if the faculty member subsequently receives a grant from the company to do research. In these situations, faculty should provide information about this additional relationship to the company in eDisclose.

Committee membership can be viewed here:

[https://my.jhsph.edu/Committees/ConflictofInterestCommittee/Pages/default.aspx](https://my.jhsph.edu/Committees/ConflictofInterestCommittee/Pages/default.aspx)

**Contact Information for Assistance**

For questions about conflict of interest and commitment, please contact Elizabeth Peterson, Research Compliance Officer, at 410-502-0433 or epeterso@jhsph.edu
Resources:

JHSPH Conflict of Interest and Commitment Policy (PPM-4)
https://my.jhsph.edu/Resources/PoliciesProcedures/ppm/PolicyProcedureMemoranda/Faculty_04_Conflict_of_Interest_and_Commitment.pdf

JHSPH Policy on Interaction with Industry (PPM-10)
https://my.jhsph.edu/Resources/PoliciesProcedures/ppm/PolicyProcedureMemoranda/Faculty_10_Interaction_with_Industry_and_Outside_Interests.pdf

JHU Policy on Conflict of Interest
http://www.hopkinsmedicine.org/Research/OPC/JHU_Conflict_of_Interest/

NIH Policy on Conflict of Interest
http://grants.nih.gov/grants/policy/coi/
Do I need to disclose this travel expense?*

STOP You are not required to disclose these travel expenses.

NO

Do you participate in PHS funded research?

YES

STOP You are not required to disclose these travel expenses.

NO

Did you get reimbursed for travel from a grant, contract, or other source through the School or University?

YES

STOP You are not required to disclose these travel expenses.

NO

Were the travel expenses paid by any of the following: U.S.* state, federal or local government agencies, teaching hospitals, medical centers, institutes of higher education or their related research institutes?

YES

STOP You are not required to disclose these travel expenses.

NO

GO You must disclose the amount received for these travel expenses in eDisclose.

**Travel paid by foreign entities must be disclosed.

*Disclosures for travel expense associated with outside activities paid directly to you or for you. Includes transportation, lodging, and meals.
Supervision of Students, Post-doctoral Fellows, and Other Research Personnel

The Johns Hopkins Bloomberg School of Public Health is committed to fostering an environment that promotes academic and professional success for all research team members. This requires cultivation of an atmosphere of mutual respect, collegiality, fairness and trust. Faculty bear significant responsibility in creating and maintaining this atmosphere during interactions with colleagues, staff and students. We also serve as role models so the manner in which we conduct our own research should be above reproach. The daily interactions that occur in a lab or other research situation likely do as much to instill good practices in students as any other single aspect of training. The following guidelines may seem obvious but are worth stating. Supervision takes significant investment of your time and energy but be advised that this pales in contrast to the time and energy necessary to remedy difficulties when they arise.
Guidelines*

✓ Within a research team or individual project, responsibility for supervision of each student, fellow, or other (non-faculty) member should be assigned to a specific faculty member and that faculty member should know for which trainees they are responsible.

✓ The burden for ensuring that all trainees and other research personnel meet appropriate regulatory and institutional requirements, such as those required for the conduct of studies involving humans, animals, radioactive or other hazardous substances, and recombinant DNA falls on the Principal Investigator.

✓ Only faculty can serve as PIs on submission of Human Subjects (IRB) or Animal (IACUC) research proposals. As such, they are fully responsible for conduct of that study, even if it is a student’s project.

✓ The ratio of trainees to faculty members should be commensurate with the ability to adequately supervise and ensure that close interaction is possible for scientific interchange as well as for supervision at all stages of research.

✓ Faculty should have realistic expectations regarding the performance of trainees and other research personnel and should inform them of these expectations.

✓ Faculty should create an environment conducive to unbiased analysis of all data without intentional or unintentional pressure to support a particular hypothesis.

✓ Faculty should supervise the design of studies and the processes of acquiring, recording, examining, interpreting, and storing data. The editing of manuscripts alone does not constitute adequate supervision by a faculty member.
Collegial discussion among faculty and mentees contributes positively to the scientific efforts of the members of the group and to informal peer review. For this reason, faculty should schedule periodic meetings with their students, fellows and other members of the research team. Such meetings can serve to socialize mentees to the scientific community and help the mentee establish a scientific network of individuals that they can consult for issues surrounding ethical research practices.

Faculty should be alert to behavioral changes in mentees or other research personnel that may indicate inordinate personal or academic stress or substance abuse. Since the care with which research activities are conducted may be adversely affected by a research team member’s personal situation, a mentee or employee may need closer supervision at such times. When such questions arise, faculty should seek advice from the Office of Graduate Education and Research, Student Support Services, or the Johns Hopkins Students Assistance Program (http://hopkinsworklife.org/fasap/student.html)

Resources

There are some excellent resources that can help circumvent problems and provide guidance on how to handle mentor/mentee relationships.

These include:


Gadlin, H. Jessar, K. *Preempting Discord: Prenuptual Agreements for Scientists*. Available at: [http://ori.hhs.gov/education/preempt_discord.shtml](http://ori.hhs.gov/education/preempt_discord.shtml)
Authorship

Some of the most common yet thorniest academic issues involve problems with authorship – exclusion, order and, at times, inclusion. The best advice for all individuals is to negotiate authorship prior to initiating a manuscript. The principal investigator should recognize that students may be hesitant or embarrassed to raise authorship issues so the PI should take the lead on insuring an open airing of the topic. It is not uncommon for authorship order to shift during the crafting of a manuscript as individuals assume greater or lesser roles. Again, discussion of the consequences of such changes as they occur can prevent future disputes.

Authors are usually listed in their order of importance with the designation of first or last author carrying special weight, although the significance of being last author is more pronounced in certain fields. All authors, regardless of their order, assume responsibility for the work. Thus you assume credit for good work, but also liability if the work is found to lack scientific integrity. Efforts to distance oneself from disputed results cannot be reasonably justified on the grounds of unfamiliarity with the methods, analysis or interpretation.

Occasionally, someone finds his name included on a paper either as an ill-advised act of generosity by the main author or in an effort to confer legitimacy to a group of less experienced investigators. Both circumstances should be avoided and if they occur, be rectified. It’s always better to resolve disputes prior to journal submission. The Associate Dean for Research can assist in this process if mediation would be helpful.

A fairly common cause of authorship disputes is when one author charged with taking the lead on a publication, often a student, fails to do so in a timely fashion. Often the student assumes that the data belong to him and the publication timing is equally under his control; this is particularly true for thesis research. Neither assumption is correct (see Data Management section). In particular, PIs of sponsored projects are obligated to ensure that results of the research are appropriately disseminated. The value in establishing a mutually agreed upon timeline of expectations for completion, in writing, and contingencies as to how authorship order may change if responsibilities for manuscript preparation change if the timeline is not met cannot be underestimated.
Guidelines

✓ All persons designated as authors should qualify for authorship, and all those who qualify should be listed. The principal investigator should be prepared to explain the order in which authors are listed.

✓ Authorship credit for original, research-based works (in any medium) may be based on:

1) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data;

2) drafting the article or revising it critically for important intellectual content;

3) sufficient participation in the work to take public responsibility for appropriate portions of the content; and

4) final approval of the version to be published.

Authors should meet conditions 1, 2, 3, and 4. Other contributions such as provision of a key reagent, or collection of data may also be considered as long as conditions 2, 3 and 4 are met.

✓ Authorship credit for reviews or commentaries not based in original research should be based on conditions 2, 3 and 4.

✓ Acquisition of funding, collection of data (for example, from a fee-for-service core facility), or general supervision of the research group (e.g. by former or current mentors not directly involved in the conception or execution of the publication), alone, does not justify authorship.
✓ Increasingly, authorship of multi-center trials is attributed to a group. All members of the group who are named as authors should fully meet the above criteria for authorship.

✓ Contributors who do not meet the criteria for authorship may be included in an acknowledgments section, with written permission as needed by journal guidelines.

*These authorship guidelines were based in large part on requirements prepared by the International Committee of Medical Journal Editors. Complete text of the ICMJE requirements may be found at http://www.icmje.org/

However, different disciplines may have somewhat different practices and expectations. Refer to the authorship guidelines for specific journals or professional societies.
Resources

Most journals and many professional societies have guidance on authorship. A few notable policies are listed below.

American Journal of Public Health Authorship Policy
http://ajph.aphapublications.org/misc/ifora.pdf


American Psychological Society (APA) Ethical Principles of Psychologists and Code of Conduct, Standard 8: Research and Publication; available at:


Responsible Authorship Quick Guide
http://ori.dhhs.gov/education/products/niu_authorship/index.htm
Ending Honorary Authorship

CREDIT FOR SCIENTIFIC RESEARCH CONTRIBUTIONS MUST BE CLEARLY AND APPROPRIATELY ASSIGNED at the time of publication. This task has become increasingly complicated because of the number of different laboratories and coauthors involved in many studies. The good news is that academic institutions, funders, and publishers are exploring new ways to clarify attribution, and many publishers now require disclosure of specific contributions for scientific authorship. As part of this effort, it is critical that the problem of honorary authorship be effectively addressed. According to a recent report, honorary authors were attached to 25% of research reports, 15% of review articles, and 11% of editorials published in six major medical journals in 2008. It is time to end this practice.

A true author is someone who has made substantive intellectual contributions to a study and is responsible for a component of the work. Honorary authorship violates this central principle. Why then is it so frequent? In some cases, honorary authorship amounts to "coercive authorship," in which a senior person informs a junior colleague that the senior person must be listed as an author, even though she/he did not contribute substantially—or at all—to the work. In other cases, the principal investigator may add the name of a prominent scientist in the field as a guest author in an attempt to boost the paper's chance of publication. Both types of behavior have fraudulent aspects, distorting the ethical culture that is central to a healthy academic environment.

To discourage honorary authorship and ensure appropriate accountability for published results, many journals have updated their policies on authorship. For some (including Science), all authors must formally agree to be listed as authors, specify their contributions to the manuscript, and certify that they approve of its content and submission to the journal. But scientific journals could go even further by adding a statement on authorship forms that reminds authors of their accountability in the event of challenges to the veracity or integrity of the work, such as "By signing this statement, I acknowledge that I take credit for the content of the published work. I also acknowledge that I will take responsibility for the work if questions arise in the future as to its authenticity and credibility." Such a statement would serve as a firm reminder that being inappropriately listed as an author has negative consequences if the results are challenged or retracted.

Research institutions should develop and promulgate clear statements in their research policies about the importance of upholding ethical standards of authorship. For example, Washington University in St. Louis defines both guest and gift authorship as research misconduct, whereby "guest (honorary, courtesy, or prestige) authorship is defined as granting authorship out of appreciation or respect for an individual, or in the belief that expert standing of the guest will increase the likelihood of publication, credibility, or status of the work" and "gift authorship is credit, offered from a sense of obligation, tribute, or dependence, within the context of an anticipated benefit, to an individual who has not contributed to the work." Each institution should also specify to whom concerns should be directed, without fear of retribution, when an author feels coerced to include an inappropriate author.

It is incumbent on more-senior coauthors to assist in educating their colleagues about the proper standards for authorship. But all scientists should take a stand against coercive authorship and refuse to comply with such behavior. In this way, senior faculty and mentors will serve as role models of best practices, reinforcing for more-junior investigators the importance of ensuring appropriate authorship. Honorary authorship must no longer be tolerated. Concerted efforts by institutions, authors, and journals are needed to put an end to this fraudulent and unethical practice.

— Philip Greenland and Phil B. Fontanarosa

‡ http://wustl.edu/policies/authorship.html.
Publication and Ethical Writing

Your publication record reflects the integrity of your scientific endeavor. Responsible practices surrounding publications go far beyond authorship. Other than the obvious issues related to the degree to which the research is validly conducted, accurately reported, and appropriately interpreted are issues that relate to the timing and manner in which data are presented as well as the degree to which publications present new information.
Guidelines

✓ Submission of multiple similar research publications differing only slightly in content (e.g., substituting one primary outcome for another) should be avoided as should fragmented or piecemeal reporting of results.

✓ Results should not be published as new in more than one publication. Inclusion of previously published results should always contain appropriate citation to the original version. Text recycling, or “self-plagiarism”, is discussed below.

✓ Published papers should acknowledge financial sponsors of the work to give credit to the sponsoring agency(ies) and to fulfill any contractual obligation.

✓ Publications should also acknowledge financial and material support sponsors to adequately disclose potential financial conflicts of interest. You are obligated to inform reviewers and readers of sponsorship so that they may be alerted to possible intentional or unintentional bias in execution or interpretation of the research. This is particularly important if such disclosure has been imposed by the School’s Conflict of Interest Committee as part of a management plan.

✓ All NIH supported publications must adhere to the mandatory NIH Public Access Policy http://publicaccess.nih.gov/
A JHU guide to implementation of this policy can be found at http://guides.library.jhu.edu/content.php?pid=315747&sid=2683791

✓ “Ghost-writing,” a practice whereby a commercial entity or its contractor essentially writes an article or manuscript and a scientist is listed as an author, is
not permissible. Making minor revisions to an article or manuscript that is ghost-written does not justify authorship.

**Can you plagiarize yourself?**

The practice of reusing what you wrote in one article verbatim or near verbatim in another article is known variously as “text recycling” or “self-plagiarism” and is receiving greater attention. Whether or not this violates ethical standards is a gray area and there are no clear guidelines or standards. While technically cutting and pasting text from one article in one journal to another in a different journal is a potential copyright violation, the issue of intent and content seems to be important. Some practices may be commonly accepted in certain scientific disciplines where methodologies may be highly technical in nature and where changes in the wording of the methodology could misrepresent the procedures and thus appear justifiable. On the other hand, content that is repeated from one publication to the other that is less related to methods may mislead a reader into thinking that this material is unique to this article and violate good publication practices of non-overlap of material. You should be aware of this issue and attempt to revise commonly used portions of research reports as much as possible to avoid encountering problems.

An excellent resource on publication practices and ethical writing, which was supported by the Office of Research Integrity, is:


It contains examples of appropriate and inappropriate paraphrasing as well as more arcane topics such as “salami slicing” and “citation stuffing”.
Resources


Resources for Research Ethics Education, Publication. Available at: http://research-ethics.net/topics/publication/#summary


(attached below)
Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing
Miguel Roig, Ph.D.

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http://facpub.stjohns.edu/~roigm/plagiarism/Index.html

Please send any questions, comments, or suggestions to Miguel Roig, Ph.D.

In recognizing the importance of educating aspiring scientists in the responsible conduct of research (RCR), the Office of Research Integrity (ORI), began sponsoring in 2002 the creation of instructional resources to address this pressing need. The present guide on avoiding plagiarism and other inappropriate writing practices was created, in part, to meet this need. Its purpose is to help students, as well as professionals, identify and prevent such practices and to develop an awareness of ethical writing. This guide is one of the many products stemming from ORI's educational initiatives in the RCR.

INTRODUCTION

Scientific writing can be a complex and arduous process, for it simultaneously demands clarity and conciseness; two elements that often clash with each other. In addition, accuracy and integrity are fundamental components of the scientific enterprise and, therefore, of scientific writing. Thus, good scientific writing must be characterized by clear expression, conciseness, accuracy of what is being reported, and perhaps most importantly, honesty. Unfortunately, writing, or for that matter the entire scientific process, often occurs within the constraints of tight deadlines and other competing pressures. As a result of these constraints, scientific papers, whether generated by science students or by seasoned professionals, will at times be deficient in one or more of the above components.

Insufficient clarity or lack of conciseness are typically unintentional and relatively easy to remedy by standard educational or editorial steps. Lapses in the accuracy of what is reported (e.g., faulty observations, incorrect interpretation of results) are also assumed to be most often unintentional in nature, but such lapses, even if unintentional, can have significant undesirable consequences if not corrected. Intentional lapses in integrity, even if seemingly minor, are by far the most serious type of problem because such misconduct runs contrary to the primary goal of the scientific enterprise, which is the search for truth.
In scientific writing, perhaps the most widely recognized unethical lapse is plagiarism. Plagiarism can occur in many forms and some of the more subtle instances, while arguably unethical in nature, may not be classified as scientific misconduct by federal agencies such as the National Science Foundation (NSF) or the Office of Research Integrity (ORI). Nevertheless, the ethical professional is expected to operate at the highest levels of scientific integrity and, therefore, must avoid all forms of writing that could be conceptualized as plagiarism.

There are other questionable writing practices, some of which may be quite common in professional scientific writing. One example is reporting and discussing results of one’s research in the context of literature that is supportive of our conclusions while at the same time ignoring evidence that is contrary to our findings. Another writing “malpractice” occurs when another author’s review of a literature is used, yet the reader is led to believe that the current author has conducted the actual review.

**On ethical writing**

A general principle underlying ethical writing is the notion that the written work of an author, be it a manuscript for a magazine or scientific journal, a research paper submitted for a course, or a grant proposal submitted to a funding agency, represents an implicit contract between the author of that work and its readers. According to this implicit contract, the reader assumes that the author is the sole originator of the written work, that any text or ideas borrowed from others are clearly identified as such by established scholarly conventions, and that the ideas conveyed therein are accurately represented to the best of the author’s abilities. In sum, as Kolin (2002) points out “Ethical writing is clear, accurate, fair, and honest”. It also conveys to the reader that we strive for ethical conduct as well as ethical practice.

As is the case with most other human activities, errors in writing which violate the spirit of the contract do occur. For example, in proposing a new idea or data, an author may dismiss a certain line of evidence as unimportant, and thus quite unintentionally, ignore other established data or other evidence that fail to support, or outright contradict, his/her own ideas or data thereby misleading the reader. Judging by some of the readers’ letters and commentaries published in scientific journals in response to certain published articles, this type of oversight appears to be not all that uncommon in the sciences, particularly when dealing with controversial topics.

Other errors include situations in which an idea claimed by its author to be completely original, may have actually been articulated earlier by someone else. Such “rediscovery” of ideas is a relatively well-known phenomenon in the sciences, often occurring within a very close timeframe. Cognitive psychologists have provided considerable evidence for the existence of cryptomnesia, or unconscious plagiarism, which refers to the notion that individuals previously exposed to others’ ideas will often remember the idea, but not its source, and mistakenly believe that they themselves originated the idea.
Other unintentional errors occur, such as when authors borrow heavily from a source and, in careless oversight, fail to fully credit the source. These and other types of inadvertent lapses are thought to occur with some frequency in the sciences. Unfortunately, in some cases, such lapses are thought to be intentional and therefore constitute clear instances of unethical writing. Without a doubt, plagiarism is the most widely recognized and one of the most serious violations of the contract between the reader and the writer. Moreover, plagiarism is one of the three major types of scientific misconduct as defined by the Public Health Service; the other two being falsification and fabrication (U. S. Public Health Service, 1989). Most often, those found to have committed plagiarism pay a steep price. Plagiarists have been demoted, dismissed from their schools, from their jobs, and their degrees and honors have been rescinded as a result of their misdeeds (Standler, 2000).

PLAGIARISM

"taking over the ideas, methods, or written words of another, without acknowledgment and with the intention that they be taken as the work of the deceiver." American Association of University Professors (September/October, 1989).

As the above quotation states, plagiarism has been traditionally defined as the taking of words, images, ideas, etc. from an author and presenting them as one’s own. It is often associated with phrases, such as kidnapping of words, kidnapping of ideas, fraud, and literary theft. Plagiarism can manifest itself in a variety of ways and it is not just confined to student papers or published articles or books. For example, consider a scientist who makes a presentation at a conference and discusses at length an idea or concept that had already been proposed by someone else and that is not considered common knowledge. During his presentation, he fails to fully acknowledge the specific source of the idea and, consequently, misleads the audience into thinking that he was the originator of that idea. This, too, may constitute an instance of plagiarism. Consider the following real-life examples of plagiarism and the consequences of the offender’s actions:

- A historian resigns from the Pulitzer board after allegations that she had appropriated text from other sources in one of her books.
- A biochemist resigns from a prestigious clinic after accusations that a book he wrote contained appropriated portions of text from a National Academy of Sciences report.
- A famous musician is found guilty of unconscious plagiarism by including elements of another musical group’s previously recorded song in one of his new songs that then becomes a hit. The musician is forced to pay compensation for the infraction.
- A college president is forced to resign after allegations that he failed to attribute the source of material that was part of a college convocation speech.
- A member of Congress running for his party’s nomination withdraws from the presidential race after allegations of plagiarism in one of his speeches.
• A psychologist has his doctoral degree rescinded after the university finds that portions of his doctoral dissertation had been plagiarized.

In sum, plagiarism can be a very serious form of ethical misconduct. For this reason, the concept of plagiarism is universally addressed in all scholarly, artistic, and scientific disciplines. In the humanities and the sciences, for example, there are a plethora of writing guides for students and professionals whose purpose, in part, is to provide guidance to authors on discipline-specific procedures for acknowledging the contributions of others. Curiously, when it comes to the topic of plagiarism, many professional writing guides appear to assume that the user is already familiar with the concept. In fact, while instruction on attribution, a key concept in avoiding plagiarism, is almost always provided, some of the most widely used writing guides do not offer specific sections on plagiarism. Moreover, those that provide coverage often fail to go beyond the most basic generalities about this type of transgression.

Although plagiarism can take many forms there are two major types in scholarly writing: plagiarism of ideas and plagiarism of text.

**Plagiarism of ideas**

• *Appropriating an idea (e.g., an explanation, a theory, a conclusion, a hypothesis, a metaphor) in whole or in part, or with superficial modifications without giving credit to its originator.*

In the sciences, as in most other scholarly endeavors, ethical writing demands that ideas, data, and conclusions that are borrowed from others and used as the foundation of one’s own contributions to the literature, must be properly acknowledged. The specific manner in which we make such acknowledgement varies from discipline to discipline. However, source attribution typically takes the form of either a footnote or a reference citation.

**Acknowledging the source of our ideas**

Just about every scholarly or scientific paper contains several footnotes or reference notes documenting the source of the facts, ideas, or evidence that is reported in support of arguments or hypotheses. In some cases, as in those papers that review the literature in a specific area of research, the reference section listing the sources consulted can be quite extensive, sometimes taking up more than a third of the published article (see, for example, Logan, Walker, Cole, & Leukefeld, 2000). Most often, the contributions we rely upon come from the published work or personal observations of other scientists or scholars. On occasion, however, we may derive an important insight about a phenomenon or process that we are studying, through a casual interaction with an individual not necessarily connected with scholarly or scientific work. Even in such cases, we still have a moral obligation to credit the source of our ideas. A good illustrative example of the latter point
was reported by Alan Gilchrist in a 1979 Scientific American article on color perception. In a section of the article which describes the perception of rooms uniformly painted in one color, Gilchrist states: "We now have a promising lead to how the visual system determines the shade of gray in these rooms, although we do not yet have a complete explanation. (John Robinson helped me develop this lead.)" (p.122; Gilchrist, 1979). A reader of the scientific literature might assume that Mr. Robinson is another scientist working in the field of visual perception, or perhaps an academic colleague or an advanced graduate student of Gilchrist's. The fact is that John Robinson was a local plumber and an acquaintance of Gilchrist in the town where the author spent his summers. During a casual discussion of Gilchrist's work, Robinson's insights into the problem that Gilchrist had been working on were sufficiently important to the development of his theory of lightness perception that Gilchrist felt ethically obligated to credit Robinson's contribution.

Even the most ethical authors can fall prey to the inadvertent appropriation of others' ideas, concepts, or metaphors. Here we are referring to the phenomenon of unconscious plagiarism, which, as stated earlier, takes place when an author generates an idea that s/he believes to be original, but which in reality had been encountered at an earlier time. Given the free and frequent exchange of ideas in science, it is not unreasonable to expect instances in which earlier exposure to an idea that lies dormant in someone's unconscious, emerges into consciousness at a later point, but in a context different from the one in which the idea had originally occurred. Presumably, this is exactly what happened in the case of former Beatle George Harrison, whose song "My Sweet Lord" was found to have musical elements of the song "He's So Fine", which had been released years earlier by The Chiffons (see Bright Tunes Music Corp. v. Harrison Songs Music, Ltd., 1976). Unfortunately, there are probably other John Robinsons, as well as other accomplished scientists, scholars, and artists, now forgotten, whose original, but unacknowledged ideas have been subsequently and unconsciously (or sadly, perhaps quite intentionally) "reinvented/rediscovered" by others and have, thus, failed to get their due credit.

In some cases the misappropriation of an idea can be a subtle process. Consider the famous case of Albert Schatz who, as a graduate student working under Selman Waksman at Rutgers, discovered the antibiotic streptomycin. Even though the first publications describing his discovery identified Schatz as primary author (Martin, 1997), it was Waksman who, over a period of time, began to take sole credit for the discovery ultimately earning him the Nobel prize in 1952 (see, for example, Shatz, 1993; Mistiaen, 2002 for a fuller description of this case).

Of course, there also have been instances in which unscrupulous scientists have intentionally misappropriated ideas. The confidential peer review process is a ripe source from which ideas may be plagiarized. Consider the scenario where the offender is a journal or conference referee, or a member of a review panel for a funding agency. He reads a paper or a grant proposal describing a promising new methodology in an area of research directly related to his own work. The grant fails to get funded based, in large part, on his negative evaluation of the protocol. He then goes back to his lab and prepares a grant
proposal using the methodology stolen from the proposal that he refereed earlier and submits his proposal to a different granting agency.

Most of us would deem the behavior depicted in the above scenario as downright despicable. Unfortunately, similar situations have occurred. In fact, elements of the above scenario are based on actual cases of scientific misconduct investigated by ORI. The peer review context appears to be sufficiently susceptible to the appropriation of ideas that in 1999 the federal Office of Science and Technology expanded their definition of plagiarism as follows:

"Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit, including those obtained through confidential review of others' research proposals and manuscripts." (Office of Science and Technology Policy, 1999).

**Guideline 1:** An ethical writer ALWAYS acknowledges the contributions of others and the source of his/her ideas.

**Plagiarism of text**

- Copying a portion of text from another source without giving credit to its author and without enclosing the borrowed text in quotation marks.

When it comes to using others’ word-for-word (verbatim) text in our writing the universally accepted rule is to enclose that information in quotations and to indicate the specific source of that text. When quoting text from other sources, you must provide a reference citation and the page number indicating where the text comes from. Although the use of direct quotes is uncommon in the biomedical literature, there may be occasions when it is warranted. The material quoted earlier from Gilchrist (1979) serves as a good example of when to use quotations.

Although the evidence indicates that most authors, including college students, are aware of rules regarding the use of quotation marks, plagiarism of text is probably the most common type of plagiarism. However, plagiarism of text can occur in a variety of forms. The following review will allow the reader to become familiar with the various subtle forms of plagiarism of text.

**Guideline 2:** Any verbatim text taken from another author must be enclosed in quotation marks.

Let’s consider the following variety:

- Copying a portion of text from one or more sources, inserting and/or deleting some of the words, or substituting some words with synonyms, but
never giving credit to its author nor enclosing the verbatim material in quotation marks.

The above form of plagiarism is relatively well known and has been given names, such as patchwriting (Howard, 1999) and paraphragiarism (Levin & Marshall, 1993). Iverson, et al. (1998) in the American Medical Association’s Manual of Style identify this type of unethical writing practice as mosaic plagiarism and they define it as follows:

“Mosaic: Borrowing the ideas and opinions from an original source and a few verbatim words or phrases without crediting the original author. In this case, the plagiarist intertwines his or her own ideas and opinions with those of the original author, creating a ‘confused plagiarized mass’” (p. 104).

Another, more blatant form which may also constitute plagiarism of ideas occurs when an author takes a portion of text from another source, thoroughly paraphrases it, but never gives credit to its author.

**Guideline 3:** We must always acknowledge every source that we use in our writing; whether we paraphrase it, summarize it, or enclose it quotations.

**Inappropriate paraphrasing**

- *Taking portions of text from one or more sources, crediting the author/s, but only changing one or two words or simply rearranging the order, voice (i.e., active vs. passive) and/or tense of the sentences.*

Inappropriate paraphrasing is perhaps the most common form of plagiarism and, at the same time, the most controversial. This is because the criteria for what constitutes proper paraphrasing differs between individuals even within members of the same discipline. We will discuss these issues shortly, but first let’s consider the process of paraphrasing.

**Paraphrasing and Summarizing**

Scholarly writing, including scientific writing, often involves the **paraphrasing** and **summarizing** of others’ work. For example, in the introduction of a traditional scientific paper it is customary to provide a brief and concise review of the pertinent literature. Such a review is accomplished by the cogent synthesis of relevant theoretical and empirical studies and the task typically calls for the summarizing of large amounts of information.
Guideline 4: When we summarize, we condense, in our own words, a substantial amount of material into a short paragraph or perhaps even into a sentence.

At other times, and for a variety of reasons, we may wish to restate in detail and in our own words a certain portion of another author's writing. In this case, we must rely on the process of paraphrasing. Unlike a summary, which results in a substantially shorter textual product, a paraphrase usually results in writing of equivalent textual length as the original, but, of course, with a different words and, ideally, different sentence structure. Whether paraphrasing or summarizing others' work, we must always provide proper credit. In fact, when paraphrasing in the humanities, one may thoroughly modify another author's text and provide the proper citation. However, if the original sentence structure is preserved in the paraphrase, some will classify such writing as an instance of plagiarism.

Guideline 5: Whether we are paraphrasing or summarizing we must always identify the source of our information.

Paraphrasing and Plagiarism: What the writing guides say

Although virtually all professional and student writing guides, including those in the sciences, provide specific instructions on the proper use of quotes, references, etc., many fail to offer specific details on proper paraphrasing. With some exceptions, writing guides that provide instructions for proper paraphrasing and avoiding plagiarism tend to subscribe to a 'conservative' approach to paraphrasing. That is, these guides often suggest that when paraphrasing, an author must substantially modify the original material. Consider the following examples of paraphrasing guidelines:

"Don't plagiarize. Express your own thoughts in your own words.... Note, too, that simply changing a few words here and there, or changing the order of a few words in a sentence or paragraph, is still plagiarism. Plagiarism is one of the most serious crimes in academia." (Pechenik, 2001; p.10).

"You plagiarize even when you do credit the author but use his exact words without so indicating with quotation marks or block indentation. You also plagiarize when you use words so close to those in your source, that if your work were placed next to the source, it would be obvious that you could not have written what you did without the source at your elbow." (Booth, Colomb, & Williams, 1995; p. 167)
On the other hand, some writing guides appear to suggest a more liberal approach to paraphrasing. For example, consider the following guideline from the Publication Manual of the American Psychological Association (2001), a guide that is also used by other disciplines (e.g., Sociology, Education), in addition to psychology:

"...Each time you paraphrase another author (i.e., summarize a passage or rearrange the order of a sentence and change some of the words), you need to credit the source in the text." (p. 349).

However, this same resource provides an example of paraphrasing that is consistent with the more conservative definitions outlined above. Moreover, other writing guides (e.g., Hacker, 2000) that review the style used by American Psychological Association (APA) interpret the APA guidelines in the same conservative fashion. I advocate the more conservative approach to paraphrasing with one caveat (see below).

**Guideline 6:** When paraphrasing and/or summarizing others' work we must reproduce the exact meaning of the other author's ideas or facts using our words and sentence structure.

**Examples of paraphrasing: Good and Bad**

The ethical writer takes great care to insure that any paraphrased text is sufficiently modified so as to be judged as new writing. Let's consider various paraphrased versions of the following material on the electrochemical properties of neurons (taken from Martini & Bartholomew, 1997). In acknowledging the source, we will use the footnote method commonly used in the biomedical sciences. The actual reference would appear in the reference section of the paper.

"Because the intracellular concentration of potassium ions is relatively high, potassium ions tend to diffuse out of the cell. This movement is driven by the concentration gradient for potassium ions. Similarly, the concentration gradient for sodium ions tends to promote their movement into the cell. However, the cell membrane is significantly more permeable to potassium ions than to sodium ions. As a result, potassium ions diffuse out of the cell faster than sodium ions enter the cytoplasm. The cell therefore experiences a net loss of positive charges, and as a result the interior of the cell membrane contains an excess of negative charges, primarily from negatively charged proteins." (p. 204).

Here is an **Appropriate Paraphrase** of the above material:
A textbook of anatomy and physiology\(^1\) reports that the concentration of potassium ions inside of the cell is relatively high and, consequently, some potassium tends to escape out of the cell. Just the opposite occurs with sodium ions. Their concentration outside of the cell causes sodium ions to cross the membrane into the cell, but they do so at a slower rate. According to these authors, this is because the permeability of the cell membrane is such that it favors the movement of potassium relative to sodium ions. Because the rate of crossing for potassium ions that exit the cell is higher than that for sodium ions that enter the cell, the inside portion of the cell is left with an overload of negatively charged particles, namely, proteins that contain a negative charge.

Notice that, in addition to thoroughly changing much of the language and some of the structure of the original paragraph, the paraphrase also indicates, as per guideline 5, that the ideas contained in the rewritten version were taken from another source. When we paraphrase and/or summarize others’ work we must also give them due credit, a rule not always applied by inexperienced writers.

Let’s suppose that instead of paraphrasing, we decide to summarize the above paragraph from Martini and Bartholomew. Here is one summarized version of that paragraph:

The interior of a cell maintains a negative charge because more potassium ions exit the cell relative to sodium ions that enter it, leaving an over abundance of negatively charged protein inside of the cell.\(^1\)

In their attempts at paraphrasing, sometimes authors commit ‘near plagiarism’ (or plagiarism, depending on who is doing the judging) because they fail to sufficiently modify the original text and thus, produce an inappropriately paraphrased version. Depending on the extent of modifications to the original, the extent of text involved, and on who is doing the judging, inappropriate paraphrasing may constitute an instance of plagiarism. For example, the following versions of the Martini and Bartholomew paragraph are inappropriately paraphrased and can thus be classified as plagiarized versions:

**Inappropriate paraphrase (version 1):**

Because the intracellular concentration of potassium ions is _high_, potassium ions tend to diffuse out of the cell. This movement is _triggered_ by the concentration gradient for potassium ions. Similarly, the concentration gradient for sodium ions tends to promote their movement into the cell. However, the cell membrane is _much_ more permeable to potassium ions than to _it is to_ sodium ions. As a result, potassium ions diffuse out of the cell _more rapidly_ than sodium ions enter the cytoplasm. The cell therefore experiences a _loss_ of positive charges, and as a result the interior of the cell membrane
contains a surplus of negative charges, primarily from negatively charged proteins.¹ (p. 204).

A comparison between the original version of the Martini and Bartholomew paragraph to the ‘rewritten’ version above reveals that the rewritten version is a mere copy of the original. The few modifications that were made are superficial, consisting merely of a couple of word deletions, substitutions, and additions. Even though by the insertion of a reference note (¹) the writer has credited Martini and Bartholomew with the ideas expressed, most of the words and structure of the original paragraph are preserved in the rewritten version. Therefore, the reader would have been misled as to the origin of the writing.

Inappropriate paraphrase (version 2):

The concentration gradient for sodium (Na) ions tends to promote their movement into the cell. Similarly, the high intracellular concentration of potassium (K) ions is relatively high resulting in K’s tendency to diffuse out of the cell. Because the cell membrane is significantly more permeable to K than to Na, K diffuses out of the cell faster than Na enter the cytoplasm. The cell therefore experiences a net loss of positive charges and, as a result the interior of the cell membrane now has an excess of negative charges, primarily from negatively charged proteins.¹ (p. 204).

At first glance this second ‘rewritten’ version may look as if it has been significantly modified from the original, but in reality, it is not unlike the first inappropriately paraphrased version in that only superficial changes have been made to the original. In this particular case, the writer has made a seemingly disingenuous change by substituting the names of the atoms by using their chemical symbols (e.g., sodium = Na). In addition, the order of the first two sentences was changed giving the appearance of a substantial modification. However, as in the previous version, the language and much of the rest of structure is still too similar to the original.

Again, it must be emphasized that when we paraphrase we must make every effort to restate the ideas in our words. Here is another properly paraphrased version:

Appropriate paraphrase (version 2):

The relatively high concentration gradient of sodium ions outside of the cell causes them to enter into the cell’s cytoplasm. In a similar fashion, the interior concentration gradient of potassium ions is also high and, therefore, potassium ions tend to scatter out of the cell through the cell’s membrane. But, a notable feature of this process is that Potassium ions tend to leave the cell faster than sodium ions enter the cytoplasm. This is because of the nature of the
cell membrane’s permeability, which allows potassium ions to cross much more freely than sodium ions. The end result is that the interior of the cell membrane’s loss of positive charges results in a greater proportion of negative charges and these made up mostly of proteins that have acquired a negative charge.¹

Paraphrasing highly technical language

We have established that taking a paragraph, or for that matter, even a sentence from another source, and using it in our own writing without enclosing the material in quotations can constitute plagiarism. Similarly, inappropriate paraphrasing may also be classified as plagiarism.

The available evidence indicates that one of the reasons writers misappropriate text is because they may be unfamiliar with the concepts and/or language with which s/he is working. The ability to properly paraphrase technical text depends in large part on an author’s conceptual understanding of the ideas being processed and his/her mastery and command of the technical language involved. Accordingly, correct paraphrases are easy when the language of the original material allows us many options for substituting words and phrases. Research shows that when asked to paraphrase, students, as well as university professors, are more likely to appropriate and, therefore, plagiarize text when the original material to be paraphrased is made up of technical language and it is difficult to read than when the material is written in plain language and is easier to read.

Obviously, inexperienced authors (e.g., students) have the greatest difficulty paraphrasing the advanced technical text often found in the primary literature. In an effort to introduce them to primary sources of information in a given discipline, college students are often required to write a research paper using only articles from professional journals. For those students who must complete this type of assignment for the first time, and, in particular, for foreign students whose primary language is not English, writing a research paper can be a daunting task. This is because scholarly prose: 1) can be very intricate, 2) adheres to unique, stylistic conventions (e.g., use of the passive voice in the biomedical sciences), and 3) relies heavily on jargon that novice writers have yet to master. Consequently, students’ need to create an acceptable academic product that is grammatically correct and that demonstrates knowledge of the concepts discussed, forces many of them to rely on close paraphrases of the original text. Unfortunately, such writing can result in a charge of plagiarism.

Guideline 7: In order to make substantial modifications to the original text that result in a proper paraphrase, the author must have a thorough understanding of the ideas and terminology being used.
An analogous situation can occur at the professional level when we wish to paraphrase, say, a complex process or methodology. Traditional writing conventions give us the option to use any material that is difficult to paraphrase by enclosing it in quotation marks with some type of indication (e.g., a footnote) as to its origin. Therefore, if the text is so technical that it would be very difficult or near impossible to modify substantially without altering its meaning, then perhaps it would be best to leave it in the original author’s wording, enclose it in quotation marks, and include a citation. However, unlike literature or philosophy, quoting in certain disciplines (e.g., biological sciences) is not encouraged (see Pechnick, 2001). One would be hard pressed to find an entire sentence quoted, let alone a short paragraph, in the pages of prestigious journals in the biomedical sciences (e.g., Nature, Science, New England Journal of Medicine).

In sum, the reality is that traditional scientific prose and diction do not always facilitate paraphrasing. To illustrate the difficulties inherent in paraphrasing highly technical language, let’s consider the following paragraph from a report recently published in Science (Lunyaak, et al., 2002).

“Mammalian histone lysine methyltransferase, suppressor of variegation 39H1 (SUV39H1), initiates silencing with selective methylation on Lys$^9$ of histone H3, thus creating a high-affinity binding site for HP1. When an antibody to endogenous SUV39H1 was used for immunoprecipitation, MeCP2 was effectively coimmunoprecipitated; conversely, aHA antibodies to HA-tagged MeCP2 could immunoprecipitate SUV39H1 (Fig. 2G).” (p. 1748)

Here is an attempt at paraphrasing the above material:

A high affinity binding site for HP1 can be produced by silencing Lys$^9$ of histone H3 by methylation with mammalian histone lysine methyltransferase, a suppressor of variegation 39H1 (SUV39H1). MeCP2 can be immunoprecipitated with antibodies prepared against endogenous SUV39H1; on the other hand, immunoprecipitation of SUB39H1 resulted from aHA antibodies to HA-tagged MeCP2.

Unlike the previous examples of appropriate paraphrasing, the above example does not embody as many textual modifications. For the exact meaning of the original Science paragraph to be preserved in the present case, many of the same terms must be left intact in the paraphrased version. Although synonyms for some of the words may be available, their use would likely alter the meaning of the original. For example, take the word affinity, which is defined as “that force by which a substance chooses or elects to unite with one substance rather than with another” (Dorland, 2000). Roget’s Thesaurus (Chapman, 1992) lists the following synonyms for affinity: accord, agreement, attraction, friendship, inclination, marriage relationship, preference, relationship, similarity, and tendency. Although it might be possible to rewrite the first sentence using the synonym “attraction”, this alternative fails to capture the precise meaning conveyed by the original sentence, given how the term is used in this area of biomedical research. The fact of the matter is that
the word *affinity* has a very specific denotation in the context in which it is being used in the *Science* paragraph and it is the only practical and meaningful alternative available. The same can be said for other words that might have synonyms (e.g., binding, silencing, site). Other terms, such as *methylation* and *antibodies* are unique and do not have synonyms available. In sum, most of the terms (e.g., immunoprecipitation, endogenous, coimmunoprecipitated) and expressions (e.g., HA-tagged, high-affinity, mammalian histone lysing methyltransferase) in the above paragraph are extremely difficult, if not impossible, to substitute without altering the intended meaning of the paragraph. As a result, the paraphrased version looks somewhat similar to the original and thus, applying the strict definitions of paraphrasing, such as those provided by some writing guides would render our paragraph as a borderline or an outright case of plagiarism.

Perhaps in recognition of the fact that highly technical descriptions of a methodology, phenomena, etc., can be extremely difficult, if not impossible, to properly paraphrase, ORI’s definition of plagiarism provides the following caveat:

“ORI generally does not pursue the limited use of identical or nearly-identical phrases which describe a commonly-used methodology or previous research because ORI does not consider such use as substantially misleading to the reader or of great significance.”

The above considerations may underlie the reason for the absence of an operational definition of proper paraphrasing. Nevertheless, and in spite of the above clarification provided by ORI, the following guideline is offered:

**Guideline 8:** A responsible writer has an ethical responsibility to readers, and to the author/s from whom s/he is borrowing, to respect others’ ideas and words, to credit those from whom we borrow, and whenever possible, to use one’s own words when paraphrasing.

**Plagiarism and common knowledge**

As has been pointed earlier, one must give credit to those whose ideas and facts we are using. One general exception to this principle occurs when the ideas we are discussing represent ‘common knowledge’. If the material we are discussing is assumed to be known by the readership, then one need not cite its origin. Suppose you are an American student writing a paper on the history of the United States for a college course and in your paper, you mention the fact that George Washington was the first president of the United States and that the Declaration of Independence was signed in the year 1776. Must you provide a citation for that pair of facts? Most likely not, as these are facts commonly known by average American college and high school students. The general expectation is that “everybody knows that”. However, suppose that in the same paper the student must identify the 23rd president and his running mate and the main platform under which they
were running for office, plus the year they both assumed power. Should such material be considered common knowledge? The answer is probably no. It is doubtful that the average American, would know those facts. In fact, I had to look up the answers.

Let’s take another example. Imagine that we are writing a paper and in it we have a need to discuss the movement of sodium and potassium ions across a cell’s membrane (see the Martini and Bartholomew paragraph above). Surely, those ideas are not common knowledge amongst college students and if they were expected to use those concepts in a paper they would be required to provide a citation. However, let’s suppose that the individual writing the paper was a seasoned neuroscientist and that she intended to submit her paper for publication to a professional journal. Would the author need to provide a citation for that material? Not necessarily. Although for the non-scientist the description of the concentration gradients of sodium and potassium ions inside neurons may look sufficiently complex and unfamiliar, the material is considered common knowledge amongst neuroscientists. It would, indeed, be shocking to find a neuroscientist or biologist who was not familiar with those concepts.

In sum, the question of whether the information we write about constitutes common knowledge is not easily answerable and it depends on several factors, such as who the author is, who the readers are, and the expectations of each of these groups. Given these considerations, we recommend that authors abide by the following guideline:

**Guideline 9:** When in doubt as to whether a concept or fact is common knowledge, provide a citation.

**Plagiarism and authorship disputes**

Consider the following scenario. Two researchers who have collaborated on various projects have, in the past, have jointly published a number of papers. Three quarters into the writing of the manuscript from their most recent joint projects, the researchers experience a profound difference of opinion regarding the direction of the current project and the incident leads to the eventual break-up of their research association. Soon after, one of the researchers moves to another institution in another country and begins to pursue a different line of research. A year later, the remaining researcher decides to finish writing the manuscript and submits it for publication with his name as sole author. By appropriating the joint manuscript and submitting it under his name, has this other researcher committed plagiarism?

Let’s consider another scenario, a graduate student working under her mentor’s supervision makes an interesting discovery as part of her doctoral thesis work. Before she is ready to publish her thesis, however, her mentor feels that the discovery merits immediate publication and decides to report her data, along with other data he had collected from other graduate fellows working in his lab, in a journal article. The mentor does not list the graduate student’s name as a co-author nor is there a byline in the article
indicating the extent of her contribution under the pretext that the student's contribution in and of itself did not merit authorship.

Clearly, the above scenarios represent ethical breaches that many individuals and institutions, including the National Science Foundation, would consider as instances of plagiarism. However, not everyone agrees that these types of cases are plagiarism. For example, ORI classifies these problems not as plagiarism, but as authorship disputes. The involved parties can avoid these and other troublesome situations, such as disputes regarding the order of authorship of a paper, by discussing and agreeing on a plan before work on a project commences.

Additional discussion and guidance on these matters can be found in the section titled: "Authorship issues and conflicts of interest".

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As this document illustrates, there are many varieties of plagiarism. Although we have covered some of the most common forms, these can be combined in a variety of ways to form new types of plagiarism not discussed here. In the next section we turn our attention to the problem of self-plagiarism.

**SELF-PLAGIARISM**

When plagiarism is conceptualized as theft, the notion of self-plagiarism may seem impossible. After all, one might ask: Is it possible to steal from oneself? As Hexam (1999) points out, it is possible to steal from oneself as when one engages in embezzlement or insurance fraud. In writing, self-plagiarism occurs when authors reuse their own previously written work or data in a 'new' written product without letting the reader know that this material has appeared elsewhere. According to Hexam, "... the essence of self-plagiarism is [that] the author attempts to deceive the reader".

Although in scholarly and scientific writing there are some situations in which some forms of text reuse are acceptable, many other instances in which text and/or data are known to have been reused violate the ethical spirit of scholarly research. The concept of ethical writing, about which this instructional resource revolves, entails an implicit contract between reader and writer whereby the reader assumes, unless otherwise noted, that the material was written by the author, is new, is original and is accurate to the best of the author's abilities. In this section we review some of the most common instances of self-plagiarism and provide guidelines to avoid these pitfalls.

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The available literature on self-plagiarism is concerned with four major problems: The publication of what is essentially the same paper in more than one journal, but without
any indication that the paper has been published elsewhere (i.e., redundant and duplicate publication), the partitioning of a large study which should have been reported in a single paper into smaller published studies (i.e., salami-slicing), copyright infringement, and the practice of text recycling. We now examine these issues in more detail.

Redundant and Duplicate (i.e., dual) Publications

A large proportion of scientific and scholarly research is carried out by college and university professors. For these academics, the presentation and subsequent publication of research in peer-reviewed scholarly and scientific journals represents one of the most important criteria for gaining tenure and/or promotion. Consequently, the more publications authored by an academic, the better his/her chances of getting a promotion or tenure. The current academic reward system is thought to produce a tremendous amount of pressure to generate as many publications as possible. Unfortunately, some of the most serious negative outcomes of the present system are the problems of duplicate publication and of redundant publication. In the sciences, duplicate publication generally refers to the practice of submitting a paper with the same data to more than one journal, without alerting the editors or readers to the existence of other identical published versions. The new publication may differ only slightly from the original by, for example, changes to the title, abstract, and/or order of the authors. Papers representing instances of duplicate publication almost always contain identical or nearly identical text relative to the earlier published version. The related and more frequent practice known as redundant publication occurs when researchers publish the same data, with a somewhat different textual slant within the body of the paper. For example, redundant papers may contain a slightly different interpretation of the data or the introduction to the paper may be described in a somewhat different theoretical or empirical context. Sometimes, additional data or somewhat different analyses of the same, previously published data are reported in the redundant paper. The fact of the matter is that each of these types of practices is frowned upon by most scientific journals (see Kassirer & Angell, 1995) and most of the major scientific writing guides caution against them (e.g., Iverson, et al., 1998).

While the accepted practice for authors of manuscripts that are intended to be published as trade books is to send their manuscript to several publishers, the standard practice for authors of scientific or scholarly papers is to submit their paper for publication to a single journal. An author may submit the same paper or a revised version of it to another journal once it is determined that the first journal will not publish it. Only under exceptional circumstances would it be acceptable for a paper published in one journal to appear in another journal. In spite of these universally accepted practices, redundant publication continues to be a problem in the biomedical sciences. For example, in a recent editorial, Schein (2001) describes the results of a study he and a colleague carried out in which the authors found that 92 out of 660 studies taken from 3 major surgical journals were actual cases of redundant publication. While some authors have estimated that between 10% to 20% of the biomedical literature is laden with redundant publications
(Jefferson, 1998), a recent review of the literature suggests the more conservative figure of approximately 10% (Steneck, 2000). The current situation has become so serious, however, that many biomedical journals have begun to publish policies clarifying their opposition to multiple submissions of the same paper. Some journals now request that authors who submit a manuscript for review must also submit previously published papers or those that are currently under review that are related to the topic of the manuscript under consideration. This requirement has been implemented to allow editors to determine whether the extent of overlap between such papers warrants the publication of yet another paper. If, in the opinion of the editor, the extent of overlap were substantial, the paper would likely not be published.

**Instances in which dual publication may be acceptable**

Some authors who submit the same article to more than one journal do so with the rationale that their paper would be of interest to each set of readers who would probably not otherwise be aware of the other publication. Indeed, circumstances have been identified which would justify the dual publication of a paper. However, the editors of both journals would have to agree to this arrangement and the existence of each version of the published paper would have to be made clear to each set of readers. Blancett, Flanagan, & Young (1995; cited in Iverson, et al., 1998) provide a number of scenarios where dual publication may be acceptable (see also the International Committee of Medial Journal Editors’ Uniform Requirements for Manuscripts Submitted to Biomedical Journals, updated, 2006). For example, summaries or abstracts of papers that are published in conference proceedings are often subsequently published in expanded form as a journal article. Another situation where redundant publication may be acceptable occurs when an article published in one language is translated into a different language and published in a different journal. In these and other cases where redundant publication is being considered by the author, the editors and the readers of each paper must be made aware that a second published version exists.

**Why redundant publication must be avoided**

Journal space is notoriously competitive in scholarly and scientific publishing, thus a paper that appears in two different journals unbeknownst to readers and editors robs other authors the opportunity to publish their worthwhile work. Moreover, referees often volunteer their valuable time to review authors’ work in the service of science and scholarship. Duplicate or redundant publications waste the time and limited resources of the editorial and peer review system. More importantly and particularly in the sciences, is the fact that dual/redundant publications mislead researchers as to the true nature of a given database. For example, an author who wishes to study the significance of an experimental effect or phenomenon using sophisticated statistical techniques, such as meta-analysis, will arrive at erroneous results and conclusions if the same experiment were to be counted twice. Consider the following anecdote reported by Wheeler (1989):

“In one such instance, a description of a serious adverse pulmonary effect associated with a new drug used to treat cardiovascular patients was
published twice, five months apart in different journals. Although the authors were different, they wrote from the same medical school about patients that appear identical. Any researcher counting the incidence of complications associated with this drug from the published literature could easily be misled into concluding that the incidence is higher than it really is.” (p.1).

It should be clear to the reader that redundant and duplicate publication must be avoided, for it has the potential for distorting the existing data base, possibly resulting in the establishment of flawed public health policies.

Guideline 10: Authors who submit a manuscript for publication containing data, reviews, conclusions, etc., that have already been disseminated in some significant manner (e.g., published as an article in another journal, presented at a conference, posted on the internet) must clearly indicate to the editors and readers the nature of the previous dissemination.

Academic Self-plagiarism (Double-dipping)

Redundant publication has a direct counterpart in the area of academic dishonesty—it is referred to as ‘double dipping’. It occurs when a student submits a whole paper or a substantial portion of a paper to fulfill a course requirement, even though that paper had earlier been submitted to satisfy the requirements for another course taught by a different professor. Many college undergraduates and even some graduate students are not aware that this type of practice is a serious offense and constitutes plagiarism. Of course, as in redundant publication, submitting the same paper, or a large portion of a paper, to two different courses is entirely acceptable if the instructors of both courses were informed by the student of the double submission, and if both agreed to the arrangement. However, some institutions have specific policies prohibiting this practice.

Salami Slicing (i.e., data fragmentation)

Although often associated with redundant publication, the segmenting of a large study into two or more publications is somewhat different than reporting exactly the same data in two publications, but it is a similarly unacceptable scientific practice. As with redundant publication, salami slicing can lead to 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. Consider the examples provided by Kassirer and Angell (1995), former editors of The New England Journal of Medicine:

"Several months ago, for example, we received a manuscript describing a controlled intervention in a birthing center. The authors sent the results on the
mothers to us, and the results on the infants to another journal. The two outcomes would have more appropriately been reported together. We also received a manuscript on a molecular marker as a prognostic tool for a type of cancer; another journal was sent the results of a second marker from the same pathological specimens. Combining the two sets of data clearly would have added meaning to the findings." (p. 450).

A related malpractice known as **data augmentation** occurs when a researcher publishes a study and subsequently collects additional data, which typically end up strengthening the original effect, and publishes the combined results as a new study. The reader is mislead into believing that the data from the new study is derived from a sample that is different than the one from which the initial data were derived.

As with redundant and duplicate publication practices, these types of misrepresentations can distort the conclusions of literature reviews if the various segments of a salami publication or the augmented data that represent data from the same subject sample, are included in a meta analysis under the assumption that all of the data are derived from independent samples. For this reason, data augmentation or fragmentation can have serious negative consequences for the integrity of the scientific database. In certain key areas of biomedical research the consequences can result in policy recommendations that could have adverse public health effects.

**Guideline 11**: Authors of complex studies should heed the advice previously put forth by Angell & Relman (1989). If the results of a single complex study are best presented as a ‘cohesive’ single whole, they should not be partitioned into individual papers. Furthermore, if there is any doubt as to whether a paper submitted for publication represents fragmented data, authors should enclose other papers (published or unpublished) that might be part of the paper under consideration (Kassirer & Angell, 1995). Similarly old data that has been merely augmented with additional data points and that is subsequently presented as a new study is an equally serious ethical breach.

One element likely to be common to both redundant publication and salami publication is the potential for copyright infringement. This is because data or text (or both elements) appearing in one copyrighted publication will also appear in another publication whose copyright is owned by a different entity. Let’s turn our attention now to this topic.
Copyright Law

Because some instances of plagiarism and self-plagiarism (e.g., redundant publication) have the potential for violating copyright law, the following section is devoted to a brief review of the concept of copyright.

Copyright law is based on Article 1, sec. 8, cl. 8 of the United States Constitution. Its fundamental purpose was "to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries". Once owners of an artistic (e.g., song, lyrics, films) or an intellectual work (e.g., book, article) copyright a product, they have the exclusive right to publish, reproduce, sell, distribute, or modify those products. For authors who wish to have their papers published in traditional journals, the typical arrangement is for the copyright of the author's work to be transferred to the publisher of the journal. The journal can then reproduce and distribute the author's work legally. An increasing number of journals now allow the author to maintain ownership of their work, but both entities sign an agreement specifying the journals' right to publish and re-use the author's material. In the case of "Open Access" journals (freely available to the public without expectation of payment), the author agrees to allow for the free dissemination of his/her works without prior permission.

With some exceptions, the unauthorized use of copyrighted work violates copyright law and represents copyright infringement. Exceptions to copyright infringement fall under the doctrine of "Fair Use" of copyright law and represent instances in which the activity is largely for nonprofit educational, scholarship, or research purposes (see US Copyright Office, 1996). For example, in some situations, a student or individual researcher may make a copy of a journal article or book chapter for his/her own personal use without asking permission. Likewise, an author describing the results of a published study may take a couple of lines of data from a table from a journal article, include a citation, and reproduce it in his/her paper. The American Medical Association's Manual of Style (Iverson, et al., 1998) provides additional examples of instances of "fair use".

Copyright Infringement, fair use, and plagiarism

The use of relatively short direct quotes from a published work does not usually require permission from the copyright holder as it typically falls under the "fair use" provision. However, extensive quoting of text from a copyrighted source can constitute copyright infringement, whether the appropriated text is properly enclosed in quotation marks or correctly paraphrased, even if a citation is provided according to established scholarly conventions. Obviously, the same applies if the material is plagiarized outright. Moreover, the reader should note that intellectual or artistic work does not need to be published in order to be copyrighted. In fact, the moment the work becomes final it is automatically copyrighted. Thus, instances of plagiarism, whether from a published article or an unpublished manuscript, such as a grant proposal, can also constitute copyright infringement, though copyright infringement does not always constitute plagiarism.
Iverson, et al., (1998) cautions the reader that the amount of text that can be taken from a copyrighted source without permission depends on its proportion to the entire work. However, the reader should also note that some publishers have established word limits for borrowing text. For example, according to the Publication Manual of the American Psychological Association (APA), authors who wish to borrow text of more than 500 words from a published APA publication must seek permission from the APA.

Given the above considerations, it should be clear that redundant or duplicate publication, which occurs without the respective editors’ knowledge, is not only considered a form of self-plagiarism, but it may also qualify as copyright infringement because the copyright may be held by the publisher; not by the author. This would certainly be the case if the original article were published in a journal owned by one publisher and the second article were to appear in a journal owned by a different publisher.

**Guideline 12:** Because some instances of plagiarism, self-plagiarism, and even some writing practices that might otherwise be acceptable (e.g., extensive paraphrasing or quoting of key elements of a book) can constitute copyright infringement, authors are strongly encouraged to become familiar with basic elements of copyright law.

**Text recycling**

Programmatic research often involves publishing papers describing empirical investigations that use nearly identical or identical methodologies. Similarly, the background literature reviewed in one paper may be similar or exactly the same as that of related papers by the same author/s. Therefore, it is possible to have two or more papers describing legitimately different observations that contain almost identical methodology, literature reviews, discussions, and other very similar or even identical textual material. Given the enormous pressure to publish felt by many researchers and the ease with which text can be manipulated with word processing software, these situations present unique challenges because of the allure to simply use as templates portions of text written for previously published papers and include the recycled material in a new paper. Thus, we define text recycling as a writer’s reuse of portions of text that have appeared previously in other works.

As with the problem of inappropriate paraphrasing, the question of how much a writer may recycle from his/her previous writings has not been generally addressed in the writing literature. In fact, of the concepts reviewed so far, text recycling is perhaps the most problematic because few, if any, official guidelines exist and because when it does occur, it is generally not found to be consistent with the principles of ethical writing. Given
that the present instructional resource is grounded in those very principles, some sensible guidelines can be derived.

**Forms of acceptable text recycling**

As with redundant publication, certain types of text recycling appear to be acceptable within the biomedical and social sciences even though they seemingly violate the spirit of the writer’s implicit contract. Here are specific examples.

**Recycling text from an Institutional Review Board (IRB) application, Animal Care and Use Committee, Grant application, or other form of unpublished ‘internal’ proposal.** Academics and researchers who write research proposals, either for the purpose of seeking funding or for internal or ethical review, will often use the same material, though likely in expanded form, in a paper that is later published. This is an accepted practice because these proposals are typically never published and are only reviewed by a very small number of individuals. On the other hand, in some instances there may be proprietary copyright issues with respect to an unpublished proposal or report that was originally written for a private enterprise when the author was employed by that institution. Therefore, in these cases permission to subsequently publish portions of material originally written for use by, say, a corporate entity should be sought. On the other hand, the recycling of text from IRB, grants, and other types of proposals reviewed within academic institutions is generally considered an acceptable practice.

**Recycling papers given at a conference.** Often, scientists who make presentations at conferences distribute preliminary copies of their papers to the audience. Sometimes after the presentation, and perhaps based on the audience’s feedback of the scientist’s presentation, some modifications are made to the paper and it is subsequently submitted for publication to a journal. This practice is also generally acceptable. However, there are instances where some caution should be observed. For example, in cases where the conference abstracts or even the preliminary papers themselves are subsequently published as proceedings by the sponsoring organization, the author should inquire as to whether that organization permits republication of their materials. Authors should also keep in mind that some editors may consider the above scenario as a case of redundant publication. Therefore, they should always inform an editor if an abstract or a brief version of a paper being submitted for publication has already appear in the proceedings of a conference. Lastly, in cases where a published paper is based on a conference presentation, the standard practice is to also inform the reader about its prior version. This is usually done in the form of a footnote or endnote. To further clarify the nature of these two products, authors are also strongly encouraged to insure that the both, the paper presented at a conference and its published version share the same or similar title.

**‘Borderline’/unacceptable cases of text recycling**

**Recycling sections of a complex method section from a previously published paper.** In writing methodology sections of empirical papers, one of the goals of authors is to provide
all the necessary detail so that an independent researcher can replicate the study. Because these sections are often highly technical and can be laborious to write, authors of multiple papers using the same methodology will sometimes recycle text with little or no modification from a previously published paper and use it in a new paper. Technically, if an author were to adhere to the ‘implicit contract’ between reader and writer embodied in the concept of ethical writing and to the strict rules of proper scholarly conduct, s/he would need to put any verbatim text from the method section in quotation marks and appropriately paraphrase any other recycled text that is not placed in quotations. Curiously, such practice is seldom, if ever, followed in these instances. Instead, what seems to have become a routine practice for authors is to recycle, with some minor modifications, substantial portions of these sections (see Roig, 2002). Judging by instructions to authors in at least one journal, it appears that, in the past, some authors have not bothered to make even minor changes when they repeatedly recycle the same method section from article to article. For example, in a section titled “Avoidable errors in manuscripts” Biros (2000), editor-in-chief of Academic Emergency Medicine writes:

"Methods are reported that were not actually used. [This] most frequently occurs when an author has published similar methods previously and has devised a template for the methods which is used from paper to paper. Reproducing the template exactly is self-plagiarism and can be misleading if the template is not updated to reflect the current research project." (p. 3).

In addition to constituting self-plagiarism, there is another reason why this practice may be problematic. Consider the following scenario: An author takes a substantial amount of text from one of her papers that had been published in a journal owned by one publisher and recycles that text in a paper that will now be published by a journal owned by a different publisher. In this situation, the author may be violating copyright rules. Thus, Biros (2000) also cautions that:

"Many authors do not understand the implications of signing the copyright release form. In essence, this transfers ownership of the paper and all of its contents from the author to the publisher. Subsequent papers written by the same author therefore must be careful not to reproduce in any way material that has previously been published, even if it is written by them. Such copying constitutes self-plagiarism." (p. 4).

Yet, another situation that may be problematic occurs when a member of one team of authors who wrote the original method section is not one of the authors who recycles that method section in a later publication. Here the potential for an accusation of plagiarism could easily develop.

On the other hand, as discussed earlier, methodology sections often include very intricately complex descriptions of procedural processes that are laden with unique terminology and phraseology for which there are no acceptable equivalents (e.g., *Mammalian histone lysine methyltransferase, suppressor of variegation 39H1 (SUV39H1)*). Even when major textual modifications to these sections are possible, a
change in the language can run the risk of slightly altering the intended meaning of what is being described and such an outcome is a highly undesirable in the sciences. Thus authors should be allowed some latitude in terms of the extent to which they should modify portions of text when paraphrasing material from methodology sections that is highly technical in nature, even if the material is derived from other sources.

**Guideline 13:** While there are some situations where text recycling is an acceptable practice, it may not be so in other situations. Authors are urged to adhere to the spirit of ethical writing and avoid reusing their own previously published text, unless it is done in a manner consistent with standard scholarly conventions (e.g., by using of quotations and proper paraphrasing).

Substantial text recycling, as well as the other forms of self-plagiarism reviewed above, suggest at the very least a degree of intellectual laziness. At worst, these practices can result in serious consequences to the scholarly and scientific literature, to public health, and even to the perpetrator. Authors are well advised to carefully review the editorial guidelines of journals to which they submit their manuscripts, as well as their disciplines' codes of ethics. More importantly, contributors to the literature need to be reminded that they are always held to the highest standards of ethical conduct.

**THE LESSER CRIMES OF WRITING: OTHER QUESTIONABLE WRITING PRACTICES**

Recently, Zigmond and Fischer (2002) have called attention to what they refer as the “misdemeanors” of science: Ethically inappropriate practices in the conduct of scientific research. These authors explain that, whereas fabrication, falsification, and plagiarism are considered to be the “high crimes” of science, many other inappropriate practices frequently take place and these lesser crimes should command more attention. Some examples of common misdemeanors are, neglecting to indicate one’s source of funding, failing to identify possible conflicts of interest, and establishing honorary authorship (assigning authorship to an individual whose contributions to the work do not earn him/her such status).

We can apply the high crimes vs. misdemeanors classification in the area of writing. In our previous discussion of plagiarism and self-plagiarism, we described a variety of practices, some of which would undoubtedly be classified as high crimes (e.g., appropriating the ideas or data of someone else without attribution), while others would fall under the misdemeanor category (e.g., inadequate paraphrasing). In this section, we turn our attention to other practices that violate the spirit of ethical writing and that fall under Zigmond & Fischer’s (2002) misdemeanor category.
ETHICALLY QUESTIONABLE CITATION PRACTICES

Citations and References

Citations are the notations in the text of a paper that identify the source of our claims, other research and theories mentioned in the paper. Depending on the style of writing used these are typically represented as numbers in parentheses or in superscript (e.g., AMA) or as last names with dates (e.g., APA). The list of references is always found at the end of a paper and these contain sufficient detail for readers to track down copies of these works (e.g., names of the authors, titles of articles or books, journal title, volume number, pagination and year of publication).

Carelessness in citing sources

References provide a crucial service in scholarly and scientific writing for they allow the reader to explore in more detail a given line of thinking or evidence. For these reasons, it is important that authors strive for accuracy when listing references in manuscripts. Unfortunately, it appears that authors do not always give the proper level of attention to citations and reference sections. In fact, the available evidence suggests that a disproportionate number of errors occur in reference sections even in some of the most prestigious biomedical journals (e.g., Siebers and Holt, 2000).

The importance of citing the original observation

Another area of concern is the failure to cite the author who first reports the phenomenon being studied. Apparently, some authors instead cite later studies that better substantiate the original observation. However, as Zigmond and Fischer (2002) note, failure to cite the original report denies the individual who made the initial discovery his/her due credit.

GUIDELINE 14: Authors are strongly urged to double-check their citations. Specifically, authors should always ensure that each reference notation appearing in the body of the manuscript corresponds to the correct citation listed in the reference section and vice versa and that each source listed in the reference section has been cited at some point in the manuscript. In addition, authors should also ensure that all elements of a citation (e.g., spelling of authors’ names, volume number of journal, pagination) are derived directly from the original paper, rather than from a citation that appears on a secondary source. Finally, authors should ensure that credit is given to those authors who first reported the phenomenon being studied.
Inappropriate Manipulation of References

In a later section I discuss the tendency on the part of some scientists to provide what may be a biased review of the relevant literature. That is, in providing a context for the presentation of our data or theory, we sometimes cite only references that are favorable to our position. However, ethical writers have a responsibility to cite all relevant material, even work that may contradict our own point of view. Failure to do so compromises our objectivity and is contrary to the primary mission of a scientist which is to search for truth.

Citation Stuffing

Another way in which references are thought to be inappropriately manipulated occurs when authors intentionally cite their own articles, regardless of their relevance, in an attempt to raise their own articles’ impact factor. The impact factor is a measure of importance and prestige of journals that takes into account how often articles published in those journals are cited. However, a measure of the number of times an article is cited in other articles can also be used as a measure of their importance in an individuals’ tenure and review decisions, thus the tendency of some authors to weave into their paper references of their own prior work that are largely irrelevant to the current topic.

A related matter involves the inappropriate inclusion of references that are authored by individuals thought to be likely peer reviewers of the article in question. The thought being that the reviewer will be more likely to give a favorable review to a paper that cites his or her own work than to one that does not.

Finally, there is some evidence that editors of some journals sometimes insist that authors include references from their journal for the mere purpose of enhancing that journal’s impact factor (see WAME discussion of March 7th to the 16th, 2006: Manipulating a Journal’s Impact Factor). Authors should attempt to resist such requests unless the editors’ recommendations are genuinely relevant to their paper.

GUIDELINE 15: The references used in a paper should only be those that are directly related to its contents. The intentional inclusion of references of questionable relevance for purposes of manipulating a journal’s or a paper’s impact factor or a paper’s chances of acceptance is an unacceptable practice.

Relying on an abstract or a preliminary version of a paper while citing the published version

At the beginning of this instructional resource we identified clarity, conciseness, accuracy, and integrity as essential elements of scientific writing. Unfortunately, the latter
two concepts are sometimes overlooked with certain citation practices. Consider what can happen in the following scenario. A researcher needs to conduct a literature review for a manuscript that he is preparing for submission to a biomedical journal. She begins her search by accessing the PubMed database and typing topic-relevant terms in the search field. The search yields several useful abstracts and the researcher proceeds to track down the various journal articles. Unfortunately, one key article is not available on-line. It is not carried by her institution’s library, nor is it available at nearby libraries as it has been published as a technical report in a nontraditional journal with very limited circulation. Pressed for time, the researcher decides, instead, to rely on material from the abstract for the literature review and includes the journal article citation in the reference section. However, she fails to indicate that she relied on the abstract and not the actual journal article.

Another variation of this problem occurs when the researcher cites the published version of the paper, but actually relies on the contents of an earlier version that was published in the proceedings of a conference, or the preliminary version that was distributed at the conference presentation itself. These behaviors violate the requisites of accuracy and integrity.

The main problem with relying on versions other than the published paper is that important elements of these earlier versions may be different from their counterparts in the published version of the paper. Such changes are typically due to the peer review process, editorial changes, or errors that are spotted and corrected by the author between the time the paper is presented at a conference and the time that it is subsequently published. In some cases, the published version will contain additional data and/or interpretations that are substantially different or perhaps even contrary to those of earlier versions. For example, a conference paper describing experimental data may, in its published form, may contain additional data from a new experimental condition that was run in response to referees’ suggestions. Data from the new condition can place the earlier data in a new perspective possibly leading to new interpretations. Again, with respect to abstracts, relying on such summaries can be problematic because abstracts typically do not provide sufficient details about the paper’s contribution (i.e., Taylor, 2002). In addition, because of their condensed form, abstracts cannot provide essential details about a study’s methodology, and results. Moreover, we note that in some databases there may be instances in which individuals other than the author/s of the journal article write the article’s abstract. As a result, subtle misrepresentations are more likely to occur. Writing guidelines, such as the Uniform Requirements for Manuscripts Submitted to Biomedical Journals, discourage the use of abstracts as references.

**GUIDELINE 16:** Authors should follow a simple rule: Strive to obtain the actual published paper. When the published paper cannot be obtained, cite the specific version of the material being used, whether it is conference presentation, abstract, or an unpublished
manuscript.

Citing sources that were not read or thoroughly understood

The practice of relying on a published paper's abstract to describe its contents also fits in the present category. However, there are other scenarios that better illustrate the practice of citing papers that were either poorly understood or perhaps not even read by the author citing them. Let's go over a couple of examples:

Consider an investigator who is in the process of writing the results of a series of studies he conducted. In his search for background literature relevant to his work, he finds one particular journal article whose introduction cites a number of other works that seem very relevant to his own paper. Although he recognizes most of the references cited, there are a couple of papers that he is not familiar with and, unfortunately, for a variety of reasons he cannot obtain copies of them at this point. Given the context of the published paper's description of these two other papers that are unfamiliar to him, our author decides to include them in his own review of the literature by paraphrasing the relevant portions of the published paper's introduction that summarize the contributions of these two unfamiliar papers. He then includes these papers as references in his manuscript's reference section, along with the journal article from which he derived the information. Finally, although our author cites the published article in at least one other context, he does not indicate that this article had served as the source of the paraphrase.

By not indicating the true source of the paraphrase of these two papers, the reader is deceived by falsely assuming that the brief summary of these two papers was based on our author's direct reading of these papers. Technically, this type of transgression qualifies as a form of plagiarism because the author has paraphrased a summary of another's work that was written by someone else and has not properly attributed his summary to the author of the journal article. Of course, a formal charge of plagiarism would depend on a number of variables, such as the amount of paraphrasing that took place without proper attribution, the significance or uniqueness of the material involved, etc.

This type of deceptive practice can also be risky because there could conceivably be other aspects of the papers cited (but which were not read) that do not quite correspond with the offending author's thesis. Therefore our author may be citing references that do not entirely support his data or point of view. Inexperienced students sometimes use this inappropriate strategy when they review the literature and discover a paper that reviews roughly the same literature that the student must describe. In an effort to optimize his time and given the effort needed to write a proper paper some students will paraphrase, in whole or in part, a review of the same literature that has already appeared in a published source. In an effort to maintain the deception, the student cites in his/her paper's reference section every source mentioned in the paraphrase, including the article from which the material was taken. This strategy is designed to mislead the professor into assuming that the student has actually read all of the papers cited in his/her review. Ironically, these transgressions
are typically uncovered, not only because the students' paraphrases are often too close to the original, thus betraying the students' less sophisticated writing, but also because at least some of the papers cited are known to their professor to not be directly supportive of the students' main position. Other clues in the writing often point to the deception.

The reader should note, however, that there might be instances in which the practice of citing sources that were not read may be acceptable. For example, an author may simply wish to point out a well-known discovery or theory and provide the reader with the original citation. When this is done without misleading the reader into believing that the author read the paper detailing the discovery and is thoroughly acquainted with its contents, then no real harm is done.

**GUIDELINE 17:** Generally, when describing others' work, do not rely on a secondary summary of that work. It is a deceptive practice, reflects poor scholarly standards, and can lead to a flawed description of the work described. Always consult the primary literature.

The reader should note that some writing manuals have spelled out specific conventions to deal with a situation when an important paper relevant to one's manuscript contains a reference that we would like to cite, but is not available to us. One such writing manual, the current edition of the Style Manual of the American Psychological Association (American Psychological Association, 2001), offers a simple strategy for authors who need to cite a source that is not available to them, but that is contained within another source (as described in the above example). Let's say that our author had read about the work of Smith (1999) in an article authored by Rodriguez (2003). According to the APA Manual the author can use this material by stating as follows: "According to Smith (1999; as cited in Rodriguez, 2003) an important variable ...". The reader may have noticed that I have already relied on this strategy elsewhere in this instructional resource.

There is at least one other milder form of citing material without having actually read it that has been identified even in seasoned writers. Consider the situation in which a 'landmark' paper, whose contributions are well known, needs to be cited in a manuscript. The author cannot readily find a copy of the paper, but he has read it at least once, cited it before, and is familiar with its contents. In summarizing the contents of that landmark paper, the author of the manuscript, who may have read the paper long ago, is relying on her recollection of its contents based on her prior reading of the paper and on summaries published by others. After all, this is a paper that is widely known throughout the discipline.

The problem with the above situation is that our recollection of vital details about a paper read at an earlier time is probably less than optimal. In addition, secondary sources may inadvertently slant or distort important details of others' work, particularly if the material in question is of a controversial nature. Taken together, these factors can ultimately result in the dissemination of faulty information.
One example of this type of problem within the social sciences concerns current descriptions of a famous demonstration carried out by psychologists John B. Watson and Rosalie Rayner (1920) in which an infant known as “Little Albert” was conditioned to fear a rat. Watson and Rayner’s demonstration with Little Albert is cited in a large proportion of introductory psychology textbook and in many other textbooks within that discipline and beyond (e.g., education, nursing). However, according to Paul and Blumenthal (1989), investigators have pointed out a number of serious flaws in this classic demonstration and have also shown how, over the years, various elements of the demonstration have become distorted. For example, some descriptions of Little Albert indicate that Watson & Rayner used a white rabbit rather than a white rat. In explaining the continued presence of this classic demonstration in textbooks without mention of the flaws, Paul and Blumenthal state:

“Textbook authors are under considerable pressure to keep their references current. An author who cites older works will often be instructed by manuscript reviewers and editors to consult the current literature. Most surely do. But from the evidence of the texts, others simply update their citations or lists of ‘suggestion for further reading.’ As a result, references in introductory textbooks sometimes bear little relationship to authors’ substantive discussions. Indeed, citation may directly contradict claims asserted in the text.” (p. 551).

GUIDELINE 18: If an author must rely on a secondary source (e.g., textbook) to describe the contents of a primary source (e.g., an empirical journal article), s/he should consult writing manuals used in her discipline to follow the proper convention to do so. Above all, always indicate the actual source of the information being reported.

Borrowing extensively from a source but only acknowledging a small portion of what is borrowed

When we write a review of the literature in the biological and social sciences we often summarize in one or more sentences, or perhaps in a short paragraph or two, the ideas or data of each source we consult. Of course, we also include proper citations within the summary. Thus, a typical review of the literature is sprinkled with numbered references in superscript as per the style outlined in the American Medical Association Manual of Style or, as is commonly done in the social sciences and in this instructional resource, parenthetical notations with last names of authors and dates, that indicate the sources of our information. There are instances, however, when an author will draw heavily from a single source. Yet, the reader will typically not see the systematic appearance of the same reference notation on every few sentences throughout the several paragraphs of the work.
that has been borrowed. Most authors recognize the awkwardness of this practice and
manage to avoid it by providing only one or two citations strategically placed throughout
the portion of text that is derived from another source and carefully crafting the writing to
clearly indicate that the ideas expressed are not the author's. Some authors, however, are
not as consistently creative and will sometimes intersperse their ideas with those of the
source being used in away that is not clear to the reader when the contributions of the
source end, and those of the manuscript's author begin. In the event that the resulting text
leads the reader to interpret the borrowed ideas as having been derived by the manuscript's
author, there is a risk that the author of the manuscript will be accused of plagiarism.

GUIDELINE 19: When borrowing heavily from a source, authors
should always craft their writing in a way that makes clear to
readers, which ideas are their own and which are derived from the
source being consulted.

ETHICALLY INAPPROPRIATE WRITING PRACTICES

Responsible science and scholarship entails the highest degree of objectivity in
reporting the results of our research. Authors, often with the assistance of the editorial
process, make every effort to describe their observations without exaggerating the
importance of the findings or overstating their conclusion. However, lapses in preserving
that high level of objectivity when presenting research to a general audience have been
noted. For example, Woloshin and Schwartz (2002) have carried out an analysis of press
releases and reported that these often fail to emphasize the limitations of the studies. These
authors noted that "[d]ata are often presented using formats that may exaggerate the
perceived importance of findings". Their results are noteworthy because, in some cases,
study authors are consulted during the editorial stages of producing a press release.

Other ethically questionable writing practices have been identified in which subtle
biases are introduced in the writing process. What follows is a brief discussion of some of
the most frequent problems.

Selective reporting of Literature

Whether one is working on a paper for a course, a doctoral dissertation, or a paper
targeted for publication in a scientific journal, one of the main purposes of reviewing the
relevant literature and citing others' work is to provide empirical and/or theoretical support
for one's thesis. The literature review also provides readers with the proper context to
understand a proposed study or theory by informing them of important issues, such as the
current state of knowledge on the topic, the type of methodologies being used in the area,
theoretical underpinnings of the research, and the significance of the problem.
Depending on the type of manuscript being developed, the literature review will be either
comprehensive (e.g., doctoral dissertation, review article) or very succinct (e.g., journal article). The latter situation presents a unique challenge because journal space can be very expensive forcing authors to be very concise in their writing.

For aspiring scholars and scientists, the classroom represents the training ground for future professionals. As a result, professors tailor the requirements for academic papers assigned in many graduate and advanced undergraduate courses to those demanded by scholarly journals (see for example, Salazar, 1993). These constraints sometimes present a real challenge for authors, who must always make an effort to simplify their literature reviews and only include a very concise summary of highly relevant papers.

Obviously, literature that is cited in support of our point of view must be grounded in sound arguments, tight research methodologies, and flawless data. Citing references in support of our work, that are known to be methodologically or logically deficient, and that fail to mention these shortcomings is ethically inappropriate. Likewise, if in our search for relevant literature we become aware of important relevant evidence that runs contrary to our data or point of view, we have an ethical obligation to cite such evidence, either in the introduction or the discussion section of our paper and to do so objectively. Of course, there are instances in which the extent of our review is extremely limited as, for example, when reporting in the format of a short communication or brief report. Space limitations in such contexts may be such that it is impractical to provide adequate coverage of relevant literature, let alone contrary evidence.

Given that the main purpose of a literature review is to find evidence in support of our research, it is not uncommon to find instances in which authors fail to cite relevant literature that runs contrary to their thesis. Based on the pace at which science and scholarship continues to grow, that many of these lapses may be due to authors’ inability to keep up with the burgeoning literature. However, a perusal of scholarly journals that accept letters to the editor as commentaries to recently published articles will reveal instances in which such writing practices appear intentional (see Goodman, 1998; Perkin, 1999; Nathan, 1994).

**GUIDELINE 20:** When appropriate, authors have an ethical responsibility to report evidence that runs contrary to their point of view. In addition, evidence that we use in support of our position must be methodologically sound. When citing supporting studies that suffer from methodological, statistical, or other types of shortcomings, such flaws must be pointed out to the reader.
Selective reporting of Methodology

Replication of others' research is one of the hallmarks of the scientific enterprise. As such, scientists and scholars have a responsibility to inform others about the specific procedures used in their research. This information is typically found in the methods section of a research paper the purpose of which is to provide other researchers with sufficient details about the study so that in the event that anyone wishes to replicate the study, they will have enough information to do so. For example, we identify the subjects of our study (e.g., select clinical population, specific species of animals) and provide important details about characteristics of the sample, such as how subjects were recruited, that are relevant to the kinds of variables that are being manipulated and measured.

The Methods section also contains description of instrumentation or other observational techniques that are used in carrying out a study. Whether data were collected using sophisticated instrumentation, such as a positron emission tomography or via a simple paper-and-pencil questionnaire, scientists must describe these materials with sufficient detail to allow other researchers to conduct the study.

Perhaps the most important part of a Methods section is the description of the actual procedure that was used to carry out the study. Here, investigators must explain in clear language the series of steps that were used to establish, observe, or manipulate the independent variables. They must offer a complete description of the testing conditions and all of the other necessary details that would allow an independent investigator to carry out the same study again. Any essential details that are inadvertently omitted from this section may lead others to carry out replication attempts that will be doomed to failure, resulting in a waste of valuable time and resources. A more serious offense occurs when an author intentionally leaves out an important detail about the procedure or a crucial event that altered the conditions of the study. There are several reasons why some authors will knowingly leave important details out of a research report. Perhaps an extraneous variable was inadvertently introduced into the study while it was in progress leading to biased results. Thus, for the sake of expediency, rather than discarding the biased results and starting all over again, the investigator may inappropriately leave that major detail out of the report. The important point here is that authors have an obligation to describe all of the important aspects of the research conducted, even if some of those details reflect poorly on his or her abilities.

Because of the concern that some investigators may at times omit important details of the methodology used, guidelines have been formulated to help authors write better research reports. For example, for reports describing randomized control trials authors are advised to consult Moher, Schultz, and Altman's (2001) Consort statement, which is a set of guidelines designed to improve the quality of such reports.

GUIDELINE 21: Authors have an ethical obligation to report all aspects of the study that may impact the independent replicability of their research.
Selective reporting of results

Designing an empirical study takes planning and careful consideration of existing theory and research in the area under investigation. When testing for simple causal relationships, it should be relatively easy to predict the specific outcome when producing a change in the causal variable. Most modern investigations, however, are far from simple as they often involve several variables all of which interact in ways that are sometimes difficult, if not impossible, to predict. One positive feature of complex studies is that they can yield many interesting outcomes, but some of these outcomes may also generate results that are contrary to our expectations. When this happens, there may be a temptation to manipulate the statistical analyses in a way that obscures the actual unwanted results obtained (e.g., using a less powerful statistical test, removing outliers), while perhaps simultaneously enhancing the hypothesized results. Another temptation is to simply not report negative results and only report those results that are consistent with our line of thinking. Other techniques, such as the manipulation of graphs, have been used to subtly change, and therefore distort, the presentation of results in a way that make them more consistent with our hypotheses and theories. Such practices are almost always deceptive and are contrary to the basic scholarly-scientific mission of searching for truth. However, there are instances in which practices, such as the removal of outliers, are acceptable given that the author follows established procedures, informs readers of these actions, and provides a cogent rationale for carrying them out.

GUIDELINE 22: Researchers have an ethical responsibility to report the results of their studies according to their a priori plans. Any post hoc manipulations that may alter the results initially obtained, such as the elimination of outliers or the use of alternative statistical techniques, must be clearly described along with an acceptable rationale for using such techniques.

AUTHORSHIP ISSUES AND CONFLICTS OF INTEREST

An instructional resource on scholarly and scientific writing would not be complete without some discussion of conflicts of interest and authorship issues, such as the conditions that merit the granting of authorship. We now turn our attention to these matters.

Advances in biotechnology, communication, instrumentation, and computing have allowed scientists to investigate increasingly complex problems. It is not uncommon these days for large-scale investigations to be carried out by a handful of scientists from various institutions sometimes spanning two or more continents. Groups and individual contributors may work on the same or different key aspects of a project and these collaborations will invariably result in multiple-authored publications. Unfortunately, some of these collaborative efforts have given rise to disputes about authorship issues. The most
frequent disputes center around the following questions: 1) Which members of a research team merit authorship? 2) Who is designated as senior author of the resulting journal article? And 3) How is the rest of the authorship order determined?

Given that authorship, particularly the designation of senior author of a paper in scientific and scholarly publications plays such a prominent role in the current merit system, it is extremely important to have sound guidelines for establishing the conditions for authorship. For example, in writing about these issues, Steinbok (1995) questions whether various situational roles in biomedical research merit authorship. He writes: “Should the head of the department automatically be an author? Should the various clinicians involved in the care of the patients who are subjects of a paper automatically be authors? What about the person who goes through a set of charts and puts information into a database? What about the statistician who analyzes the data?” (p. 324). Others have raised questions related to the current trend for graduate and undergraduate students to be directly involved in research and in the authoring of papers.

Fortunately, individuals and a number of professional societies have proposed relevant guidelines in this area (see references in later section). Although these sets of guidelines are not identical there is sufficient overlap to offer readers certain recommendations. In considering these guidelines, readers are advised to consult their professional associations for any specific authorship guidelines that these entities may have developed. Readers are also advised to consult the institutions with which they are affiliated, as well as the individual journals to which they intend to submit a manuscript.

**Deciding on authorship**

Whether students or professionals, individuals collaborating on a research project should discuss authorship issues, such as who will be designated as senior author, the order of other authors, and any other individual acknowledgements for other contributions to the project, before initiating work on the project. All parties should familiarize themselves with authorship guidelines suggested by their respective disciplines. In the absence of such guidelines, prospective authors should follow the guidelines of the International Committee of Medical Journal Editors. Any agreement reached regarding authorship should be recorded in writing and should outline the formula used for determining whom the senior author should be and the authorship order for the rest of the investigators involved in the project. The agreement should be sufficiently flexible to accommodate changes that may arise while the project is in progress (e.g., an individual not initially designated as author ends up making substantive contributions that earn her authorship in the paper, or an individual previously designated as author fails to carry out the designated duties, making his contributions not sufficient or important to merit authorship).

**GUIDELINE 23:** Authorship determination should be discussed prior to commencing a research collaboration and should be based
on established guidelines, such as those of the International Committee of Medical Journal Editors.

**Establishing authorship**

As per the guidelines of the International Committee of Medical Journal Editors, only individuals that make substantive intellectual contributions to the project should be listed as authors and the order of authorship should be based on the degree of importance of each author’s contribution to the project. The latter may be difficult to establish in disciplines, such as particle physics, where a team of several dozen, perhaps even over one hundred contributors, may author a single paper. Authorship entails the ability to publicly take responsibility for the contents of the project (e.g., being sufficiently knowledgeable about the project to be able to present it in a formal forum). What determines whether a contribution is substantive or not is a matter of debate and, technically, it should not matter whether the aim of the collaboration is an internal technical report, a conference presentation, or an article targeted for refereed journal. Generally, examples of substantive contributions include, but are not limited to, aiding in the conceptualization of the hypotheses, designing the methodology of the investigation and significantly contributing to the writing the manuscript. “Mechanical” activities, such as entering information in a database or merely collecting actual data (e.g., running subjects, collecting questionnaires) are not sufficient grounds for authorship, but should be acknowledged in a footnote. In addition, “honorary” or “courtesy” authorship assigned on the basis of some leadership position (e.g., such as being head of the department where the research is carried out) must also be avoided.

**GUIDELINE 24:** Only those individuals who have made substantive contributions to a project merit authorship in a paper.

**Authorship in faculty-student collaborations**

Undergraduates, and certainly graduate students, are increasingly involved in research collaboration with their faculty. Along with high grade point averages and scores on standardized testing, undergraduate research experience is one of the most valued criteria for advanced graduate training. As a result, an increasing number of undergraduates are becoming involved in research and authoring journal articles.

Are the authorship guidelines for students different than those for other professionals? Apparently not. According to Fine and Kurdek (1993) who have written on these issues. According to these authors:

"To be included as an author on a scholarly publication, a student should, in a cumulative sense, make a professional contribution that is creative and intellectual in nature, that is integral to completion of the paper, and that requires an
overarching perspective of the project. Examples of professional contributions include developing the research design, writing portions of the manuscript, integrating diverse theoretical perspectives, developing new conceptual models, designing assessments, contributing to data analysis decision and interpreting results ...” (p. 1145).

Faculty mentors might think of the above guidelines for students as being rather harsh. However, consider part of the rationale for these authors’ position that awarding authorship to an undeserving student is unethical:

“First, a publication on one’s record that is not legitimately earned may falsely represent the individual’s scholarly expertise. Second, if because he or she is now a published author, the student is perceived as being more skilled than a peer who is not published, the student is given an unfair advantage professionally. Finally, if the student is perceived to have a level of competence that he or she does not actually have, he or she will be expected to accomplish tasks that may be outside the student’s range of expertise” (p. 1143).

On the other hand, there is evidence suggesting that students’ earned authorship credit is sometimes underrepresented or outright denied by supervising faculty (Swazey, Anderson, & Lewis, 1993; Tarnow, 1999). Clearly, such outcomes are equally unethical as they rob the deserving student of their due credit.

GUIDELINE 25: Faculty-student collaborations should follow the same criteria to establish authorship. Mentors must exercise great care to neither award authorship to students whose contributions do not merit it, nor to deny authorship and due credit to the work of students.

Ghost Authorship

Ghost authorship occurs when a written work fails to identify individuals who made significant contributions to the research and writing of that work. Although in recent times this unethical practice is typically associated with the pharmaceutical and biomedical device industry, the term is also applicable in a number of other contexts. For example, in academic contexts, it is widely recognized as cheating to have someone other than the named student author write a paper that is then submitted as the student’s own. Perhaps with some exceptions (e.g., speech writers), ghost authorship is ethically unacceptable because the reader is mislead as to the actual contributions made by the named author.
Academic Ghost Authorship

A not uncommon form of academic dishonesty that has probably always existed is to have someone else other than the student (a friend or relative), complete an assignment or write a paper. Several Internet sites now exist that, in addition to making available copies of papers that have already been written, they also provide custom-written papers, including doctoral theses. The customer (i.e., student) specifies the topic and other requirements for the paper and, for a fee, a staff writer for the service will supply a custom-written product. For an eye-opening account of how this practice works even before the proliferation of on-line paper mill sites, I refer the reader to Whitherspoon (1995)'s personal account as a Ghostwriter.

Situations in which authors, whether students or professionals, find themselves in need of extensive external assistance with their writing can also raise some interesting ethical dilemmas. For example, consider the doctoral candidate who, because of limited writing skills, relies heavily on an individual or editorial service resulting in that individual making substantial editorial changes to the writing of the thesis. Such a situation may be acceptable as long as the named author indicates in a byline or acknowledgement section the full extent of others' assistance. This, however, is not always done and one of the reasons is that such acknowledgement may reflect negatively on the author as possibly indicating that s/he does not have the necessary skills expected of a doctoral candidate. By mischaracterizing or by not acknowledging altogether the high level of assistance received, students falsely portray a level of academic competency that they truly lack. In instances in which doctoral students anticipate relying on outside individuals to help with the writing of a thesis or even term paper, it is strongly recommended that they confer with their thesis committee and supervisor to determine the accepted parameters of such assistance and to fully disclose the nature of the assistance received.

Professional Ghost Authorship

In the literary world ghost authorship is most often associated with celebrity-authored works in which a celebrity, together with a skilled writer produce written products, such as an autobiography or a sort of “tell all” book. Although much of the writing may be done by the ghost writer, his/her contributions are not always acknowledged and, consequently, in those instances the reader may be mislead into believing that the celebrity is the sole author of the work.

In the biomedical sciences ghost writing has become particularly problematic (see Ngai, Gold, Gill, & Rochon, 2005). For example, in a typical scenario, a pharmaceutical or medical device company will hire an outside researcher with known expertise in the company’s line of products (e.g., antidepressants) to write an “balanced” review of their product. To facilitate the write-up of the paper, the company furnishes the expert with a draft of the paper that had already been prepared by a ghost author employed by the company. And, as it often happens in these types of cases, the resulting paper ends up portraying the product in a more favorable light than in reality it might deserve.
The extent of ghost contributions can range from the initial draft framing of a manuscript to the complete or nearly complete write-up of the paper (see the distinction made by Chalmers as cited by Altus, 2006). In either case, the main concern is the extent to which the writing influences the reader toward a particular product or point of view rather than presenting an unbiased position or data. In the past few years, several articles and editorials have condemned the practice as ethically questionable. For example, the World Association of Medical Editors has produced a position statement, which considers ghost authorship dishonest and unacceptable.

**GUIDELINE 26:** Academic or professional ghost authorship in the sciences is ethically unacceptable.

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**Sources on publication and authorship from which the above guidelines were derived**

- Committee on Publication Ethics (COPE) Guidelines On Good Publication Practice
- International Committee of Medical Journal Editors, Uniform Requirements for Manuscripts Submitted to Biomedical Journals
- British Sociological Association: Authorship Guidelines for Academic Papers
- For additional references on authorship consult The Council of Science Editors

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**A brief overview on Conflict of Interests**

When an investigator’s relationship to an organization affects, or gives the appearance of affecting, his/her objectivity in the conduct of scholarly or scientific research, a conflict of interest is said to occur. The relationship does not have to be a personal nor a financial one. For example, a conflict of interest could arise when a family member of a researcher is associated with an organization whose product the researcher is in the process of evaluating. Does the family member’s association with the organization compromise his ability to carry out the evaluation objectively? Perhaps. Let’s consider another example, imagine an investigator who has been conducting basic science on the various processes involved in the release of certain neurotransmitters and whose work has been steadily funded by the maker of one of the most popular antidepressants. Now imagine a new situation where the research carried out by that investigator naturally leads him to study the efficacy of that same antidepressant while being funded by the company that manufactures it. In conducting the research, is that investigator’s objectivity affected by his long-standing relationship to the drug company? Perhaps it hasn’t.

Naturally, some conflicts of interest are unavoidable and having a conflict of interest is not in itself unethical. However, the increasing role industry has played in sponsoring research that bears on commercial applications has led to a focus on how such
sponsorship affects the research process and outcomes. The situation appears to be particularly serious in the realm of pharmaceutical research. For example, Stelfox, Chua, O’Rourke, and Detsky (1998) collected a sample of published reports (e.g., studies, letters to the editor) on the safety of calcium channel blockers, drugs used to treat cardiovascular disease and correlated the authors’ conclusions about their efficacy with whether or not the investigators had received financial support from companies that manufacture those types of drugs. The results revealed a strong association between conclusions that were supportive of the drugs and prior financial support from companies that were associated with those types of drugs.

To ameliorate the situation, research institutions, professional societies, and an increasing number of journals have formulated guidelines for dealing with potential conflicts of interest. Essentially, most of these guidelines require authors to disclose such conflicts either in the cover letter to the editor of the journal to which an investigator submits a manuscript and/or in a footnote on the manuscript itself. For additional details consult the various statements listed in the ORI web site (see next section).

**GUIDELINE 27:** Authors must become aware of possible conflicts of interest in their own research and to make every effort to disclose those situations (e.g., stock ownership, consulting agreements to the sponsoring organization) that may pose actual or potential conflicts of interest.

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Links to resources on Conflicts of Interest listed by ORI

- [On Being A Scientist: Responsible Conduct in Research](#)
- [Draft Interim Guidance on Financial Relationships in Clinical Research: DHHS](#)
- [Report on Conflict of Interest in Biomedical Research: GAO](#)
- [Conflict of Interest Statement - NIH](#)
Complete list of Guidelines

1. An ethical writer ALWAYS acknowledges the contributions of others and the source of his/her ideas.

2. Any verbatim text taken from another author must be enclosed in quotation marks.

3. We must always acknowledge every source that we use in our writing; whether we paraphrase it, summarize it, or enclose it quotations.

4. When we summarize, we condense, in our own words, a substantial amount of material into a short paragraph or perhaps even into a sentence.

5. Whether we are paraphrasing or summarizing we must always identify the source of our information.

6. When paraphrasing and/or summarizing others’ work we must reproduce the exact meaning of the other author’s ideas or facts using our words and sentence structure.

7. In order to make substantial modifications to the original text that result in a proper paraphrase, the author must have a thorough understanding of the ideas and terminology being used.

8. A responsible writer has an ethical responsibility to readers, and to the author/s from whom s/he is borrowing, to respect others’ ideas and words, to credit those from whom we borrow, and whenever possible, to use one’s own words when paraphrasing.

9. When in doubt as to whether a concept or fact is common knowledge, provide a citation.

10. Authors who submit a manuscript for publication containing data, reviews, conclusions, etc., that have already been disseminated in some significant manner (e.g., published as an article in another journal, presented at a conference, posted on the internet) must clearly indicate to the editors and readers the nature of the previous dissemination.

11. Authors of complex studies should heed the advice previously put forth by Angell & Relman (1989). If the results of a single complex study are best presented as a ‘cohesive’ single whole, they should not be partitioned into individual papers. Furthermore, if there is any doubt as to whether a paper submitted for publication represents fragmented data, authors should enclose other papers (published or unpublished) that might be part of the paper under consideration (Kassirer & Angell, 1995)

12. Because some instances of plagiarism, self-plagiarism, and even some writing practices that might otherwise be acceptable (e.g., extensive paraphrasing or quoting of key elements of a book) can constitute copyright infringement, authors are strongly encouraged to become familiar with basic elements of copyright law.
13. While there are some situations where text recycling is an acceptable practice, it may not be so in other situations. Authors are urged to adhere to the spirit of ethical writing and avoid reusing their own previously published text, unless it is done in a manner consistent with standard scholarly conventions (e.g., by using of quotations and proper paraphrasing).

14. Authors are strongly urged to double-check their citations. Specifically, authors should always ensure that each reference notation appearing in the body of the manuscript corresponds to the correct citation listed in the reference section and that each source listed in the reference section has been cited at some point in the manuscript. In addition, authors should also ensure that all elements of a citation (e.g., spelling of authors’ names, volume number of journal, pagination) are derived directly from the original paper, rather than from a citation that appears on a secondary source. Finally, authors should ensure that credit is given to those authors who first reported the phenomenon being studied.

15. The references used in a paper should only be those that are directly related to its contents. The intentional inclusion of references of questionable relevance for purposes of manipulating a journal’s or a paper’s impact factor or a paper’s chances of acceptance is an unacceptable practice.

16. Authors should follow a simple rule: Strive to obtain the actual published paper. When the published paper cannot be obtained, cite the specific version of the material being used, whether it is conference presentation, abstract, or an unpublished manuscript.

17. Generally, when describing others’ work, do not rely on a secondary summary of that work. It is a deceptive practice, reflects poor scholarly standards, and can lead to a flawed description of the work described.

18. If an author must rely on a secondary source (e.g., textbook) to describe the contents of a primary source (e.g., an empirical journal article), s/he should consult writing manuals used in her discipline to follow the proper convention to do so. Above all, always indicate the actual source of the information being reported.

19. When borrowing heavily from a source, authors should always craft their writing in a way that makes clear to readers which ideas are their own and which are derived from the source being consulted.

20. When appropriate, authors have an ethical responsibility to report evidence that runs contrary to their point of view. In addition, evidence that we use in support of our position must be methodologically sound. When citing supporting studies that suffer from methodological, statistical, or other types of shortcomings, such flaws must be pointed out to the reader.

21. Authors have an ethical obligation to report all aspects of the study that may impact the independent replicability of their research.
22. Researchers have an ethical responsibility to report the results of their studies according to their a priori plans. Any post hoc manipulations that may alter the results initially obtained, such as the elimination of outliers or the use of alternative statistical techniques, must be clearly described along with an acceptable rationale for using such techniques.

23. Authorship determination should be discussed prior to commencing a research collaboration and should be based on established guidelines, such as those of the International Committee of Medical Journal Editors.

24. Only those individuals who have made substantive contributions to a project merit authorship in a paper.

25. Faculty-student collaborations should follow the same criteria to establish authorship. Mentors must exercise great care to neither award authorship to students whose contributions do not merit it, nor to deny authorship and due credit to the work of students.

26. Academic or professional ghost authorship in the sciences is ethically unacceptable.

27. Authors must become aware of possible conflicts of interest in their own research and to make every effort to disclose those situations (e.g., stock ownership, consulting agreements to the sponsoring organization) that may pose actual or potential conflicts of interest.”
References


Taylor, D. McD. The appropriate use of references in a scientific paper. Emergency Medicine, 14, 177-170.


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Paraphrasing/Plagiarism Exercise

Earlier, when we covered paraphrasing and plagiarism, we offered various examples of properly paraphrased and plagiarized text. Because inappropriate paraphrasing appears to be one of the most common forms of plagiarism it is important that contributors to the scientific literature become sensitive to this problem and integrate proper paraphrasing practices in their writing. To that effect, an exercise has been developed for the purpose of offering instruction on acceptable paraphrasing strategies.

For this exercise, the reader is asked to imagine the following scenario: You are working on a manuscript in which you review published studies on the colony raiding behavior of fire ants, S. invicta. In one of the journal articles that you are reading for your review there is a short paragraph that you deem very important and thus, you decide that you want to include the information in your manuscript. Here is the paragraph:

This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation.1


You could copy the above paragraph verbatim, enclose it in quotation marks, and include it in your manuscript, but as is generally known in the biomedical sciences, the use of quoted text, a fairly common practice in certain disciplines within the humanities, is typically shunned by most authors and editors of biomedical journals. Another option would be for you to summarize the important points of the above paragraph by condensing it into one or two shorter sentences that fully capture the essence of the ideas being conveyed. However, let’s assume that your intention is to paraphrase the entire paragraph thereby preserving all of the information contained in the paragraph. How would you paraphrase the paragraph without committing plagiarism and in a manner that is consistent with the principles of ethical writing?

For the first part of this exercise, please paraphrase the above paragraph to the best of your ability. Take your time and use whatever resources you deem necessary (e.g., dictionary, thesaurus). Before commencing, keep in mind that when paraphrasing you must substantially modify the original text while preserving the exact meaning of the ideas conveyed in the original paragraph. You should note that when faced with the task of paraphrasing text, many individuals often complain that the reason their paraphrases are too close to the original is because there are only a limited number of ways that one can express the same thought. Although this may be true to some extent when the original text
is comprised of highly technical language, such as the paragraph on mammalian histone lysine methyltransferase used earlier in our discussion of plagiarism, it is not true for most other writing. It is certainly not true for the sample paragraph on fire ants that we have selected.

You should also remember that your paraphrase must also indicate the source of the original material. This is typically done with either a footnote or with some form of parenthetical notation indicating the source of the original. For example, in the style suggested by the American Psychological Association, you might insert the following at the end of your paraphrase: (Balas and Adams, 1996). For this exercise, please assume that your paraphrase contains the proper reference notation indicating the source of the material. You should also assume that a full citation has been placed in the reference section of your paper.

Use the space below to paraphrase the paragraph:

________________________________________________________________________
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The second part of the exercise will help you to determine whether your rewritten version of the paragraph meets the requirements of an appropriate paraphrase. For this portion of the exercise, you are to place yourself in the same scenario as described above: That you are writing a paper on the ecology and behavior of fire ants and that you discover a paragraph that you wish to paraphrase in your paper.

Below you will find several rewritten versions of the original paragraph. Please examine each version and determine whether it has been properly paraphrased or whether it constitutes an instance of potential plagiarism. As you consider each rewritten version, please assume that you have already incorporated it into your manuscript and that you are now reviewing that section of your paper for accuracy and proper scholarship. Immediately after you select your answer you will be given feedback as to the correctness of your responses.

ORIGINAL PARAGRAPH
"This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

REWITTEN VERSION 1:

A study was conducted to examine whether workers of S. invicta can assist their mothers in colony usurpations. The first hypothesis tested was whether queens of S. invicta are better able to usurp colonies to which their daughters have moved. For the second hypothesis, the researchers tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. The researchers observed aggressive behavior during these usurpation attempts to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation.

Please indicate whether the above paragraph is:

1. Properly paraphrased.
2. Definitely plagiarized.
3. Cannot determine.

FEEDBACK: This rewritten version is definitely plagiarized. The author has merely added or substituted a few words at the beginning of each sentence, and copied verbatim the remainder of the sentences. Notice that although none of the sentences in the rewritten paragraph are identical to their counterparts in the original, the rewritten version is still deemed as an instance of plagiarism because the author has simply appropriated too many phrases from the original. Thus, the attempted paraphrase falls way short of the requirement for the original text to be thoroughly modified. This is a clear-cut case of plagiarism. See the following tables for comparisons between the original paragraph and its rewritten counterpart.
"This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

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* Red colored, underlined strings of text indicate that they have been taken verbatim from the original paragraph.

* Blue highlighted text indicates that it has been appropriated from the original paragraph with a change in the order of the words or phrases.
"This study examines whether workers of *S. invicta* are able to assist their mothers in colony usurpations. First we tested whether [queens] of *S. invicta* are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

**REWRITTEN VERSION 2**

An investigation was carried out to examine whether workers of *S. invicta* can assist their mothers in colony usurpations. The first hypothesis tested was whether queens of *S. invicta* are better able to usurp colonies to which their daughters have moved. The second hypothesis tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressiveness during these usurpation attempts was measured to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation.

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Please indicate whether the above paragraph is:

1. Properly paraphrased.
2. Definitely plagiarized.
3. Cannot determine.

**FEEDBACK:** The author has not truly paraphrased the original paragraph. As with the first rewritten version, only a few words have been substituted, deleted, or added, leaving the rest of the sentences in the new paragraph virtually unchanged. Once again, too many of the phrases that make up the original paragraph are reproduced in the rewritten version. The author has simply failed to modify the original material sufficiently. For these reasons, the current rewritten version is considered an instance of definite plagiarism.
"This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

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* Red colored, underlined strings of text indicate that they have been taken verbatim from the original paragraph.

* Blue highlighted text indicates that it has been appropriated from the original paragraph with a change in the order of the words or phrases.
"This study examines whether workers of *S. invicta* are able to assist their mothers in colony usurpations. First we tested whether [queens] of *S. invicta* are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

**REWRITTEN VERSION 3**

To determine whether workers of *S. invicta* can assist their mothers in colony usurpations, two researchers have conducted a study in which the following hypotheses were tested: First, they wanted to see whether queens of *S. invicta* are better able to usurp colonies to which their daughters have moved. Second, they tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. The ants’ aggressive behavior during these usurpation attempts was observed to determine if the presence of related or familiar workers influenced the aggressive response toward either the resident queen or the queen attempting a colony take-over.

Please indicate whether the above paragraph is:

1. Properly paraphrased.
2. Definitely plagiarized.
3. Cannot determine.

**FEEDBACK:** The first sentence of the rewritten version is probably an acceptable paraphrase of the first sentence in the original paragraph. However, with the exception of a minor transposition of words in the last sentence, the rest of the sentences have only been superficially changed by the addition or substitution of a few words at the beginning of each sentence. The remaining phrases in these sentences have not changed. As with the previous example, none of the sentences in the rewritten paragraph are totally identical to their counterparts in the original. Because there is still a significant amount of verbatim material taken from the original, the rewritten version would still be deemed as an example of plagiarism.
"This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First, we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

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* Red colored, underlined strings of text indicate that they have been taken verbatim from the original paragraph.

* Blue highlighted text indicates that it has been appropriated from the original paragraph with a change in the order of the words or phrases.
ORIGINAL PARAGRAPH

"This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

REWITTEN VERSION 4

To determine whether workers of S. invicta can assist their mothers in colony usurpations, a study was conducted in which the following variables were investigated: First, S. invicta queens' hypothesized ability to usurp colonies to which their daughters have moved was examined. The second hypothesis tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. During these usurpation attempts aggressive behavior was observed to determine if the presence of familiar or related workers influenced aggression toward either the resident queen or the queen attempting colony usurpation.

Please indicate whether the above paragraph is:

1. Properly paraphrased.
2. Definitely plagiarized.
3. Cannot determine.

FEEDBACK: In this version the first two paraphrased sentences appear to have undergone moderate modifications. However, the second two sentences have not been adequately paraphrased. As with previous versions, the third sentence was changed by a mere substitution of the first two of three words and the fourth sentence has not been changed at all making these two sentences plagiarized versions of the original. Because the first two sentences were not sufficiently modified and because the last two sentences contain only minimal changes, this rewritten version of the original paragraph is still considered as a case of plagiarism.
“This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation.”

To determine whether workers of S. invicta can assist their mothers in colony usurpations, a study was conducted in which the following variables were investigated: First, S. invicta queen's hypothesized ability to usurp colonies to which their daughters have moved was examined. The second hypothesis tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. During these usurpation attempts, aggressive behavior was observed to determine if the presence of familiar or related workers influenced aggression toward either the resident queen or the queen attempting colony usurpation.

* Red colored, underlined strings of text indicate that they have been taken verbatim from the original paragraph.

* Blue highlighted text indicates that it has been appropriated from the original paragraph with a change in the order of the words or phrases.
"This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

REWRITTEN VERSION 5

An investigation was carried out to determine whether S. invicta mothers are helped by their worker offspring during colony usurpations. The study’s focus of investigation was the question of whether colony take-over by S. invicta queens is more effective when their daughters first invade the colonies. One hypothesis concerned the extent to which daughters’ familiarity with the queen, or their genetic similarity to her, affects successful colony take-over. During attempts at taking over another colony, behavioral observations were made of usurping workers that were either familiar or genetically related to the queens to see if these variables were related to aggressive behavior toward the resident or the invading queen.

Please indicate whether the above paragraph is:
1. Properly paraphrased.
2. Definitely plagiarized.
3. Cannot determine.

FEEDBACK: Although some of the terms from the original paragraph have been retained in the rewritten version, the current paraphrased version has been sufficiently modified from the original and is, therefore, classified as having been correctly paraphrased.
"This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

An investigation was carried out to determine whether S. invicta mothers are helped by their worker offspring during colony usurpations. The study’s focus of investigation was the question of whether colony take-over by S. invicta queens is more effective when their daughters first invade the colonies. One hypothesis concerned the extent to which daughters’ familiarity with the queen, or their genetic similarity to her, affects successful colony take-over. During attempts at taking over another colony, behavioral observations were made of usurping workers that were either familiar or genetically related to the queens to see if these variables were related to aggressive behavior toward the resident or the invading queen.

* Red colored, underlined strings of text indicate that they have been taken verbatim from the original paragraph.

* Blue highlighted text indicates that it has been appropriated from the original paragraph with a change in the order of the words or phrases.
ORIGINAL PARAGRAPH

"This study examines whether workers of S. invicta are able to assist their mothers in colony usurpations. First we tested whether [queens] of S. invicta are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

REWrittEn VERSION 6

Balas and Adams carried out an investigation to determine whether S. invicta mothers are helped by their worker offspring during colony take-overs. These authors asked whether colony take-over by S. invicta queens is more effective when their daughters first invade the colonies. A second hypothesis concerned the extent to which daughters' familiarity with the queen, or their genetic similarity to her, affects successful colony take-over. During these occupation attempts, aggressive behavior of usurping workers that were either familiar or genetically related was observed to see if these variables mediated aggressive behavior toward the invading or the resident queen.

Please indicate whether the above paragraph is:

1. Properly paraphrased.
2. Definitely plagiarized.
3. Cannot determine.

FEEDBACK: If you selected "properly paraphrased", you are correct. Although as in the earlier example (No. 5) the structure of the paragraph (i.e., order of the sentences) has been preserved, the present rewritten paragraph represents a thoroughly modified version of the original. The reader is reminded, however, that in some disciplines, particularly within the humanities, a proper paraphrase entails a change in the overall structure of the paragraph as well as a change in the wording. Given, that scientific writing is sometimes multidisciplinary in scope, authors should make every effort to be thoroughly acquainted with the rules of scholarship encompassing the readership of their work.
"This study examines whether workers of *S. invicta* are able to assist their mothers in colony usurpations. First we tested whether [queens] of *S. invicta* are better able to usurp colonies to which their daughters have moved. Second, we tested whether the effect of daughters on usurpation success is due to familiarity with the queen or to genetic relatedness. Aggressive behavior during these usurpation attempts was observed to determine if the presence of familiar or related workers influenced the aggressive response toward either the resident queen or the queen attempting usurpation."

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* Blue highlighted text indicates that it has been appropriated from the original paragraph with a change in the order of the words or phrases.
Plagiarism Sleuths

A Texas group is trolling through publications worldwide hunting for signs of duplicated material. The thousands of articles they’ve flagged online raise questions about standards in publishing—and about the group’s own tactics.

HAROLD “SKIP” GARNER NEVER INTENDED to become an enforcer. The affable computational biologist set out 7 years ago with a modest enough goal: to access the scientific literature more efficiently. With colleagues, he crafted a computer program called eTBLAST that could detect similarities in published abstracts, making it relatively easy to sort through the 19 million papers in a database like MEDLINE and pick out those in a narrow slice of science.

But his group at the University of Texas (UT) Southwestern Medical Center in Dallas quickly realized that eTBLAST had another, tantalizing application. “We could do stuff like find plagiarisms,” says Garner. That held definite appeal—but first, Garner wanted to sharpen the program’s accuracy. Two years ago, with support from the Office of Research Integrity and the National Institutes of Health, he launched Déjà vu, an online database that bills itself as “a study of scientific publication ethics.” It now lists 74,790 pairs of papers drawn from MEDLINE that eTBLAST has found with striking similarities in language or content. The authors include everyone from Nobel Prize winners to scientists toiling in obscure institutions in every corner of the world. When Science conducted random searches of illustrious names, between one-third and one-half showed up in Déjà vu as potential duplicators of their own or others’ work. Garner and his crew have built a powerful tool for uncovering repetitive papers—and for raising authors’ hackles.

Over the past year or so, Déjà vu has rapidly gained prominence. It has prompted discussions with journal editors and at least 48 retractions of suspicious papers. In March, a rheumatologist resigned from Harvard Medical School after Déjà vu detected similarities between a review article he had published and an earlier article by a Texas researcher. Some journals now run accepted papers through eTBLAST software, which is freely available, to hunt for duplications prior to publication. Some senior faculty members contacted by Science say they would consider using Déjà vu to help guide hiring, promotion, and publication decisions.

But how reliable is Déjà vu, and what do its developers hope to accomplish? Science examined many papers listed there and found that Déjà vu casts a wide net, scooping up innocent papers (such as translations) along with suspicious ones. Its large haul raises questions about writing and publication standards for scientific papers; it is also leaving frustrated scientists in its wake. “It’s inappropriate to flag these sorts of papers,” says Lawrence Solin, a radiation oncologist at the Albert Einstein Healthcare Network in Philadelphia, Pennsylvania, who was angry to learn that he had three pairs of papers in Déjà vu, all written by him. “These people have a serious obligation to do this correctly or not do it at all. And in my view, they are simply not doing this correctly.”

The vast majority of listings in Déjà vu, nearly 66,000, are from scientists who, like Solin, appear to be repeating their own previously published work. Repetitive reviews and incremental reports are part of an accepted tradition, and authors say they are less than thrilled to be fingered. Others say Déjà vu makes mistakes—for example, flagging similar studies on different populations.
But Déjà vu’s masters at UT Southwestern are not just out to nail plagiarists. They are challenging accepted and gray-area practices, particularly the tendency by authors and journals to recap previously published work as novel. “We don’t consider ourselves the publication police,” says Garner. At the same time, he says, for Déjà vu’s team, seeing what makes up the scientific literature has been one “of the most eye-opening experiences in our life.”

Worst offenders

Garner and his team of four run an efficient shop. The first step is automated: eTLAFLAST picks up suspicious papers based on similar titles and abstracts, and Déjà vu slaps them online for anyone to see. But eTLAFLAST isn’t perfect, Garner acknowledges, so these papers are labeled “unverified”—a classification that includes more than 90% of Déjà vu’s listings.

Reviewing papers manually is a painstaking task, led primarily by Tara Long, a mathematics major who began working with Garner in 2006 while still in college. If a great deal of text, figures, and references matches that of another paper published earlier, it is classified as a “duplicate.” On average, duplicates whose full text has been examined share 85% of their text, says Long. (Each entry consists of two papers, the earlier one and the later one.)

Scrutinizing papers, Long shifts them out of the unverified classification and into one of four main categories: Distinct, Sanctioned, Update, or Duplicate. The first two comprise only appropriate examples of repeated work, whereas in the latter two, suitability varies depending on the circumstances (for example, if a paper was reprinted with permission). Of the 5833 pairs of papers in these four groupings, 2124 are labeled duplicates. Another key question is whether papers have different authors. Déjà vu lists close to 66,000 pairs of papers with shared authors, whereas the rest, just over 9000, have different authors. Of the 2124 listings in the duplicate category, 258 have different authors on the earlier and later paper, suggesting that they may be examples of plagiarism.

These are the ones Garner’s group has focused on most aggressively, systematically contacting authors and journals. They have followed up on 165 cases so far and prompted some acknowledgments of wrongdoing and retractions.

Many apparent instances of plagiarism picked up by Déjà vu reflect a strategy known as “patchwriting”—an underrecognized problem in scientific publishing, according to Garner. Patchwriters lift large portions of the introduction, scientific design, and other sections of a published paper, then plug in details from their own experiment. “They don’t take the data, but they take the scientific design,” says Beth Notzon, who has taught classes on publication ethics to young physicians at M. D. Anderson Cancer Center in Houston, Texas, and is administrative editor at the International Journal of Radiation Oncology, Biology, Physics. “They’re able to repeat the whole thing but in a different population of patients.”

Notzon’s journal was alerted to such a case by Déjà vu. A group in China had, by Déjà vu’s estimate, copied more than 95% of a paper on breast cancer first published in 2003 in the International Journal of Radiation Oncology, Biology, Physics. The Chinese group changed the focus from breast cancer to nasopharyngeal cancer, which is much more common in those of Asian ancestry, and reported data from their own patients. The lead author of the original paper, Odilia Popanda of the German Cancer Research Center in Heidelberg, notes that she was rather miffed that the Chinese work, published in 2005, appeared in a higher profile journal, Clinical Cancer Research.

The first author of the Clinical Cancer Research paper, Wei-dong Wang, an oncologist at Xinqiao Hospital in Chongqing, China, wrote in an e-mail message to Science that “our English skill was not good enough to meet the language requirements” of Clinical Cancer Research. “To publish our findings as quickly as possible, the first author Dr. Wang organized our results in the similar pattern of Popanda’s publication,” Wei-dong Wang continued, referring to himself in the message. He stressed, however, that the type of cancer and the results were different.

Wang also wrote that “we have done foolish things” and “we should express our findings in our own words.” Wang wrote in a later e-mail message to Science that he and his co-authors had decided to withdraw the paper, and it was retracted late last month.

Wang’s account of patchwriting jibes with what Notzon has seen in her classes. She was startled to find that many foreign scholars at M. D. Anderson, particularly those from Asia, consider it perfectly appropriate. “We had a young woman visiting from China who taught writing and editing in China, and she said laughingly, ‘Oh, we encourage this sort of thing because people don’t have good idiomatic English.’” But, Notzon says, patchwriting is “wrong because it’s really a kind of plagiarism—they’re taking someone else’s research idea.”

Challenging standards

More disconcerting questions raised by Déjà vu focus on the norms of scientific publishing. Take reviews, which make up about 20% of the listed papers, Long estimates. They often contain duplicated material, particularly from the author’s own published articles. “You can’t just copy your introduction [on an article]. But to what extent is that wrong? There’s definitely a gray area,” says Notzon.

When it comes to repetition of their own writing, few scientists see a problem. “When
Repetition Is Not Duplication

Kay Dickersin, an epidemiologist at Johns Hopkins University in Baltimore, Maryland, grew intrigued by Dējā vu after encountering a case of plagiarism in a class she taught. On a lark, she plugged her own name into the database and was shocked to see a pair of papers she'd authored come up. "People are going to think I'm plagiarizing myself," she said. Quickly, Dickersin realized she had an even bigger problem on her hands: Dējā vu was riddled with papers like hers from the Cochrane Collaboration, whose U.S. center she runs, because the center's specialty is publishing updated reviews of clinical research. They are repetitive by design.

The Cochrane database, containing about 3800 papers in all, has a whopping 2879 papers listed on Dējā vu. We "realized straight away that people would say, 'These guys in Cochrane are just ripping each other off,'" says Nick Royle, CEO of Cochrane, based in Oxford, U.K. He immediately wrote to Harold "Skip" Garner of the University of Texas Southwestern Medical Center in Dallas, who runs Dējā vu.

you labor over a sentence, when you love that sentence, it's really hard to move too many commas around" if you use it again, says Douglas Mann, a cardiologist at Washington University in St. Louis, Missouri, who has five pairs of papers on Dējā vu, all 10 of them reviewed or co-authored by him. Four sets are "unverified" and one is listed as a duplicate.

"There's going to be redundancy" in review articles, Mann continues, echoing similar comments by others, "but I don't think that's scientific misconduct." Some blame the system. Often when a topic is trendy, journals solicit many reviews from the same author, on the same subject, in a short period of time. Authors respond with repetitive articles. In original research papers, too, wording may overlap substantially. When it comes to writing introductions, "if you have a series of papers on the same topic, I can imagine some of the same narrative getting in there, consciously or unconsciously," says William Gelbart, a geneticist at Harvard University.

More clear-cut is the use of material published by other researchers without proper attribution. Rudolf Weiner, a bariatric surgeon at the hospital Krankenhaus Sachsenhausen in Frankfurt, Germany, was notified of a paper that Dējā vu declared a duplication of obesity research from another bariatric surgeon at Mount Sinai School of Medicine in New York City, Daniel Herron. "Between one-third and half of the article was essentially word for word taken from my article," a review, Herron says.

In an e-mail to Science, Weiner, the first author on the later paper, wrote that one of his co-authors "received the order to create an introduction for this article about morbid obesity" and "he made a copy (obviously) of an introduction from the previous article." Weiner emphasized that the article was an overview, not original research. He declined to answer any additional questions. The co-author in question died suddenly, he says. The article was not retracted, and the journal, Surgical Technology International, did not return calls seeking comment.

Garnet responded by creating a new category for the Cochrane papers: All 2879 are now listed as "sanctioned," a class of legitimate duplications. "To his credit," says Royle, Garner grasped the problem. Still, Royle is uneasy with the outcome, concerned that the term "sanctioned" will be misconstrued as negative. Dickersin, who admits she might be "paranoid" about showing up in Dējā vu, would rather see the papers removed from the database altogether. But that's something Garner won't do.

Garner has become accustomed to fielding queries from panicked, nervous, or irate scientists. He has written personal notes to more than 100 people in an attempt to assuage concerns. But not once has a listing been pulled, he says, and he won't grant special exemptions, no matter how eminent the researcher.

Does Garner worry about posting inaccurate listings or inculpating that someone has plagiarized when they have not? "Hell, yeah," he says. "This is a touchy subject, and it can affect people's careers." With that in mind, Dējā vu's minds examine papers brought to their attention by the authors, and Garner then writes them to explain that the paper was reviewed and—in most cases—determined to be benign. It's then placed in an innocuous category. Pulling papers, Garner believes, would dilute Dējā vu's potency. "It's valuable to show other categories where things are highly similar," he says, "but also valuable to science."

Falsely fingered? Patrick Bossuyt discovered 19 listings under his name and says all are ethical publications.

One duplication spotted by Dējā vu led to a resignation. Rheumatologist Lee Simon of Harvard Medical School in Boston stepped down in March after Dējā vu determined that a review published by him in August 2004 describing new treatments for rheumatoid arthritis was similar to a paper released 13 months earlier, by Roy Fleischmann of UT Southwestern. Simon could not be reached for comment. Harvard spokesperson David Cameron confirmed that Simon had resigned and that Harvard had investigated the case, but gave no details.

Guilt by association

Garner believes that there's no problem with quoting one's own or others' work as long as the later article cites the earlier one and makes clear what's being repeated. Translations are an obvious form of approved duplication. Indeed, a paper that Garner, Long, and their colleagues published earlier this year in Science about Dējā vu (Science, 6 March, p. 1293) will likely fall into Dējā vu's duplicate category if a translation appears in a Spanish journal, as one has requested. Garner says that because the Spanish version will note the publication in which the article was first published, he has no qualms about appearing in Dējā vu.

But many with whom Science spoke disagree. Surfacing in Dējā vu, they say, suggests wrongdoing. They also lament Dējā vu's decision to publicly post tens of thousands of unverified papers. "A list like this that's computer generated can cause much harm and then put the onus on a young scientist to explain away why their entirely appro-
priate use of review material got them onto the list," says Jeffrey Macklis, a neuroscientist at Harvard whose own reviews appear on Déjà vu's unverified list because of their similarity. Macklis says all of these papers properly cited his previous reviews. If just showing up in Déjà vu suggests wrongdoing, as he worries it does, that's comparable to McCarthy-era blacklists from the 1950s that, he says, "were feared" in his house. "This is meant to be a shame-and-blame list," says Karl-Heinz Krause, a physician who studies stem cells at the University of Geneva in Switzerland. He appears in Déjà vu's duplicate category because, he says, a journal in which he published, Swiss Medical Weekly, republished a paper of his in a supplement without notifying him.

Patrick Bossuyt, a clinical epidemiologist at the University of Amsterdam in the Netherlands, anxiously searched Déjà vu after a colleague told him that several of his papers were listed there as "fraudulent." (In reality, Déjà vu has no such category.) At least 10 of his 19 listings appeared in one of the "safe" categories; the others were mostly unverified, with one labeled a duplicate. The unverified listings, he says, refer to a combination of translations, updates, and distinct papers, whereas the duplicate listing captures two identical introductory articles used to present a series in different issues of Nature Reviews Microbiology. Bossuyt calls them all examples of ethical publication but still worries that so many listings could sully his reputation.

Some also question Déjà vu's accuracy, pointing to papers it had flagged that they deem unique experiments. Nader Rifai, a clinical chemist at Harvard Medical School, appears in three listings in Déjà vu with articles that are "completely different," he says. One includes two papers that investigated two distinct drugs. Another, for which Rifai is only on the earlier paper and not the later one, examined hormone levels associated with diabetes, with one experiment in men and one in women, he says. Walter Willett, a prominent epidemiologist and nutrition expert at Harvard School of Public Health, had a similar experience: Two of the six unverified listings on which he appears in Déjà vu describe a similar study of high blood pressure performed in different populations, men and women. Willett's other listing is a review, which have to "cover the waterfront," he says. "If you come back and review something in 2 years, it will probably be 80%" like the earlier article.

Shades of gray

Just 2 years after its launch, Déjà vu has become the place to go to for anyone who wants to report suspicions of plagiarism or inappropriate duplication. It receives dozens of tips, Garner says, from "people who reported their previous mentors, their department chairman." Garner's group spends hours contacting journals and authors to alert them of Déjà vu's findings.

Garner says his aim is cleaning up the literature and coaxing scientists and journals to reconsider what's appropriate. Gelbart, himself a member of the booming club listed in Déjà vu, agrees that including many types of repetitious work is "useful as fodder for the scientific community to decide whether this falls within the norms of acceptable behavior or not." His pair of listings in Déjà vu were progress reports "written with a lot of boilerplate," he says, intended to get the word out about FlyBase, a database of fruit fly genes that began in the early 1990s.

Journals have responded to Déjà vu in different ways. Many have ignored inquiries about suspect papers. Journals in India and Egypt contacted by Science because the database listed them as having published more than a dozen duplicate papers did not respond. Some journals have embraced Déjà vu or adjusted their standards because of it. Natalie Marty, managing editor of Swiss Medical Weekly—which Krause says republished his paper without prior notification—admitted that it had reprinted many papers in a supplement but cited the initial publication. PubMed, however, failed to pick up that the papers were reprinted, and Marty says the journal has notified PubMed to add a comment to this effect. The journals Annals of Surgery and Anesthesia and Intensive Care both learned of duplication cases from Déjà vu and now screen accepted articles with eBLAST, available for free online, before they're printed. "It gives us more confidence about what we publish," says Pamela Nevar, the managing editor of Annals of Surgery.

John Loadman, an anesthesiologist in Sydney, Australia, and editor of Anaesthesia and Intensive Care, hopes to set up an automated system to check every paper submitted to the journal with eBLAST. His journal had 21 cases listed in Déjà vu, three of which turned out to be "true cases of duplicate publication," he says. Loadman doesn't believe false positives are a problem, as "it's very easy to work out" which are real.

Some researchers say they would willingly use Déjà vu to check papers when making hiring and promotion decisions. But others—particularly those who say they appear in Déjà vu wrongfully—consider that a terrible idea.

Witold Filipowicz, an RNA biologist at the Friedrich Miescher Institute in Basel, Switzerland, says it's useful for scientists to be "aware that there is a watchdog." He emigrated from Poland 25 years ago, where at the time, as in other Eastern European countries, promotions, funding, and other career decisions were primarily "based on number of publications," he says. Although that has changed, Filipowicz estimates that now worldwide, "50% or 70% of what is published is just of no value." Garner agrees that one issue underscored by Déjà vu is an excess of journals and of review articles in particular.

Still, Filipowicz thinks Déjà vu ought to highlight true plagiarism and lessen its emphasis on articles that are not original research. (One of his own papers, a symposium report based on an earlier publication, has been flagged by Déjà vu as an unverified case.) "If 90% of [listings] are benign," he says, "they will in a way muddy the real crimes," distracting attention from where it says it should lie.

—JENNIFER COUZIN-FRANKEL AND JACKIE GROM
Data Management

Data that are reliably collected using valid methods are the currency of our work. Management of data, including ownership, storage, access, sharing, security and privacy issues, is becoming an increasingly complex proposition. This section covers a few of the issues that faculty most often have questions about but is not meant to be exhaustive. The resource section points you to further information that may be useful.

Data Ownership

Investigators spend a great deal of time and energy planning how to best collect data, collecting or supervising others in its collection, and analyzing it so it is easy to forget that technically we do not actually own the data. The University owns all data generated by research projects conducted at or under the auspices of The Johns Hopkins University regardless of funding source, unless stipulated otherwise by funding agreement. While we can retain custody of the data, regardless of custody, ownership includes other rights such as control over access, sharing, intellectual property, and ultimate disposition.

Various funding sources and mechanisms support research in different ways. Grants provide funding that investigators use to conduct the research as proposed and investigators are generally permitted to retain control of the final data and other outputs from the work. Conversely, contracts require the investigator to deliver a product or service and as such may be much more prescriptive. Funders vary in the degree to which they cede control of the data or specimens and may seek to impose restrictions on publication. Before undertaking any research, you should make sure you understand the provisions of the award so that you are aware of any obligations that collecting the data may impose on you.

The Office of Research Administration, directed by Alexandra McKeown, reviews and approves all grant and contract proposals prior to submission and negotiates and accepts all subsequent awards. It’s particularly useful to discuss provisions of contracts, including proposals to philanthropic organizations, with a member of that office before initiating the
proposal process. Their expertise in negotiating terms will help ensure maximum flexibility in your ability to use the data in a manner acceptable to you and the School.

*If you leave the School.* Although the university owns the data you collect while a faculty member here, it is not uncommon for faculty who leave the university, but are in good standing at the time of departure, to take either original data or copies of original data with them to their new position. However, before any data are removed from the School, the faculty member **must** seek permission from the Department Chair to do so, who may wish to further consult with the Associate Dean for Research.

**Data retention**

“How long do I need to keep my data?” is a common question without an easy answer. The duration that you need to keep original or raw data varies based on funding source, the nature of the data, and your scientific discipline. For example, Department of Health and Human Services (DHHS) policy, which includes NIH, stipulates that data should be retained for a minimum of three years following submission of the final report but data subject to HIPAA guidelines† must be retained seven years. Some funders require different periods of retention, so make sure to check the requirements in your agreements.

Storage requirements aside, there is no reason not to retain data indefinitely, particularly data that do not contain identifiers. Scanning allows conversion of raw data into an electronic format that can be securely stored without traditional long term storage fees. One of the most compelling reasons to retain data is that it is your primary means of defense against charges of misconduct. In particular, a common denominator in many cases of alleged research fraud has been the absence of a complete set of verifiable data. Supportive and complete data can go a long way in defusing such situations.

†Unlike the Johns Hopkins School of Medicine and Hospital, the School of Public Health is not considered a HIPAA entity and as such is not subject to HIPAA guidelines on data retention. However, the JHSPH HIPAA policy requires that health information obtained from any Hopkins HIPAA entity be kept according to HIPAA guidelines.
Data sharing

Once study results have been published, it is generally expected that all information about that study, including the primary data, should be freely available in a de-identified format for other researchers to use. Some journals require that the data published in articles be available to other researchers upon request or stored in public databases. In the specific case of federally funded research, research data must be available in response to Freedom of Information Act (FOIA) requests. Should you receive a FOIA request, contact the Associate Dean for Research, who will work with the General Counsel's office to make sure the request is legitimate, that the requested materials meet FOIA eligibility (for example, physical materials and information that is confidential or constitutes intellectual property do not) and will help you meet the request in a timely fashion with appropriate financial reimbursement.

Data sharing, including FOIA requests, cannot abrogate participant confidentiality. In recent years, federal policies to promote data sharing of human subjects research in an effort to provide transparency in science have, at times, been in direct conflict with assurances to participants of confidentiality. The definition of “identifiability” is currently in flux, particularly for genome-wide data. As such, all investigators should seek consultation and ultimate permission from the School’s IRB (www.jhsph.edu/irb) when considering sharing data of any kind that have been collected from human participants.

Data Access and Storage

Investigators are responsible for limiting access and storing data in a manner that protects it from accidental damage, loss, or theft and especially from inadvertent disclosure of information about an identifiable individual. Most security strategies are a mix of common sense and planning. There is a hierarchy of safeguarding that corresponds to the degree to which the data can be linked to the individual who provided the data coupled with its level
of sensitivity, and varies according to whether the data are stored electronically or on paper. Information Systems (IS) office has information on methods to ensure data security that can be found at:
https://my.jhsph.edu/Offices/InformationSystems/datasecurity/Pages/default.aspx
(attached below)

Some existing data sources require high levels of restricted access before funding can be awarded. These include methods that are consistent with the Federal Information Security Management Act (FISMA) or other specific requirements posed by individual sponsors. Before you apply for such funding, make sure that you can meet the restricted-use obligations, which may include installing keycard access to rooms which house a computer, which in turn may be used only to access a single database. Consult with IS, directed by Ross McKenzie, for help in determining the restricted-access requirements and how they can be met.
Guidelines

✓ Students, post-docs and staff who leave your research team must have your permission to take any copies of data with them. However, you must retain custody of the original data.

✓ While you retain data custody, the University owns the data, and you must have permission to remove it from your Department Chair should you leave the School.

✓ Keep all original data records for a minimum of 3 years, unless the funder's terms stipulate a longer period.

✓ Maintaining all data indefinitely is the best defense against challenges to your research, which may come years after publication. Consider converting your de-identified primary records to electronic documents if storage is an issue.

✓ If you receive a Freedom of Information Request (FOIA) pertaining to records from your research, contact the Associate Dean for Research who will assist you in evaluating and complying with the request.

✓ Do not send unencrypted data that includes identifying information via email. If you must email such data, use encrypting software.

✓ Use common sense. Don't leave hard copies or unencrypted data that includes identifiers on a laptop or other form of electronic data in your car. Thefts from automobiles are among the most common sources of breaches of confidentiality.
Resources

The University-wide Policy on Access and Retention of Research Data and Materials may be found at http://jhuresearch.jhu.edu/Data_Management_Policy.pdf.


The Office of Research Integrity provides a comprehensive guide to data management http://ori.hhs.gov/education/products/clinicaltools/data.pdf.

HIPAA policy for the School of Public Health can be found here: http://www.jhsph.edu/hipaa
INTRODUCTION

The following policy paper contains parameters for Research Data and Materials Management (hereafter to be referred to as Research Data). In recent years, the amount of scrutiny and inquiry into Research Data has increased from a variety of sources, which has prompted efforts at Johns Hopkins and elsewhere to evaluate and update their Research Data Management practices.

The purpose of this policy is to protect researchers and the university. These measures are designed to address compliance requirements for researchers while diffusing some of the burden associated with Research Data Management. At Johns Hopkins, the department, research administration, divisional and university administration and the researcher are partners in managing and protecting the Research Data produced at the university.

This policy provides an umbrella approach to Research Data Management across the university. Divisional and other policies may also apply but are not to conflict with the overarching policy. This policy has been carefully designed to serve the best interests of our researchers and the university in management of Research Data. This policy is designed to complement, not supersede, other policies of the Johns Hopkins University including (but not limited to) protection of human subjects, HIPAA, intellectual property, financial management, etc. This policy does not apply to academic issues.

1. DEFINITIONS

RESEARCH DATA AND MATERIALS: Research Data is defined as information recorded in physical form, regardless of form or the media on which it may be recorded. For the purposes of this policy, Research Data is further defined as including any records that would be used for the reconstruction and evaluation of reported or otherwise published results. Research Data also includes materials such as unmodified biological specimens, environmental samples, and equipment. Examples of Research Data and Materials include laboratory notebooks, notes of any type, photographs, films, digital images, original biological and environmental samples, protocols, numbers, graphs, charts, numerical raw experimental results, instrumental outputs from which Research Data can be derived and other deliverables under sponsored agreements.
PRIMARY RESPONSIBLE INVESTIGATOR: The individual who bears primary responsibility for technical, programmatic, fiscal, and administrative requirements of the project.

2. APPLICABILITY OF POLICY: This Policy on Access and Retention of Research Data and Materials shall apply to all Johns Hopkins University faculty, staff, postdoctoral fellows, students and any other persons, including consultants, involved in the design, conduct or reporting of research performed at or under the auspices of the University.

3. OWNERSHIP OF RESEARCH DATA: The University owns all Research Data generated by research projects conducted at or under the auspices of the Johns Hopkins University regardless of funding source, unless specific terms of sponsorship, other agreements or University policy supersede these rights.

This policy does not attempt to determine relative rights of researchers and issues surrounding collaborative efforts such as authorship.

4. RETENTION AND ARCHIVING: The Primary Responsible Investigator of a research project is responsible for selection of an appropriate method of storing and archiving Research Data, and for determining what needs to be retained in sufficient detail and for an adequate period of time to enable appropriate responses to questions about accuracy, authenticity, primacy, and compliance with laws and regulations governing the conduct of research. The Primary Responsible Investigator is responsible for educating all participants in the research project of their obligations regarding Research Data, and for protection of the University’s rights and ability to meet obligations related to the Research Data. The Primary Responsible Investigator should also consult with University officials regarding the development of any contingency plans.

5. RIGHTS TO ACCESS: The Primary Responsible Investigator will have access to the Research Data generated by the project. Any other faculty, staff, student or person involved in the creation of Research Data may have the right to review that portion of the Research Data that he or she created. The University will have access to the Research Data as necessary for technology transfer, compliance and other purposes. The University also has the option to take custody of the Research Data as determined by the appropriate University official. Such option will not be invoked without cause and subsequent notification of the Primary Responsible Investigator. In some instances, a research sponsor has a legal right of access or access may be requested through the sponsoring agency under the federal Freedom of Information Act (FOIA). Such requests will be coordinated through the Office of the General Counsel and/or the appropriate Research Administration Office.
6. DESTRUCTION OR REMOVAL: Research Data must be maintained for the periods required by law, University policy and sponsored agreement terms (See Appendix V). Thereafter, Research Data must not be destroyed without prior approval of the appropriate University official. With respect to removal of the Research Data, the University recognizes the importance of Research Data to the future research and career of its faculty. Therefore, should removal of Research Data be approved, for example, because of the transfer of the investigator to another institution, the following requirements apply:

I. Researchers may receive approval to remove original Research Data. The University may retain copies.

II. Research Data generated during the Researcher’s employment at the University will be maintained in accordance with Johns Hopkins policy.

III. Research Data that are integral to the ongoing research of another Johns Hopkins employee or student will continue to be made available for that purpose.

IV. The researcher bears full responsibility for making original Research Data available to Johns Hopkins or federal and legal entities upon request.

Others involved in the project may remove copies (but not originals) of the Research Data with permission of the Primary Responsible Investigator.

7. MAINTENANCE AND REVISION OF THE RESEARCH DATA: The Primary Responsible Investigator of the research project is the person directly responsible for maintenance of Research Data created on that project. In order to support the project’s credibility and the University’s rights and ability to meet obligations related to the Research Data, should any revisions to final Research Data be contemplated, the Primary Responsible Investigator must notify the appropriate offices in the University and the originator of the information. The Primary Responsible Investigator must retain the original Research Data. See also Appendix IV.

APPENDICES, WEB LINKS, AND/OR FORMS:

I. **RESPONDING TO REQUESTS FOR ACCESS BY NON-HOPKINS ENTITIES UNDER FOIA** (Policy and Cost Reimbursement Form)

II. **TRANSFER OF RESEARCH DATA FROM JHU CUSTODIANSHIP** (Optional Approval Form)

III. **LINK TO UNIVERSITY POLICIES** (http://jhuresearch.jhu.edu/policies.htm)

IV. **APPROVED METHODS OF ARCHIVAL**

V. **TIME MINIMUMS FOR ARCHIVAL**
Data Security: How Should Investigators Protect Confidential, Identifiable Study Data?

Investigators are responsible for protecting the confidentiality of study data, for research integrity as well as for ethical reasons. The increasing awareness by the public and lawmakers of the need for personal information security is at a point where serious consideration needs to be given to the risks associated with acquiring, housing, and analyzing sensitive data. The inadvertent disclosure of data, known as data leakage, could result in an enforcement action by the government or granting agency, a civil action brought by an individual or class of individuals, or a sullying of the School's reputation that may affect our ability to recruit future research subjects or be awarded future grants.

Electronic data may be stored in a variety of computers and storage devices. The security of that data is affected by its storage location as well as its method of transport. JHSPH Information Systems supports several enterprise level systems that provide protection to information within the JHSPH data network. Information Technology specialists consider information to be more at risk when it leaves a “protected” zone like this, such as sending data outside the firewall protections applied to the JHSPH intranet, or taking it outside the walls of the JHSPH campus. Investigators must pay particular attention to the risks associated with data transit outside protected zones.

There are administrative, physical, and technical controls available to help reduce risk and protect the confidentiality, integrity, and availability of research data. Below are some examples of these controls.

**Administrative**
- Identify government regulations and corporate policies
- Determine classification of data: all human subjects research data requires the highest level of confidentiality protections
- Define roles and procedures for data use
- Define disaster recovery and business continuity requirements/strategies
- System administration by trained, certified data security professionals
- Reduce the use of personal identifiers where possible with human subject data

**Physical**
- Identify data storage location
- Provide access controls such as locks and keys, card swipes, tethers, etc.
- Address environmental protection (power, cooling, fire) risks
- Identify surveillance (cameras or guards) requirements

**Technical:**
- Provide electronic access controls (Passwords, ID cards, pins, or electronic tokens)
- Anti-virus protection
- Encryption (disk, transport and backup)
- Theft protection mechanisms (Lo-Jack for Laptops)
- Firewalls
- Vulnerability detection
- Log monitoring
It is the responsibility of the researcher to develop a *Data Security Plan* to identify and provide guidance regarding which of these controls are to be implemented.

If you would like more information on data security plans and controls, or if you need assistance with developing a data security plan, please contact Information Systems.
Data Security Guidelines for Community-Based Research

A Best Practices Document Prepared by the
Ad-Hoc Committee for Data Security
Program for Global Disease Epidemiology and Control
Department of International Health

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Date: May 8, 2011
**Document Outline**
I. Definitions and Basic Principles
II. General Recommendations
III. Confidential Data and De-identification
IV. Guidelines for handling (identified) data at various user levels
V. Laptop and External Devices
VI. Handling Data Files, Data Storage, and Data Transfer
VII. Data Security Risk Scenarios

**Appendices**
Appendix A. JHSPH I.S. Document “Data Security Measures When Using Personal Identifiers” *(Online)*
Appendix B. JHSPH I.S. Document “Data Security: How Should Investigators Protect Confidential, Identifiable Study Data?” *(Online)*
Appendix C. JHSPH I.S. Document “Data Security Checklist” *(Online)*
Appendix D. Data Request Form – an example from the JiVitA Study
Summary: Data Security Review and Guidelines
The following document presents the summary discussions, findings and recommendations of an ad hoc committee formed by faculty and data-management staff of the Global Disease Epidemiology and Control (GDEC) and Human Nutrition (HN) Programs of the Johns Hopkins Bloomberg School of Public Health Department of International Health. The committee's charge was to review IRB recommendations, Information Systems recommendations, standard data practices across a number of overseas project sites, and identify 'risk' scenarios involving data with the aim of providing reasonable, "best practice" guidelines for the secure storage and transaction of research data. These guidelines are meant to provide tangible risk-minimization strategies for a broad set of stakeholders, from student researchers to project Principal Investigators. Extensive and detailed discussions with leadership of the JHSPH IRB was instrumental in the construction and content of this document.
I. Definitions and Basic Principles

Data Management

Data management of human subjects research data includes: data collection, data entry, and database repository oversight (controlling access, tracking use of analytic datasets). Theoretically, data collected for research may be used indefinitely, extending the obligation to protect that data, especially as long as the subjects remain identifiable as individuals or as a group. Good data security planning requires establishing controls and guidelines to govern access, use, and protection for all users.

Definitions

- **Database**: Generally refers to the "study database", e.g., repository of all study data, usually the repository of data as it is entered from original sources such as paper forms. Database access is usually limited to a small number of technical administrators, data entry personnel (often limited to write-only access) and less frequently, study investigators. Databases generally contain identifying information about participants, if it has been collected and subsequently entered. Databases may be simple, with all data residing in a single tabular format, or complex, with multiple tables containing different participant data, linked together by a common identifier (also referred to as a “relational database”).

- **Analytic dataset**: A subset of the study database created by a data administrator or data gatekeeper in accordance to the data abstraction needs of the user. Analytic datasets may contain identifying information, only a unique identifier, or no identifier whatsoever.

- **Data Gatekeeper**: An individual who is authorized by the study PI to manage the issuance of analytic datasets, according to an explicit data security plan. The gatekeeper will be responsible to de-identify analytic datasets, to the maximum extent possible, as described below. The gatekeeper should also be tasked with logging the release and contents of analytic datasets, and request the return or deletion of data as defined in the data use agreement.
Some of these core principles are illustrated in the figure, above, with the following components: A, the population from which participants are recruited; B, the participants who contribute data / biospecimens; C, data that is entered and consolidated into a research database, managed by database administrators; D, and parsed into discreet, maximally de-identified analytic datasets, to be used by; E, various levels of end-users ranging from investigators, students, data analysts, quality control staff, course instructors, etc. The position of the data “gatekeeper” is illustrated as "X", serving as a management and control point between the database and the analytic datasets.

- **Unique Nonsense Identifier**: A non-sense random number that is assigned to a study participant upon enrollment into a research protocol. The number should not contain components that can be deciphered as a household number, cluster number or other geo-coded information.

- **Unique Logical Identifier**: A non-random number that is assigned to a study participant upon enrollment into a research protocol. The number is an aggregate of a series of numbers describing where the participant was enrolled in time and/or space. Eg. 11020223 – refers to household ‘1102’ in cluster ‘022’, where the participant is the 3rd member of the household census.

- **Data Identifiability**: Data are “identifiable” to a specific investigator if that investigator is able to ascertain the identity of the participant. Use of a “unique nonsense identifier,” and limiting access to the personal identifiers through selective release of data by a

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*“Personal Identifiers” include any data points which, when considered alone or in concert with other information, could identify an individual participant. Obvious identifiers include name, address, or telephone number. Less obvious data points could be considered as “identifiers”, varying from case to case. For example, a geographic locator, such as the name of a village, plus the age and pregnancy status of an individual might be enough to permit association of coded data with its source individual. Each investigator must consider whether it is possible to identify an individual participant by using the data in the dataset in association with other readily available resources, to make a determination as to whether a dataset is sufficiently de-identified to protect the participant.*
designated "data gatekeeper," add protection to participants. Investigators who can see, have access to, record, or use personal identifiers that go beyond a "unique nonsense identifier", including a "Unique Logical Identifier" will be viewed as "using identifiable data." Most researchers do not need personal identifiers for their work. Ideally, the study data management plan will maximize participant protection without unnecessarily hampering data utility. Access to "identifiable data" for a particular investigator will depend upon an investigator's role in the study, and the investigator's "need to know" those identifiers.

For example:

- Data collectors who directly obtain information from individual participants "know" the participants because of that direct interaction. The data will be considered "identifiable" to them even if identifiers are not recorded.

- If data are collected with personal identifiers, but those identifiers are recorded separately from the data with a unique study number assigned as a code linking the identifiers to the data ("Unique Nonsense Identifier"), the data are "encoded." Investigators who obtain the data with only the Unique Nonsense Identifier, and who have no access to or possession of the code linking the Unique Nonsense Identifier with the participant's personal information, are most likely using a "de-identified" data set.

- Individuals who have access to, or possession of, the code to link data to identifiers beyond a study Unique Nonsense Identifier for research purposes are using "identifiable data."

- A gatekeeper could hold the code and may create and distribute analytic datasets without identifiers, or with minimal identifiers, depending upon the needs of a particular analysis. The dataset recipients will only be responsible for protecting the identifiers provided to them by the gatekeeper. The data management plan should then state that only the PI and the gatekeeper will have access to the linkage between the Unique Nonsense Identifier and other personally identifying information.

- **Data transport:** The level of security required for physical transport of data will depend upon the identifiability of the data. Transport of data without identifiers, with only Unique Nonsense Identifiers and without access or link to extended personal identifiers, will require standard data transport precautions, but not enhanced security precautions.

- **Data use agreement (DUA):** Contractual agreement executed by the PI with the data user binding the user to terms and conditions governing the use of the analytic dataset, including security requirements, confidentiality, intellectual property/attribution,
restrictions on use, length of time use permitted, end of use requirements (return/destuction), etc. This agreement can be used to govern or manage sharing of data with external collaborators.

- **Data Security Plan:** Should provide detailed guidelines and decision rules for data administrators/gatekeepers to facilitate data sharing. Data should be treated like an asset, similar to project inventory. A data security plan includes provisions for defining (and restricting) levels of 'access' to types of data (e.g. identifiers, sensitive data, lab results, etc.) either by specific user or by 'class' of user. The plan should include a method for recording (tracking/logging) these individual permissions to access, access itself, and end of access. Each data sharing may be treated as a separate “transaction” and can have its own risk profile (see below). For higher risk transactions, such as data that contains identifiers or with external collaborators, data sharing may require more protection like data use agreements, time limited access to data, and possible review of proposed use by a data use committee created by the study leadership and authorized to screen such proposals.

**Risk Assessment for Data Use/Sharing**

Risk of harm to participants due to a breach of confidentiality will vary, depending upon the sensitivity of the study information. Risk is never “zero” because the fact that a person has joined a study at all is no business of anyone outside the study, but it could be minimal, for example, if the information collected concerns a participant's food preferences. “Sensitive” information is that which, if disclosed, could expose a participant to harm, whether physical, social, economic, psychological, emotional, or legal. The chart below attempts to describe a continuum of risk associated with sharing analytic datasets with other investigators or students.

**Database/dataset Identifiability:** Highest risk (I) to lowest risk (VI) for study participants

- Data Level I: Individual w/ personal identifiers
- Data Level II: Individual w/out personal identifiers, but with a unique study identifier – a “Gatekeeper” holds code
- Data Level III: Individual w/out personal identifiers, but with potentially identifying meta-data (GIS, distinguishing features, etc.)
- Data Level IV: Individual, no identifiers, no code
- Data Level V: Community², aggregate and identified by community
- Data Level VI: Community, aggregate and not identified by “community”

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² “Community” may be an “identity” in itself. The Havasupai tribe case illustrates this point. Investigators must consider the risk of harm to the community through future data use. This protection may be achieved by reviewing the original consent document and determining whether the proposed future use of a dataset is consistent with its objectives.
Sharing Analytic Datasets: Lowest security (I) to highest security risk (V)
User Level I: Co-investigators, same institution
User Level II: Other faculty within Hopkins (JHSPH, JHMI, JHU, Jhpiego)
User Level III: Co-investigators, outside institution (sharing requires electronic transport outside firewalls)
User Level IV: JHSPH, JHMI, JHU Students
User Level V: Colleagues (not co-investigators) outside of Hopkins

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II. General Recommendations: There are many aspects of computer security, ranging from intellectual property protection and the secure backup of information to safeguarding against viruses and/or unauthorized users. In this report, we focus specifically on data security issues focusing on guarding the confidentiality of research subjects. Personally identifying information is regularly collected and stored as part of the day to day operations of many of our studies. This document focuses on the handling and safeguarding of human research subject data.

As discussed above, the committee acknowledges that there may be a "continuum of consequences" and costs associated with a security breach involving different kinds of data, based on the level of sensitivity of the concerned datasets. These recommendations acknowledge this continuum and provide guidance for situations when identifiable data must be transported, transferred or utilized outside the security of the JHMI networks. There are many ways in which these measures could be implemented, considering that increased data security measures will have associated costs (monetary, investigator time, analyst time, technical staff time).

I. Extant Guidelines:

A. Be familiar with Institutional Requirements: As a foundation to understanding this document, we propose that each person involved in data management read and become familiar with the JHSPH policies relating to data security. This information is posted on the JHSPH Information Systems Data Security site, available at this link: https://my.jhsph.edu/offices/informationystems/datasetecurity

This site contains pertinent policy information for all members of the Institution as well as a checklist and tips to prevent the inadvertent disclosure of confidential data, or data leakage. The following sections of these documents are especially important:

- Descriptions of various user roles and responsibilities.
- Understanding how data is classified into different risk groups.

B. Protect Data in Transit: As described in these documents, there are a number of safeguards that are in place while data is stored on a fixed-site computer, operating within a Johns Hopkins Information-Systems (IS) secured network. When data leaves this protected zone on a laptop, USB device, PDA or other mobile device - a scenario frequently encountered by investigators and students in our research group - the level of risk increases significantly, and specific guidance is needed.

We propose several recommendations for devices traveling outside of a protected zone with data stored on them. These recommendations are classified into four main strategies. First, we suggest limiting, to the extent possible, the number of identifiers included in a dataset that is issued for analysis. To facilitate this, we recommend the identification of a data 'gatekeeper', at the outset of a research project, who is charged with the issuance of analytic datasets or tables according to a priori data access permissions, and the careful logging of these transactions. (This person is not necessarily database administrator, but is expected to work very closely with those handling the raw data.) Second, there are certain basic system-level security procedures, such as operating system passwords, and adhering to password complexity guidelines, which should be followed. Third, the datasets and associated analysis files should be maintained in encrypted folders or be themselves encrypted. Fourth, if the datasets contain identifiable data, hardware-level security measures should be
C. **Provide Research-Specific Data Security Protocols:** We found that when research applications lack clearly documented data security protocols, data management is at risk of being *ad hoc*, with decisions driven by specific situations. Data security protocols should be thought through as part of study protocol development and should provide enough detail to cover the use of, access to, and transfer of data, including how these transactions should be documented, approved and made available to all members of the research team. Adherence to these protocols becomes a responsibility of the study PI and individual members of the research team.

We advise that each IRB research application include, to the extent possible, a comprehensive data security plan, describing in detail not only how data will be collected, entered and stored, but also acceptable protocols for:

1. data transfer from user to user
2. data transfer from study site to JHSPH
3. who, by name or position, may have access to various forms of the data such as:
   i. Raw, complete electronic or paper data
   ii. Identifiable, analytic datasets
   iii. De-identifiable analytic datasets
   iv. Summary performance statistics
4. physical and data-security protocols to be implemented for physical data, electronic data, and hardware on which data may reside; and
5. if shared with investigators or students outside the study, user agreement template which outlines permitted uses of data, and disposition after use.

This data security plan could also contain a detailed list of principal investigators, co-investigators, students and staff, with clearly delineated "access permissions" to different forms of the dataset within the scope of the proposed research application. This list can then serve as a principal guideline for the data gatekeeper, where any deviations from or additions to the specified access permissions requiring prior authorization from the Principal Investigator. Figure 1, above, illustrates some basic limitations of data access by research team member role.

*Figure 1. Illustrative hierarchy of levels of access to various forms of data in a research study.*
II. Specific Guidance: Confidential Data and De-Identification

The next sections provide basic information about confidential data and de-identification as well as guidance according to level of user, from database administrator to investigator to student. At each level, our aim is the minimization of RISK, with consideration of what is reasonable with limited resources and effort.

A. Confidential Data.

JHSPH data security policy describes 4 levels of data sensitivity. Our human subject research data falls into the class requiring the highest level of security -- Confidential:

Confidential – data with this classification requires the highest level of protection. In general, this will be data that is covered by government law or regulation.

Protecting Data Confidentiality: Ideally, these data should be maintained exclusively within the network or JHSPH Protected Zone, with only de-identified data being released to any outside use. This general rule however, should be interpreted within the working definitions presented in the initial section of this document – where the “identifiability” of a dataset is defined by the ability of the individual possessing that dataset to link the data back to an individual research participant. Thus, the committee recommends limiting the release of data with ANY form of identifier to any level of investigator or analyst. This “control at source” strategy will reduce the number of ‘risk points’ for management. This also implies that compiled data (e.g. analytic datasets) should not contain identifiers (beyond a random identifier) unless specifically requested for an analysis.

When identifier-containing data is released, specific control measures will need to accompany the release of that dataset. These are described in section IV, below. The recipient of the dataset should be held responsible for complying with the recommendations that accompany the dataset. This also implies that data for analytic use should be centrally controlled and distributed to users and investigators. Data releases should be tracked in a log file. When appropriate, data use agreements (DUA) may be employed to govern the terms and conditions of data sharing, especially with non-JHSPH collaborators.

Solutions:
1. Use de-identified or minimal-identifier data as often as possible
2. Minimize risk by maximizing work “within network”
3. Control release of identifier-data at source / identification of a “Gatekeeper”
4. Track data releases (approval documentation and logging)
5. Use Data Use Agreements (DUA) with recipients when appropriate

B. De-identification of Data

De-identification is the process of removing personal information that could be used to identify an individual research subject. Once data has been de-identified, it is no longer classified as confidential and does not require a high level of data security. This process, however, may limit the future usability of the dataset and re-integration with other potentially linked data, unless a ‘key’ to the unique identifier or nonsense identifier has been preserved by the person issuing the dataset (See elaboration on Data Identifiability in BACKGROUND Section).
CAUTION: Even if all methods of de-identification of data protect an individual research participant from a breach of confidentiality, the identity of the data as a “pool” associated with a group or community remains. The interests of the group should be protected as well.

a. Methods
There are at least three common approaches to de-identification of individual-level information:

a) The removal of all personally identifying information from data, except for a nonsense identifier, such that it can only be associated with an individual study participant by a person OTHER than the individual holding the dataset (e.g. Gatekeeper or PI).

b) The removal of all personally identifying information from data, replacing identifiers with a new nonsense, unlinked, identifier, such that it CANNOT ever be re-associated with an individual study participant.

c) Using a nonsense identifier to replace the subject identifier in the dataset, a key for which is preserved by the Gatekeeper who created the database, should a later re-merger of the dataset be required to the source dataset.

Our general practice is to use the first method, in low-risk, field trials of micronutrient deficiency.

b. Examples of identifying information
To completely de-identify a dataset, identifiers such as those listed below would need to be removed for individuals, household members, or relatives:

1. Names
2. All geographic subdivisions (e.g. smaller than a U. S. State., such as city, street address, zip, etc.)
3. Birthdates (Age by year, or a general age category is permissible).
4. Telephone and Fax numbers
5. Medical record numbers
6. License numbers (including vehicle numbers)
7. Full face photographic images
8. Ethnic group
9. Any other characteristic or information which could enable data to be reconnected to its human source.

c. Practical Steps
In day to day practice, it is often necessary to work with identifiable data. In general, study subject names are not needed, but there are many cases where personal information such as Date of Birth (DOB) or specific geographic location is needed by investigators. When working with this data, partial de-identification may be acceptable, providing either the linkage between the identifier and the specific identity of a subject is maintained by a data gatekeeper, or if these data are not removable, specific protections are in place on the machine containing identifiable data. Almost always, names can be removed, with others being expunged, as possible: date of birth, age, geographic location, ethnic group, etc.
III. Guidelines for handling data at various user levels:

The data security plan must outline the user roles and "access permissions" for data associated with the specific research project.

A. Administrators/Programmers
Responsibilities: Understand the general principles of data security. Familiarize yourself with the available tools and best practices. Follow the best practices. As technology changes rapidly, it is necessary to continually update this knowledge.

Understand the rules and procedures for distributing identified data.
- De-identify data as much as possible when distributing.
- Distribute the data using secure methods.
- Log the data release.
- Obtain PI approval for exceptions prior to release.
- Ensure documentation of data use agreement for outside recipients.

➔ Use a secure workstation for database and software development. When possible, do not use a laptop for development. If a laptop is required, all data stored on the laptop should be encrypted. See the laptop and external device recommendation below (in section III).

➔ An alternative method is to use a remote access software such as GoToMyPC to access a terminal that exists within the Institutional firewall, and perform all coding operations without storing any data on the external laptop. This approach has been successful for several users within our group.

Paper and Electronic Forms Development:
Often development is a collaborative effort, and there is significant exchange of information (drafts of forms, comments, data samples, etc.) between developers and with clients. If security procedures are not followed closely, there is a significant risk of data leakage.

➔ One method to eliminate this risk is to use a database with dummy data. However, in real day to day work, this can be very cumbersome due to the constantly changing nature of a database that is under development. There is often the need to look up errors referring to a specific record from a certain data entry form, or the need to validate or check on data entry progress. It is possible to do this without a copy of the live data, but it is not practical. In day to day work, Developers and Administrators need regular local access to copies of the full research database. This requires that security measures are in place and security methods are followed.

B. Investigators
Liability for data security rests with the Principal Investigator who is considered the data owner. The data owner may delegate management of data security, but may not delegate the liability for protecting the data.

Investigators require regular access to data files that represent both the raw data (i.e. data that are reflective of the database where data were originally or are currently stored).
and "analytic data files" (i.e. data file [or set of files] derived from the raw data files). Such derivatives may be identical to the raw database files, or may reflect further manipulations of the raw data including, but not limited to: labeling variables, renaming variables, recoding of variables, generation of new variables.

– Unless there is a specific need for the investigator to have access to fully identifiable data, the investigator could designate a specific individual, using a fixed, access-limited workstation to preserve the complete database, and issue working datasets, as needed, following the guidelines described above.

– An investigator using a portable device (laptop, tablet, usb drive, etc) should also follow the system securing recommendations described below in Section IV.

C. Field Staff
Data security practices at any field site should reflect best practical standards in data security. Even in the most remote settings, basic guidelines must be in place, carefully defining the specific parameters and controls for hardware and software security. Training should be conducted to ensure field staff have the appropriate knowledge to successfully implement and maintain data security. Involve field staff in security planning and in the decision making process so they fundamentally understand the underlying risks in, reasoning for, and strategy for securing data.

– As described earlier, clear access guidelines should be in place at the beginning of a study, delineating specific individuals (or positions) with authorization to access or obtain particular kinds of data. Procedures for obtaining approval to deviate from the access guidelines should also be specified – e.g. who has authorization to change the level of access or to provide permissions to access to any kind of data (irrespective of level of de-identification).

– Often, field sites have many visitors —students, investigators, in-house staff and external visitors. It is important that the individuals who control access to both hardware and data understand and are empowered to enforce the appropriate level of access for each person who may be 'exposed' to the data. Simple decision trees may be created to illustrate the guidelines to verify if data access rules are being adhered to. Periodic audits can also be used to check if unauthorized data is available on official study laptops, data transfer devices, etc, being used by staff or students.

D. Students and Non-JHSPH Scientists

– Any individual or position not explicitly listed in the study “data access permissions” table of the Research Protocol, written at the outset of the study must go through a process to obtain PI approval, demonstrate human subjects certification, and be added (with clear access permissions) to the permissions list.

– It is recommended that the terms and parameters of the data sharing be carefully delineated, including the level of identifiable data being provided, and any associated physical security measures that have to be in place for identifiable data. We also recommend that there be clear “expiry” dates for the data sharing, such that upon completion of a collaborative project, data may be deleted or withdrawn.
The committee discussed a number of technological solutions to potentially control duration of access, but found that all currently available solutions to be limited by the honesty of the end user. For example, a centrally controlled, cloud storage solution could be used to remove individual access to a dataset upon completion of a collaboration. However, the end-user could copy files to their personal system or storage device, rendering the solution useless.

E. Students (Course-level interactions)
Data provided to students in course-level interactions should always be completely de-identified. No identifiable data should be provided to students who require data for exclusive use for course requirements. The data should be reviewed and approved by the study PI, and the specific dataset issued should be logged by the data analyst.

IV. Use of Portable Electronic Devices (Laptops and External Devices)
When data are stored on a laptop, or external device (thumb drive, USB external hard drive, etc.), the file or folder should be password protected and encrypted. Backups are not excluded from this requirement. Backup software usually has an encryption option. These recommendations apply to any situation where an identifiable dataset exists on a computer or computing device that is mobile and may leave the physical premises of JHSPH. We recommend that the PI of the project require all authorized individuals with access to data to follow these recommendations as part of the data security plan.

Why password protect? Password protection prevents others from easily gaining access to your computer through the standard user interface: screen, keyboard, and mouse. This is important for preventing unauthorized access to your operating system in situations where you briefly step away from your computer, or when your computer is lost. If your computer is lost or stolen and your hard drive is encrypted, but you do not have password protection turned on, anyone who finds your computer can turn it on and access all your data. System-level encryption, in the absence of password protection, is useless. Password protection alone, however, does not prevent someone with a minimal amount of skill from accessing data stored on your hard drive.

Why encrypt? If the data on your hard drive is not encrypted, you computer can be opened physically, the hard drive removed, and connected to another computer, from which that data can be accessed, without any password. If the data on the drive is encrypted, the data on the hard drive cannot be accessed in this way without knowledge of the encryption key.

A. Encryption
JHSPH provides PointSec encryption for Windows laptops. This software is available for a license fee of $69. This is recommended and has the benefits of complete encryption of the hard drive and a centrally managed key system for data retrieval in situations where data needs to be recovered (such as operating system corruption).

For Macbooks, hard drive encryption is also recommended. JHSPH does not offer a system for encrypting macbooks. At a minimum, folders containing confidential data should be encrypted. A practical approach is to use the Mac’s built in File Vault encryption.

More information on encryption is available on the JHU Guide to encryption:
B. Password Recommendations:
All computers, irrespective of their mobility, should require password entry at start up and after a short period of inactivity (5-15 minutes).

On windows, this can be accomplished by setting the screen saver to turn on after 5-15 minutes of inactivity, and also selecting the "On resume, password protect" option. When stepping away from your computer, actively lock the computer by pressing "Windows key-L".

On Macs, under System Preferences→Security, select the option to require password after sleep or screen saver begins.

The use of a strong password must be required.
- The longer the better.
- Use a combination of letters, numbers, and symbols
- Use at least 14 characters

Avoid:
- Using a single word from a dictionary in any language, these may be hacked by dictionary-accessing software.
- Personal information (birthdays, middle names, children’s names, locations)
- Sequences or adjacent keyboard keys: "123456789" or "qwerty"
- Words spelled backwards or abbreviations

Tips:
- Long passwords are hard to remember, but passphrases are easier to remember and still difficult to crack. If a password policy allows it, use the space character, but passphrases can be created without a space also.
  Examples:
  StereoMusicSoundsGood!ToMe
  Stereo Music Sounds Good To Me.
  (woWthaTcakEsmelleDgooD2me)
  (woW thAT cakE smelleD gooD2me)
  01Cu812

- There are online services to test password strength. If you use these, do not use your actual password, use a password with a similar structure and length. Here are some links to password checking tools:

- Sometimes you are only allowed to enter 10 or 12 characters. In this case, use the maximum number possible and be sure to include a mixture of letters, numbers, and symbols.
- Change your password yearly.
- Be wary about using your password. Avoid logging in at internet cafes or on other people’s computers. Be especially careful not to save your password in the browser by selecting "remember me" or "keep me signed in".
JHSPH enforces a password policy for accessing email and objects under its Active Directory managed network.

JHSPH password creation policy
1. Minimum length is 8 characters. Some accounts will require longer passwords.
2. Utilize both upper and lower case characters (e.g., a-z, A-Z)
3. Have at least one digit or character from the following list: !@#$%^&*()_+-|~\`\"',<>?:./. Depending on the system or software, special characters may not be allowed.
4. Never Expires

C. Tracking Software
If budgets permit, beyond the encryption of data, hard drives and strict password policies, there are software and hardware solutions which allow remote tracking and disabling of a lost or stolen computer. Examples of these include Lojack®, or Computrace®. There are privacy concerns and the software is extremely difficult or even impossible to remove. These cons should be weighed against the value of using this software.

V. Using Data Files, Data Storage, and Data Transfer

A. Using Data
Use of database files: Raw database files often contain immediately identifying information (first and last names) of participants. In general, most users do not require access to copies of the raw database (e.g. SQL). In the rare instance that such access is required/requested, ideally the user should connect to a SQL server within the network (i.e. on a network server), rather than downloading and restoring a copy of the database to a local SQL server on a specific machine. If the latter path is chosen (for example, if access outside the network is required), the user should make all efforts to restrict use to a temporary nature, and remove the database from his/her machine when finished using it.

Exporting from raw SQL database to analytic files: In general, bulk export of individual tables (or views) from the raw SQL database into external software (i.e. SAS, STATA, EXCEL, etc) produces data that are identical to the raw database, including the incorporation of immediately identifying information (first and last names) and secondary identifying information (ID numbers, addresses, date of birth, etc). Therefore, it is advisable, if the export from raw SQL database to analytic files is done in a manner that strips the immediately identifying variables (first and last names) from the dataset. For example, if the investigator (or database administrator) has access to a network SQL server containing a copy of the live/original database, he/she should ensure that the scripts written to export the individual tables drop/exclude variables that are not necessary for analysis.

Documentation and reproducibility of manipulations from the raw data: Users should use basic principles of documentation of data management and analyses so that not only analytical results can be reproduced from the raw database, but any creation of primary analytic files can also be reproduced.
Using and Managing Analytic Files: Users (especially investigators) within our group need access to analytic files on a continual basis, including periods away from the School's network. Therefore, we require solutions that allow for maintaining analytic files on local machines, even if only for temporary use. Some basic guidelines that should be adhered to, when possible:

- Check to ensure that analytic files do not contain first/last names.
- When possible, utilize dedicated password protected, restricted-access space on shared network drives and conduct and save analytic work directly into these locations.
- The use of cloud-based servers to store and manipulate data is also a feasible, secure option to manage data without permanent local storage.
- The use of remote access software is also an interesting solution – provided users maintain a primary machine which resides within the JHSPH secure network, and remotely access the machine, conducting any analysis and storage of data on the secure machine 'virtually'.
- If a local copy of the data is required
- Follow recommendations in section IV. "Laptop and External Device" to secure your device
- Work within the secure network as much as possible, and when possible, upload your work to dedicated space on our shared network drives, as above.
- After uploading to our network drives, remove local workspaces when no longer needed.
- Remove local copies of the data when no longer needed.

B. Data Storage

In this section we review a number of options for the storage of data, analytic files and other sensitive documents.

Local File Servers

Physically, the file servers are in locked rooms and only authorized personnel have access. The systems are password protected, but the data is not encrypted. These systems have regular OS patching and antivirus updates. Network security is provided by the JHSPH firewall and network security systems. User access is granted through shared folders. Users do not have execute permission on the server and cannot run or install software on the server.

Currently, user-access is only available through the school's secure network, but we are planning to explore file access through secure internet technology. This openness should decrease the instances where users need to save files to their local computers. MS Sharepoint will be used for this feature, but this service is not yet available.

Cloud Storage

Currently, we are using cloud storage (Dropbox.com) for active, collaborative data analysis projects. These are mostly projects that are in start-up phase and involve varying kinds of research data. Users must be specifically invited to share a folder, which can either be accessed online only, or be copied to the local hard drive of the invitee. If shared folders contain data, and any end users maintain their dropbox files
on a mobile device / laptop, all the specific policies and procedures described in Section IV should apply.

It is difficult to completely audit cloud system security, but it is rapidly becoming an accepted standard. Data is heavily encrypted, all transfers are logged and handled securely (via https or sftp). Details about Dropbox.com’s Amazon S3 security is available here: http://www.dropbox.com/help/27

Amazon has policies regarding data security, and uses various certifications and audits to support their claims. Details can be found at: http://aws.amazon.com/security/

Microsoft claims their cloud is secure and reliable, but their policies are difficult to locate. Here is a PDF regarding their general cloud security practices:  http://www.globalfoundationservices.com/security/documents/SecuringtheMSCloudMay09.pdf

Google, specifically, Google Docs, is not explicit about its security policies and practices. They offer general reassurance, but do not claim to adhere to standards that would be acceptable for confidential information. http://docs.google.com/support/bin/topic.py?topic=15143

C. Data Transfer

In general, online transfer is adequately secure if it uses strong encryption. Email and FTP are not commonly encrypted, and as such, are not acceptable means of data transmission. Normal web transactions (browsing web pages, typing data into forms) are not encrypted, unless specified. Web transactions are adequately secure when SSL is used. For browser traffic, this means the "HTTPS://" prefix is visible at the beginning of a URL.

Recommended Procedure for Distribution of Non-identifiable Data.

1) Prior to data access, students and external investigators not explicitly listed in the IRB data access listing should:
   a) Get permission from the Principal Investigator (PI) and fill in a Data Request Form (DRF). This must all be documented electronically or on paper.
   b) Write a brief research and analysis plan.
   c) Obtain approval from the IRB (if appropriate, or necessary).
   d) Sign Data Use Agreement.
   e) Provide a timeline for Data Use.

2) All these documents should be approved by the PI. The data manager must be copied on all correspondence. The data manager will create an individual folder on the secure server or cloud server for each separate study project.

3) The data manager will create the data set with a mapped set of identification numbers (NEWID). This data set will not contain any personal identifiers (names, addresses, etc.). The data manager will safeguard the identification key. The data set will be stored in the individual folder on the secure server. It will not be on a personal computer.
4) When the study project ends, the PI and data manager will send an e-mail to the student or scientist and ask them to delete the data set. This email will be kept on file for the record.
VI. Data Security Risk Scenarios

Scenario #1: Graduate Student requests additional data related to thesis:

Email: ".can you check the database for the following two maternal ID numbers to see if you can obtain either the NAMES or ETHNICITY:

<table>
<thead>
<tr>
<th>ID NUM</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>00001</td>
<td>228</td>
</tr>
<tr>
<td>00002</td>
<td>229</td>
</tr>
</tbody>
</table>

Appropriate Response:
- Verify with Data Manager or Data owner that student is allowed access to request this specific data
- If ETHNICITY is available, release this in a file on a secure server. It is preferable to release ETHNICITY in place of NAMES when possible, as this is less identifying information.
- If NAMES are needed, be sure to caution the student regarding the use of names outside any secure network, and that they must comply with enhanced security regulations. Remind the student to work with the data on the server and not to save it to their local machine, if possible.

Scenario #2: Investigator (data owner) requests dataset for analysis:

Verbal request at meeting: "Can you give me all the ALRI data to date for all the men enrolled in the study, with age between 30 and 40, in study areas 4, 7, and 9?"

Appropriate response:
- Find out if any identifying information is needed, DOB, Address, etc.?
- If no identifying data is required, dataset can be created and transferred to the investigator by secure server.
- Email may be used to transmit the de-identified dataset, but this is not optimal.

Scenario #3: Staff for an overseas study wrote to an investigator in an email:

"...Please find the updated data set as requested. I have entered 103 new records of deaths into the existing data set (ref: mail below). So the total number of records in the attached file is 432 (329+103).

Attn: Field Data Manager and Field Manager: I am attaching an email with some data clarifications. Please preserve these communications in a folder. We would need these communications/explanations in future.

The attached datasets had ID, Name and other data for each woman. Not only was this data being emailed without a password, it was on the Physician’s laptop in an excel spreadsheet which most likely had no security.

Appropriate response:
- Refresh Physician's data security training and identify the lapses in security policy.
- Delete the email with the attachment from all recipient inboxes.
- Encrypt the file the Physician stores this data in.
- Administrative action may be reserved for repeat violations of security policies.

Below is an example of providing data for a student. This example models appropriate procedures and possible technologies to be used for distributing data.

Example: Student requests DOB and date of visit information for study X.

Procedure:
- Obtain documented approval for release of data.
- Log the transaction and terms of data release (e.g. Expiry date of Data Use Agreement)
- Remove unnecessary identifying information.
- Export data from database to spreadsheet or CSV file. Copy file to thumb drive.
- Because the file contains partially identifying information, a higher level of security must be maintained.
  - Encrypt the thumb drive.

Example: Student requests previous pregnancy histories for women enrolled in study X to be shared electronically.

Procedure:
- Obtain documented approval for release of data.
- Log the transaction and terms of data release (e.g. Expiry date of Data Use Agreement)
- Remove unnecessary identifying information.
- Export data from database to spreadsheet or CSV file.
- Copy file to an encrypted folder, or encrypt the file itself, on a cloud server or file-sharing system, with password-protected access.
Appendixes
Appendix A. JHSPH IS Document "Data Security Measures When Using Personal Identifiers" – available online
Appendix B. JHSPH IS Document "Data Security: How Should Investigators Protect Confidential, Identifiable Study Data?" – available online
Appendix C. JHSPH IS Document "Data Security Checklist" – available online
Appendix D. Data Request Form Example
Appendix D: Data Request Form (Sample)

Data Release Form (DRF)

Name: ___________________________ JIVItA ID [ ] Designation: ______________

Date (dd/mm/yy) ___ ___ ___

Dataset type: [ ] SQL (Complete) [ ] Frozen (All or Specify):

Freeze Date: [ ]

Format: [ ] STATA [ ] SAS [ ] SPSS

Data Issued by: ________________ JIVItA ID [ ] Date: ___ ___ ___

Approval (if needed) by: ________________ JIVItA ID [ ] Date: ___ ___ ___

Analysis Plan Attached? [ ] ON

COMPLETED DRFs MUST BE FILED IN THE DMC IN THE DRF REGISTRY FOLDER.

Comments regarding the dataset provided (ie. Merges / Exclusions / Masking):

[ ]
Research and Professional Misconduct

As faculty members who do research, we’re called upon to do the right thing again and again in the face of tremendous pressures for discovery, publication and securing funding. We all realize that our reputations for integrity in research practices are at the core of our scientific endeavor. More often than not, findings of scientific impropriety can be attributed to inadequate practices, cutting corners, “sloppy” data collection or facile interpretation rather than to fraudulent intent. However chronic engagement in poor practices is also a violation of the responsible conduct of research and can also result in charges of misconduct. This section outlines the definitions, policies and consequences of research misconduct.

Research Misconduct is defined by the federal Office of Research Integrity as the fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

- **Fabrication** is making up data or results and recording or reporting them.

- **Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

- **Plagiarism** is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

Research misconduct DOES NOT include honest error or differences of opinion.
In contrast to the narrow definition of Research Misconduct, Professional Misconduct incorporates a broader range of lapses in other aspects of faculty performance, although some of these can be research-related. Examples include failure to conduct research according to IRB policies and procedures, or the misappropriation of research funds. Two separate JHSPH policies detail the process for evaluating charges of either. These are:

- **Procedures for Dealing with Issues of Research Misconduct** (PPM #7)
- **Procedures for Dealing with Issues of Professional Misconduct** (PPM #8)

Determining whether an incident falls under the purview of research misconduct or unacceptable professional conduct is not always easy. Most people are justifiably anxious about intervening in the suspected irresponsible research practices of their colleagues. Several resources may be of help. In particular,


contains practical advice and experience from other investigators who have had to face these issues.

In addition, both the Associate Dean for Research and the Associate Dean for Faculty and Education are available to discuss any suspicions in confidence; consulting with them does not necessarily result in the immediate commencement of an investigative process. Indeed, many concerns about suspected misconduct are resolved without formal proceedings and thereby circumvent a process that can be wrenching for all involved.

The School of Public Health recognizes the risks to persons who report apparent research or professional misconduct and to the extent possible, protects their confidentiality as well as those who might be accused in error. It is a professional obligation of faculty, students, or fellows to inform superiors if they have reservations about the integrity of the work of another member of this academic community and to follow appropriate procedures.
Conversely, knowingly bringing fraudulent charges against another for malicious reasons can also constitute a violation of Professional Conduct.

Under certain circumstances, the School has an obligation to notify the federal Office of Research Integrity (ORI), particularly if a formal investigation is launched into research misconduct involving a federally funded study. In addition, the funding sponsor must be notified if certain criteria are met, including an immediate need to protect human or animal subjects or to protect the interests of the sponsor.

**Plagiarism- When in doubt, paraphrase or provide a reference!**

Plagiarism deserves special mention because, whether intentional or unintentional, it is one of the most common breaches of responsible research conduct. Most acts of plagiarism involve the act of appropriating the idea or text of another without proper attribution. Learning proper ways to reference and cite sources is the best mechanism to avoid allegations of plagiarism.

The distinction between plagiarism as a form of misconduct and plagiarism as a form of an authorship dispute is grey. Many disagreements that involve the misappropriation of each others’ ideas stem from disputes between collaborators or between supervisors and their mentees. These situations are often considered authorship disputes rather than formal research misconduct. In fact, ORI will not entertain charges of plagiarism when leveled by one member of a research group against another, or when individuals have previously worked together because the ownership of intellectual property is so unclear and disputable in such situations. Nonetheless, charges of plagiarism can ruin otherwise productive relationships and result in considerable time and effort spent in trying to clear one’s name or otherwise sort out a bad situation. Preventative measures can go a long way to avoiding these disputes and include early discussion and negotiation of authorship order and data “ownership” issues regarding future publications.
Resources


You can help your students and trainees navigate good referencing practices and avoid plagiarism by reviewing the following handbook, the link to which is provided to students at orientation.


Plagiarism and international students:
What is Plagiarism?

A Simple Definition

Plagiarism constitutes the majority of academic ethics violations at the School. Plagiarism is defined in the Student Policy and Procedure Memorandum on Academic Ethics as:

“...taking for one’s own use the words, ideas, concepts or data of another without proper attribution. Plagiarism includes both direct use or paraphrasing of the words, thoughts, or concepts of another without proper attribution. Proper attribution includes: (1) use of quotation marks or single-spacing and indentation for words or phrases directly taken from another source, accompanied by proper reference to that source and (2) proper reference to any source from which ideas, concepts, or data are taken even if the exact words are not reproduced.” (The Johns Hopkins Bloomberg School of Public Health, Policy and Procedures Memorandum Students-1 Academic Ethics; October 2006)

Accurately and appropriately citing your sources is your best defense against any allegations of plagiarism. Ignorance of proper referencing standards or the failure to apply these standards for any reason is not a valid defense. The purpose of this handbook is to provide you with an overview of the school’s standards and expectations regarding referencing and citation.
Why Do We Reference Sources?

Four Good Reasons

Acknowledging how the scholarship of others has contributed to your work is necessary to maintain both academic and professional integrity. According to Turabian (2007, 133), referencing:

Properly attributes words and ideas to their owners. People deserve acknowledgment for their words and ideas. Proper referencing assures that you sufficiently provide this acknowledgment. Failure to acknowledge the ways in which others have contributed to your work is analogous to stealing in the academic realm.

Enhances the credibility of your arguments. It is not only important to be accurate in the content of your work, but also to correctly indicate from where the content came. Proper referencing of content allows readers to judge the quality of your sources that have informed your work. Drawing from credible sources leads to increased credibility of your ideas.

Provides readers with a background into your area of interest. By providing readers with a complete and accurate portrayal of the sources you have consulted in your work, you provide them with insight into the range of sources that deal with your topic area and how your work is linked to the published literature in your area of interest.

Advances your field of inquiry. Referencing provides readers with information to pursue other avenues of investigation in the same field. Researchers often formulate future endeavors based on previous scholarship, and your work combined with the references you used to develop your work may serve as a catalyst for others to explore further issues in the field that need to be addressed.

In addition to these reasons, as mentioned above, proper referencing is your best defense against charges of plagiarism.
When should we cite sources?

Citation is used to distinguish your words and ideas from the ideas and words of another. You should provide a citation in your academic work in four situations:

When you quote a source. You should clearly indicate words taken verbatim from another source by (1) placing quotation marks around the quoted material or using a block indent for longer quotes, AND (2) providing a citation for the quote. Providing only a citation for a quote without placing quotation marks or a block indent around the quoted words is not sufficient.

When you paraphrase a source. When you are using content and ideas from another source but placing them in your own words, you should cite the source.

When you summarize information from a source. When you condense the ideas from a source into a summary, you should cite the source.

When you use facts or data in your work. Facts that constitute “common knowledge” do not have to be cited. All other facts or data in a paper should be referenced. It’s not always clear what facts constitute “common” knowledge”, so if you are unsure it’s best to consult your TA or professor. When in doubt, cite the information. Information that typically requires citation include: statistics, descriptions of specific methods or events, technical definitions, data results from experiments, and the opinions, arguments or reasoning of experts.

If you are in doubt about whether you should cite a source, the safest thing to do is to cite it.
What are some general rules for citation?

Over the years, various disciplines have developed different citation practices. In a multi-disciplinary field such as public health, you will find that different departments within our School may follow different styles of citation. Regardless of which citation style you decide to use, there are some common guidelines that you should follow.

Adhere to a bibliography style or a reference list style: In bibliography style, you indicate source content by placing a superscript number at the end of the sentence. You then provide a citation to the source through a footnote or through an endnote that corresponds to the superscript number. In reference list style, you indicate a source by placing a parenthetical notation that identifies the source at the end of the sentence. Depending on the particular citation style, relevant identifying information could include author, year of publication, and page number. Most bibliography and reference list styles have a bibliography or a reference list, which consists of a compilation of sources consulted with more detailed identifying information at the end of the document. See examples of both styles below.

REFERENCE LIST: CHICAGO STYLE

In text parenthetical reference: Developing cultural competency is important for lawyers and expert witnesses involved in capital defense cases (Perlin and McClain 2009, 257).

Corresponding reference list entry:

BIBLIOGRAPHY: CHICAGO STYLE

In text footnote: Developing cultural competency is important for lawyers and expert witnesses involved in capital defense cases.

Footnote:

Corresponding bibliography entry:

Identifying source information: All citation styles provide enough information to allow the reader to locate the source of the information. Traditionally this information includes author, title, page numbers, and publication information.

Consistency: Once you have chosen a citation style to use, you should use the style accurately and consistently throughout the work.

Electronic sources and citation: Check with your particular citation style guide to properly cite electronic sources in your work. Links to web sites alone within the document are not a sufficient way to cite sources on the web. Most styles require at a minimum, url, access date and author or sponsor. Please be aware that frequent citing of unpublished electronic sources, even if done accurately, may not earn high marks in your academic evaluation. Professors pay attention to the quality of the sources cited when evaluating student work. Wikipedia, for example, is rarely an acceptable source in academic writing. The highest quality sources are derived from peer reviewed academic and scholarly works.
What are some commonly used citation styles?

Two citation styles which students commonly use are:

APA (American Psychological Association) Style
http://www.apastyle.org/

and

Chicago Style http://www.chicagomanualofstyle.org

While the APA is primarily geared toward writing for publication purposes, the Chicago style was adapted for use by student researchers by Kate Turabian. (See Turabian, Kate L. A Manual for Writers of Research Papers, Theses, and Dissertations. Revised by Booth, Wayne, Gregory Columb, and Joseph Williams. 7th ed. Chicago: University of Chicago Press, 2007.)

The Resources section at the end of this handbook has information on other styles. If you are unsure whether a citation style is acceptable, you should check with your professor.
Tools to Make Referencing Easier

Following the proper rules of citation can be tedious and time-consuming. Fortunately, there are tools available to make referencing less burdensome. Three of the most popular programs available to help manage references are Endnote, Reference Manager, and RefWorks.

The Johns Hopkins University has obtained a license to allow students to use RefWorks, and free instruction on how to use the program is available at the Welch Library. For more information, visit:  [http://www.welch.jhu.edu/welch_tutorials/RefWorks.cfm](http://www.welch.jhu.edu/welch_tutorials/RefWorks.cfm)

Microsoft Word® makes citation easier through the Citations and Bibliography section of the References tab. Formatting assistance for several citation styles, including APA and Chicago, is available. For specific help on how to create a bibliography in Word, see the Microsoft office help site.  [http://office.microsoft.com/en-us/word-help/create-a-bibliography-HA010368774.aspx?CTT=1](http://office.microsoft.com/en-us/word-help/create-a-bibliography-HA010368774.aspx?CTT=1)
**Can I receive assistance with my writing?**

Our diverse and multi-cultural faculty and student body offer a rich learning environment that allows our students to learn public health concepts from a global perspective. Interaction and feedback between and among students and faculty members is encouraged both inside and outside of the classroom.

When completing specific academic assignments, however, you should exercise caution and awareness when seeking assistance from others. **Unless your instructor has indicated otherwise, all class assignments, including homework assignments and take-home exams, are to be done individually.** This usually encompasses all phases of completing the assignment, including brainstorming ideas, developing your argument, writing drafts, and your final work product. Requesting others to contribute to this process without approval by the instructor may lead to charges of cheating. **Allowing others to edit your work, even if they are providing minor editing for grammatical and spelling errors, is prohibited without specific instructor approval.** Faculty are aware that English is a second language for many students, and base their evaluation of academic work on the content of the material rather than on grammar and spelling.

There are several university resources for international students and others who would like to improve their writing skills. The Welch Center has classes on writing. Information about times can be found at [http://www.welch.jhu.edu/classes/free.cfm](http://www.welch.jhu.edu/classes/free.cfm). Additional writing classes are available through the School and through the Professional Development Office: [http://www.jhsph.edu/student_affairs/writing.html](http://www.jhsph.edu/student_affairs/writing.html).

Resources on citation and writing can be found at the end of this handbook. In addition, there are several plagiarism detection software programs that can serve as a tool to prevent plagiarism. If you are unsure if you have referenced appropriately, you can run your work through one of these programs. The University of Maryland offers a free plagiarism detection program on their website [http://www.dustball.com/cs/plagiarism.checker/](http://www.dustball.com/cs/plagiarism.checker/)
Common Mistakes

- Submitting a “References” or “Sources” section at the end of an assignment without including endnotes/footnotes or parenthetical citation in appropriate places in the body of the work.

- Citing online sources with only a URL within the body of the work. Most citation styles require other information, such as access date and/or authors.

- Failing to put direct quotations in quotation marks, or indent quotations to make it clear that you used actual words from a text. This error is especially insidious. It is easy to cut and paste from online sources, but it is also easy to detect this.

- Failing to be consistent in your citation style throughout the assignment.

- Taking inadequate notes on sources consulted during the research process, which leads to inadequate referencing. Sloppiness is not an excuse for plagiarism.

Sloppiness and ignorance are not acceptable excuses for plagiarism.
Strategies for Avoiding Plagiarism

**Familiarize yourself with the rules of citation.**

Students are expected to be knowledgeable about how to correctly cite and reference sources in their academic work. This handbook provides a general overview of citation and resources for further reading.

Remember that the purpose of citation is to properly acknowledge your sources and to provide enough information to allow a reader to find the source material from which your information is generated.

**Take detailed notes during research process and cite as you write.**

Often times students focus on gathering content for their research and forget to pay equal attention to diligently writing down the sources of the content. Writing down proper reference citation, including accurate page numbers and versions, in your note-taking process will assure that you can correctly attribute source material when you begin writing your academic assignment.

In addition, citing as you work makes it less likely that you will forget to cite a source and unintentionally plagiarize. Any work you allow others to see, including draft papers submitted for review, may be assumed to be written with proper citation unless you indicate otherwise, which is yet another reason to cite as you write.

**When in doubt, cite.**

If you are unclear if a specific phrase is sufficiently unique to necessitate a quotation, or if a fact is “common” knowledge that does not require a citation, you should err on the side of caution and cite.

**Plan ahead accordingly to reduce stress and time pressure.**

Many times students plagiarize as a shortcut to proper researching and referencing when they are under stress to meet deadlines. If time or stress management is an issue for you, address it as soon as possible to avoid the temptation to commit plagiarism.

The Student Assistance Program can help you with any personal problems you may be facing (443-287-7000; http://www.jhu.edu/~hr1/fasap/BSPHsap.html).

**When in doubt, ask your professor for clarification on citing style.**

While the professor may indicate which citation style he or she prefers in academic assignments, many times this information is left out of assignment instruction. It is your duty as a student to meet the citation standards required by your professor, so if you have doubts on when and how to cite your sources on assignments, then you should ask your professor for clarification. In addition, unless otherwise indicated by your professor, it is assumed that all classroom assignments and exams must be completed individually.
Resources and Further Reading

For common citation styles:

Turabian style (adapted Chicago style for student researchers):


American Psychological Association (psychology and social sciences):


International Committee of Medical Journal Editors (ICMJE) or Vancouver style (requirement for submission to most biomedical journals):

http://www.icmje.org/; see also:


Writing Resources:

Welch Library:
http://www.welch.jhu.edu/welch_tutorials/

Listing of Writing and Research Guides:
http://www.jhsph.edu/student_affairs/writing.html

Purdue University Online Writing Lab (OWL) has excellent instruction on writing and citation:
http://owl.english.purdue.edu/

For questions or comments:

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International perspectives on plagiarism and considerations for teaching international trainees

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Abstract

In the increasingly global community of biomedical science and graduate science education, many US academic researchers work with international trainees whose views on scientific writing and plagiarism can be strikingly different from US norms. Although a growing number of countries and international professional organizations identify plagiarism as research misconduct, many international trainees come from research environments where plagiarism is ill-defined and even commonly practiced. Two research-ethics educators consider current perspectives on plagiarism around the world and contend that US research-training programs should focus on trainees' scientific writing skills and acculturation, not simply on preventing plagiarism. © 2011 Elsevier Inc. All rights reserved.

Keywords: Plagiarism; International trainees; Research misconduct; Scientific writing; RCR education

Introduction

The integrity of research publications is essential to the global scientific enterprise. Fostering high ethical standards within research environments likewise requires increasing attention to international perspectives. Across the United States, research universities support investigators engaged in multinational research collaborations; employ large numbers of international faculty and staff; and attract students, residents, and fellows from around the world. In this environment, even local publications can have international impact, particularly through the Internet.

International trainees are central to the global reach of US science. According to the National Science Board's 2010 Science and Engineering Indicators, one-third of students in US graduate science programs between 1997 and 2007 entered from other nations and 30% of doctorates in the life sciences awarded during that period were earned by trainees on temporary visas [1]. The Institute of International Education reported over 60,000 international graduate students and postdoctoral fellows in US physical and life sciences programs in 2008–2009, a rise of 8% over the previous year [2]. The Council for Graduate Schools reported an additional 3% increase in international graduate admissions for Fall 2010 [3]. This growth is driven primarily by rising enrollments from Asia: students from China, India, South Korea, Japan, and Taiwan now make up almost half of the international trainees in the United States [2].

Educators have long recognized that international trainees, especially from developing nations, have particular trouble with US standards of scholarly writing and are at significantly higher risk for committing plagiarism than their US peers [4–8]. Trainees first introduced to research practice in their home countries can be surprised and bewildered by US expectations for responsible conduct of research and have been found less likely to accept US norms of academic science than are their US counterparts [9,10]. Even senior trainees from outside the United States may not know how US policies and standards differ from practices they learned at home [11].

Factors affecting the incidence of plagiarism

A host of factors may make international trainees susceptible to committing plagiarism. Among the most impor-
Normalized plagiarism and the effects of corruption

International trainees charged with plagiarism in the United States often insist that they followed practices common in their home countries [12]. Complaints against senior academics in Korea, China, India, Peru, and Iran [13–17] have renewed speculation about widespread plagiarism in these and other nations. Although no data on actual prevalence exist [18], both national surveys and international comparisons document high rates of perceived plagiarism and other misconduct in emerging research environments and developing nations.

In 2009, the China Association for Science and Technology (CAST) reported that 43.4% of the approximately 30,000 Chinese researchers they queried described plagiarism in China as “really” or “rather” serious [19]. Over half said that misconduct “surrounds” them [20]. These figures were echoed in a 2010 study of cheating in academic publication that put Chinese expenditure on ghostwritten papers at over $145 million/year [21,22].

Smaller comparative studies have found that in many countries plagiarism is “deeply rooted” in university environments [23]. A multinational group of economists who compared students in Israel, The Netherlands, Russia, and the United States in the late 1990s observed that country of origin was a strong predictor of students’ tolerance for cheating. Among the populations studied, US students were the least accepting of academic dishonesty [24]. A Croatian team that compared 4 independent studies of students’ perception of and attitudes toward plagiarism in Bulgaria, Croatia, Spain, and the United Kingdom also found national differences, which they concluded, could make it difficult to harmonize academic standards across Europe [23]. Both projects found that students in former Soviet-bloc countries (Bulgaria, Croatia, and Russia) were more accepting of academic misconduct than were their counterparts in Western Europe or the United States and less likely to report others’ cheating when they knew about it [23,24].

Latin America, India, the Middle East, and Africa are “lagging behind” other regions in their concern about misconduct [25], including attention to plagiarism. A 2008 study of faculty in Brazil’s expanding research environment found participants hard-pressed to define plagiarism and concerned less about textual copying than about unattributed use of others’ data [25]. Participants not only claimed that textual plagiarism was often justified but also expressed doubts about whether policies against plagiarism would be effective in Brazil’s “permissive” culture [25].

In India, the editor of Current Science found over 80 cases of plagiarism in articles submitted in 2006–2008, due to “authors’ poor understanding of what they should and should not do” [15]. Editors of a student medical journal in Peru reported high rates of plagiarism in submitted manuscripts from across Latin America [26] and in a structured review of Peruvian medical-student theses [27]. Their analysis found plagiarism in about 80% of 33 theses, including 20 papers that contained direct copying of others’ work, whereas faculty thesis supervisors seemed to perceive no problems [27].

Academics in developing countries often draw parallels between misconduct in the research community and corruption in society. Universities are not immune to tensions that affect society generally. One of the deleterious effects of pervasive corruption is the distortion of ethical reasoning. A constant search for ways around obstacles imposed by corrupt authorities numbs personal moral judgment to the extent that unethical and even criminal behavior becomes normalized. In the case of students in former Soviet-bloc countries, their tolerance of cheating and antipathy toward informers have been attributed to cultural adaptation to the prevalent corruption and lack of individual moral responsibility seen under authoritarian regimes [23,24].

Magnus et al. developed a “tolerance-of-cheating index” that they linked to Transparency International’s Corruption Perceptions Index (CPI), an annual ranking of perceived public-sector transparency and corruption in 180 nations [24,28]. The CPI is a 10-point scale, with higher scores indicating less perceived corruption. It primarily assesses governance, that is, the traditions and institutions by which authority is exercised [29]. In 2009, Transparency International ranked New Zealand with the least perceived corruption with a CPI score of 9.4, Somalia with the most at 1.1, and the United States in nineteenth place at 7.5 [28]. That year, 8 of the top 10 countries of origin for international students in the United States (India, China, South Korea, Taiwan, Mexico, Turkey, Vietnam, and Saudi Arabia) had significantly lower CPI scores than the US [28]. The complex effects of endemic corruption may help to explain why many international trainees tolerate plagiarism as something less than misconduct.

Absent and operationally vague standards in policy

The formulation and implementation of effective policies is a key element in successful governance [29]. Since the US Congress first addressed misconduct in federally-funded research in the 1980s, most research-intensive nations have developed regulations and procedures for adjudicating charges of fabrication, falsification, and plagiarism [19,30–36]. The European Science Foundation now seeks the harmonization of European national policies on misconduct [19,32], and
the Organization for Economic Cooperation and Development and organizers of two World Conferences on Research Integrity are working to develop a framework of principles on research misconduct suitable for addressing international collaborations [33–35]. Such principles and policies are often core materials in RCR education [36].

Yet many nations still lack official policy on misconduct and authoritative standards on plagiarism [33–35]. Indeed, where plagiarism is normalized, there may be no perceived need for such policy. Trainees initially educated in environments affected by such conditions may be unaware of others’ concerns about plagiarism. Moreover, because formal misconduct policies have been developed primarily to deal with the research misconduct of funded investigators, trainees may presume that policy standards do not apply to them.

International trainees may also have difficulty appreciating US standards due to the very nature of policy language, which is typically both concise and open-ended to cover the range of cases that policymakers anticipate, as well as unforeseen future scenarios. Policy statements thus often rely upon operationally vague rules that provide limited guidance on correct practice. The US Office of Research Integrity’s policy on the federal definition of plagiarism [37], for example, does not define such key concepts as “appropriate credit” as they might be modeled in good writing. The ability to interpret and apply policy properly, e.g., determining when an idea is “common knowledge” or how many references to include in a detailed presentation of a complex topic, requires professional judgment that is acquired through education and experience.

Differing conceptions of knowledge, authority, and intellectual property

Discussing US writing standards with international trainees often reveals divergent philosophical approaches to scholarship in their academic communities of origin. For example, trainees from countries where memorization is a common pedagogical technique are sometimes surprised by US expectations that they cite sources for all direct quotations, even those expressing “common knowledge.” Many insist that what the US considers plagiarism represents, instead, the writer’s expectation that informed readers will be familiar with the original, authoritative source of certain material. This view has also been expressed by established scholars from other nations who claim that plagiarism is a tribute to the person plagiarized [16].

Political ideology and the experience of corruption have led occasional international critics to insist that defining words and ideas as intellectual property is an effort to control and exploit knowledge that properly belongs to society. Such views are also evident in societies where bureaucrats or elites control access to academic and professional research positions, often based on a credentialing system unrelated to the actual value of candidates’ written work [14,17,38]. Other critics insist that plagiarism is an administrative issue, denying its importance as a professional or moral transgression [39]. Still others, particularly in developing countries, have condemned US efforts to promote a common ethical standard for scholarship worldwide as “moral imperialism” and “intellectual colonialism” [40] that deny the ethical viewpoints of local cultures. International trainees familiar with any of these perspectives may struggle with US practices of citation and attribution.

English as the international language of plagiarism

Perhaps the most important factor in international trainees’ susceptibility to committing plagiarism is the difficulty that many non-native speakers of English face when writing in English. Although English is considered the international language of science, most international trainees have not studied English as part of their university science curriculum [25]. Even those who scored well on the TOEFL may struggle to write scientific manuscripts. When non-native speakers encounter difficulty in academic writing, they may “borrow better English” [41] to express complex ideas. Such trainees often insist that once they have read better text than they could have written themselves, it is difficult not to repeat it. Like many non-native, English-speaking researchers abroad [25,41,42], they contend that what matters are their original data, not the words that introduce the problem or frame their data.

Teaching international trainees to write, not just to avoid misconduct

International trainees enter US academic research programs eager to become skilled and productive researchers. They may plan to remain in US institutions or return to leadership positions in their home countries [7], but in either case their success depends heavily upon publishing in English-language journals. Trainees’ success or failure reflects on the programs that admit and train them, and on the senior investigators who are their mentors. Thus, program directors, department chairs, and university administrations have a vested interest in promoting activities that help their trainees to learn to write well.

The goal of instruction in biomedical writing cannot be simply to avoid plagiarism [42]. The primary US textbooks on the responsible conduct of research present the ethical goals and practical aspects of publication in ways that offer a comprehensive grounding for US and international trainees alike [14]. Institutions can foster trainees’ acculturation into US science and biomedical publication by providing writing “labs”, formal courses in scientific or medical writing, library support, in-house editorial review of manuscripts, and opportunities to practice writing for different purposes. The teaching strategies recommended by Fischer...
and Zigmond elsewhere in this issue [43] are as important for international trainees as for those educated exclusively in the United States.

As part of those efforts, all trainees should be introduced to the international conversation on ethics in biomedical publishing. For over 20 years, the International Committee of Medical Journal Editors’ Uniform Requirements for Manuscripts Submitted to Biomedical Journals has provided guidance on a range of issues, including authoritative standards for authorship [44]. The World Association of Medical Editors, which includes the editors of almost 1,000 journals from 92 countries [45], has a comprehensive policy on plagiarism intended for an international audience, as well as other practical resources. The Committee on Publication Ethics, a British organization with 5,200 members worldwide, hosts a website with cases and commentaries, as well as a blog on contemporary issues in ethics in publishing [46]. These online materials are useful as both teaching tools and reference materials for trainees worldwide.

All trainees everywhere begin as foreigners to the world of academic science and research publication, unfamiliar with its rituals and language. Considering others’ perspectives on scientific integrity and norms of practice enhances collegial understanding across research environments and offers trainees and their faculty the opportunity to build a truly international research community.

References


Plagiarism Lines Blur for Students in Digital Age

By TRIP GABRIEL

At Rhode Island College, a freshman copied and pasted from a Web site's frequently asked questions page about homelessness — and did not think he needed to credit a source in his assignment because the page did not include author information.

At DePaul University, the tip-off to one student's copying was the purple shade of several paragraphs he had lifted from the Web; when confronted by a writing tutor his professor had sent him to, he was not defensive — he just wanted to know how to change purple text to black.

And at the University of Maryland, a student reprimanded for copying from Wikipedia in a paper on the Great Depression said he thought its entries — unsigned and collectively written — did not need to be credited since they counted, essentially, as common knowledge.

Professors used to deal with plagiarism by admonishing students to give credit to others and to follow the style guide for citations, and pretty much left it at that.

But these cases — typical ones, according to writing tutors and officials responsible for discipline at the three schools who described the plagiarism — suggest that many students simply do not grasp that using words they did not write is a serious misdeed.

It is a disconnect that is growing in the Internet age as concepts of intellectual property, copyright and originality are under assault in the unbridled exchange of online information, say educators who study plagiarism.

Digital technology makes copying and pasting easy, of course. But that is the least of it. The Internet may also be redefining how students — who came of age with music file-sharing, Wikipedia and Web-linking — understand the concept of authorship and the singularity of any text or image.

"Now we have a whole generation of students who've grown up with information that just seems to be hanging out there in cyberspace and doesn't seem to have an author," said Teresa Fishman, director of the Center for Academic Integrity at Clemson University. "It's possible to believe this information is just out there for anyone to take."

Professors who have studied plagiarism do not try to excuse it — many are champions of academic honesty on their campuses — but rather try to understand why it is so widespread.
In surveys from 2006 to 2010 by Donald L. McCabe, a co-founder of the Center for Academic Integrity and a business professor at Rutgers University, about 40 percent of 14,000 undergraduates admitted to copying a few sentences in written assignments.

Perhaps more significant, the number who believed that copying from the Web constitutes “serious cheating” is declining — to 29 percent on average in recent surveys from 34 percent earlier in the decade.

Sarah Brookover, a senior at the Rutgers campus in Camden, N.J., said many of her classmates blithely cut and paste without attribution.

“This generation has always existed in a world where media and intellectual property don't have the same gravity,” said Ms. Brookover, who at 31 is older than most undergraduates. “When you're sitting at your computer, it's the same machine you've downloaded music with, possibly illegally, the same machine you streamed videos for free that showed on HBO last night.”

Ms. Brookover, who works at the campus library, has pondered the differences between researching in the stacks and online. “Because you're not walking into a library, you're not physically holding the article, which takes you closer to 'this doesn't belong to me,'” she said. Online, “everything can belong to you really easily.”

A University of Notre Dame anthropologist, Susan D. Blum, disturbed by the high rates of reported plagiarism, set out to understand how students view authorship and the written word, or “texts” in Ms. Blum's academic language.


Ms. Blum argued that student writing exhibits some of the same qualities of pastiche that drive other creative endeavors today — TV shows that constantly reference other shows or rap music that samples from earlier songs.

In an interview, she said the idea of an author whose singular effort creates an original work is rooted in Enlightenment ideas of the individual. It is buttressed by the Western concept of intellectual property rights as secured by copyright law. But both traditions are being challenged.

“Our notion of authorship and originality was born, it flourished, and it may be waning,” Ms. Blum said.

She contends that undergraduates are less interested in cultivating a unique and authentic identity — as their 1960s counterparts were — than in trying on many different personas, which the Web enables with social networking.
"If you are not so worried about presenting yourself as absolutely unique, then it's O.K. if you say other people's words, it's O.K. if you say things you don't believe, it's O.K. if you write papers you couldn't care less about because they accomplish the task, which is turning something in and getting a grade," Ms. Blum said, voicing student attitudes. "And it's O.K. if you put words out there without getting any credit."

The notion that there might be a new model young person, who freely borrows from the vortex of information to mash up a new creative work, fueled a brief brouhaha earlier this year with Helene Hegemann, a German teenager whose best-selling novel about Berlin club life turned out to include passages lifted from others.

Instead of offering an abject apology, Ms. Hegemann insisted, "There's no such thing as originality anyway, just authenticity." A few critics rose to her defense, and the book remained a finalist for a fiction prize (but did not win).

That theory does not wash with Sarah Wilensky, a senior at Indiana University, who said that relaxing plagiarism standards "does not foster creativity, it fosters laziness."

"You're not coming up with new ideas if you're grabbing and mixing and matching," said Ms. Wilensky, who took aim at Ms. Hegemann in a column in her student newspaper headlined "Generation Plagiarism."

"It may be increasingly accepted, but there are still plenty of creative people — authors and artists and scholars — who are doing original work," Ms. Wilensky said in an interview. "It's kind of an insult that that ideal is gone, and now we're left only to make collages of the work of previous generations."

In the view of Ms. Wilensky, whose writing skills earned her the role of informal editor of other students' papers in her freshman dorm, plagiarism has nothing to do with trendy academic theories.

The main reason it occurs, she said, is because students leave high school unprepared for the intellectual rigors of college writing.

"If you're taught how to closely read sources and synthesize them into your own original argument in middle and high school, you're not going to be tempted to plagiarize in college, and you certainly won't do so unknowingly," she said.

At the University of California, Davis, of the 196 plagiarism cases referred to the disciplinary office last year, a majority did not involve students ignorant of the need to credit the writing of others.

Many times, said Donald J. Dudley, who oversees the discipline office on the campus of 32,000, it was students who intentionally copied — knowing it was wrong — who were "unwilling to engage the writing process."

"Writing is difficult, and doing it well takes time and practice," he said.
And then there was a case that had nothing to do with a younger generation's evolving view of authorship. A student accused of plagiarism came to Mr. Dudley's office with her parents, and the father admitted that he was the one responsible for the plagiarism. The wife assured Mr. Dudley that it would not happen again.