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Responsible Conduct of Research

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On Being a Scientist (1995)

"The scientific research enterprise, like other human activities, is built on a foundation of trust. Scientists trust that the results reported by others are valid. Society trusts that the results of research reflect an honest attempt by scientists to describe the world accurately and without bias. The level of trust that has characterized science and its relationship with society has contributed to a period of unparalleled scientific productivity. But this trust will endure only if the scientific community devotes itself to exemplifying and transmitting the values associated with ethical scientific conduct."

http://www.nap.edu/readingroom/books/obas/preface.html

Responsible Conduct of Research (RCR)

- "RCR is simply good citizenship applied to professional life." - Nicholas Steneck[1]
- Instructional areas for RCR education/training
  - Data Acquisition, Management, Sharing and Ownership
  - Conflict of Interest and Commitment
  - Human Subjects
  - Animal Welfare
  - ***Research Misconduct***
  - ***Publication Practices and Responsible Authorship***
  - Mentor/Trainee Responsibilities
  - Peer Review
  - Collaborative Science

[1]Steneck, NH. Introduction to the Responsible Conduct of Research. Office of Research Integrity, DHHS, 2004.

Research Misconduct

What is Research Misconduct?

“The Fabrication, Falsification, or Plagiarism in proposing, performing or reviewing research or in reporting research results. “

OSTP Federal Policy on Research Misconduct (2005)

Research Misconduct

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

42 CFR Part 93

Research Misconduct

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.

42 CFR Part 93

Research Misconduct

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

42 CFR Part 93

Research Misconduct – Why does it happen?

Most researchers have good intentions

Pressures (including, in some cases, a lack of resources) and competition can lead to vulnerabilities in integrity.

For example:

- Deadlines and the rush to produce and publish results
- Funding and financial incentives
- Prestige and fame
- Inadequate work environments
- General frustrations and personal issues
- Fear and anxieties related to all of the above

Research Misconduct

An important aspect of integrity is how we deal with errors and mistakes.

Errors and our response to them are part of the scientific process

“The integrity of the game is everything.”

Peter Ueberroth, baseball commissioner, May 12, 1985.

Research Misconduct

Research misconduct does not include honest error or differences of opinion.

42 CFR Part 93

The Grey Area of Research Malpractice

Research Misconduct

- Allegation
- Preliminary Inquiry
- Formal Inquiry
- Deciding Official
- Investigation
- Deciding Official

Research misconduct can result in a variety of actions by the government

- Debarment from federal funding or advisory relationships with federal agencies
- Involvement of other federal/local agencies
  - (Department of Justice, etc.)
- Payment of restitution
- Retraction of publications
- Imprisonment
- When ORI reaches a conclusion of research misconduct, the findings (e.g. researcher's name) can become public
- http://ori.hhs.gov/misconduct/cases/

Findings of Research Misconduct

- Resulted in administrative actions

"Fabricating data that were included in two (2) published papers"

"Knowingly and intentionally falsified data reported in two (2) papers"

"The Respondent admitted to falsifying the original research data when entering values into computer programs for statistical analysis with the goal of reducing the magnitude of errors within groups, thereby gaining greater statistical power."

"ORI made fifteen findings of misconduct in science based on evidence that …knowingly and intentionally fabricated and falsified data reported in nine PHS grant applications and progress reports and several published papers, manuscripts, and PowerPoint presentations."

http://ori.hhs.gov/misconduct/cases/

Findings of Research Misconduct

“ORI found that the Respondent knowingly and intentionally tampered with research materials related to five (5) immunoprecipitation/Western blot experiments and switched the labels on four (4) cell culture dishes for cells used in the same type of experiments to cause false results to be reported in the research record. ORI also found that the Respondent tampered with laboratory research materials by adding ethanol to his colleague's cell culture media, with the deliberate intent to effectuate the death of growing cells, which caused false results to be reported in the research record. ORI has concluded that these acts seriously deviated from those that are commonly accepted within the scientific community for proposing, conducting, and/or reporting research.”

http://ori.hhs.gov/misconduct/cases/

Table 1 | Percentage of scientists who say that they engaged in the behaviour listed within the previous three years ($n = 3,247$)

Top ten behaviours	All	Mid-career	Early-career
1. Falsifying or 'cooking' research data	0.3	0.2	0.5
2. Ignoring major aspects of human-subject requirements	0.3	0.3	0.4
3. Not properly disclosing involvement in firms whose products are based on one's own research	0.3	0.4	0.3
4. Relationships with students, research subjects or clients that may be interpreted as questionable	1.4	1.3	1.4
5. Using another's ideas without obtaining permission or giving due credit	1.4	1.7	1.0
6. Unauthorized use of confidential information in connection with one's own research	1.7	2.4	0.8 ***
7. Failing to present data that contradict one's own previous research	6.0	6.5	5.3
8. Circumventing certain minor aspects of human-subject requirements	7.6	9.0	6.0 **
9. Overlooking others' use of flawed data or questionable interpretation of data	12.5	12.2	12.8
10. Changing the design, methodology or results of a study in response to pressure from a funding source	15.5	20.6	9.5 ***
Other behaviours			
11. Publishing the same data or results in two or more publications	4.7	5.9	3.4 **
12. Inappropriately assigning authorship credit	10.0	12.3	7.4 ***
13. Withholding details of methodology or results in papers or proposals	10.8	12.4	8.9 **
14. Using inadequate or inappropriate research designs	13.5	14.6	12.2
15. Dropping observations or data points from analyses based on a gut feeling that they were inaccurate	15.3	14.3	16.5
16. Inadequate record keeping related to research projects	27.5	27.7	27.3

Note: significance of χ^2 tests of differences between mid- and early-career scientists are noted by ** ($P < 0.01$) and *** ($P < 0.001$).

Martinson, Nature (2005), 435, 737.

When Research Misconduct goes public

Illustration by
David Zinn

Retracted autism study an 'elaborate fraud,' British journal finds

- "The damage to public health continues" as a result of the autism-vaccine claim

- By **the CNN Wire Staff**
- January 5, 2011 8:14 p.m. EST
- http://www.cnn.com/2011/HEALTH/01/05/autism.vaccines/index.html

Research Misconduct

vs.

Misconduct in Research

What do you think?

Dr. M. is beginning his fifth year as an independent researcher. His work is going well. He has published a number of important articles and secured a large grant for future work. Based on this progress, he expects his pending promotion review to proceed without problems.

Late one afternoon a graduate student hands Dr. M. two papers written by a senior colleague in his department. She has circled graphs in each of the papers that are clearly the same but reported as representing two different experiments. After checking the graphs carefully and reviewing the supporting data, Dr. M. agrees that something is wrong. The senior colleague, who will almost certainly be a member of his promotion review, has either made a careless mistake or falsified information in a publication.

- **What is the compliance issue in this scenario?**
- **What should Dr. M. do?**
- **Do you think this is research misconduct?**

Authorship

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Responsible Authorship

- Dissemination should include:
  - Full and fair description of the work undertaken
  - An accurate report of the results
  - Honest and open assessment of the findings

- Authors should describe:
  - What they did (methods)
  - What they discovered (results)
  - What they make of their discovery (discussion)

Steneck, NH. Introduction to the Responsible Conduct of Research. Office of Research Integrity, DHHS, 2004.

Who gets to be listed as an author?

- Generally limited to individuals who make significant contributions to the work…
  - Intimate involvement in the conception/design
  - Assumed responsibility for data collection and interpretation
  - Involved with drafting the publication
  - Approved the final version of the publication
- Does one have to contribute to all phases?

Order of Authorship

- Authors usually listed in order of importance
  - First author assumed to contribute the most
  - Last author assumed to contribute the least
    - Last author could be person who ‘pulled it all together’
  - If equal contributions, list authors alphabetically

- Check with guidelines for authors of the journal
  - Some journals define importance of roles and require identification of which author did what

Corresponding Author

- The primary person responsible for:
  - Accuracy of the data
  - Names listed as authors (all deserving; none neglected)
  - Approval of final draft by all authors
  - Handles all correspondence and response to inquiries

- Could be any of the listed authors (first to last)

Steneck, NH. Introduction to the Responsible Conduct of Research. Office of Research Integrity, DHHS, 2004.

Elements of a responsible publication

- Abstract …(it may be all anyone reads)
  - Neither overstates/understates the importance of findings
  - Data presented should be same as that in paper
  - Use of subheadings for structure

- Methods
  - Sufficient detail for replication
    - Standard methods, less description
    - New techniques, more description

Elements of a responsible publication

- Results
  - Sufficient detail to allow others to draw own conclusions
  - Don’t leave out results because they disagree with the conclusions the authors would like to reach
  - A complete summary of what was discovered
- Discussion
  - Evaluation of significance of the findings… helps those less familiar with the field understand their importance
  - Provides opportunity for identifying unresolved problems and/or future research needs
  - Avoid “1-sidedness”; recognize cautions and other interpretations

Notes, bibliography, and acknowledgements

- Provide support for important statements of fact or assumptions
- Document the work of others used in the publication
- Point to additional reading and resources
- Recognize the support of funding agencies or colleagues and staff who do not qualify as authors

Practices to be avoided

- Honorary authorship
  - Folks who helped make it possible but did not make significant contributions
- 'Bologna' publication
  - Slicing up parts of a project for separate publications
- Duplicate publication
  - Publishing the same data more than once
- Premature public statements
  - Trumpeting research findings in the press before they have been peer-reviewed

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Introducing GVSU's Responsible Conduct of Research Website