

Research Misconduct

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Summary

Necessity for self-policing

The details of how research is conducted are often known only to those actually working on a project. This relative secrecy is driven by many different factors, from sheer practicality, to protection of credit or intellectual property rights, to worries about the possible misuse of preliminary data. Where there is this secrecy, however, misconduct will only come to light if someone close to the project blows the whistle.

Obligations to act

Scientists do not all agree regarding if, when, and how to report misconduct. There is a considerable range of opinions about how to respond to perceived misconduct – and an even greater difference between scientists and administrators (Wenger et al., 1999). Yet, as a 1995 publication of the National Academy of Sciences advises, 'someone who has witnessed misconduct has an unmistakable obligation to act.'

Questions about research

Questions about the proper conduct of research are frequent and to be encouraged, but only rarely is the problem about research misconduct. It is a responsibility of all scientists to find the best and most appropriate means to address concerns about the conduct of science.

Background

Science is predicated on trust. Without confidence in the integrity of their peers, scientists would be unable to trust one another's work. Even if the demands of ethical and responsible conduct may not always seem expedient, they are always necessary to the enterprise of science. Self-regulation and self-policing operate to ensure the legitimacy of research, and necessitate that scientists foster an environment in which responsible research is explicitly discussed and encouraged. In part, this means that scientists should be familiar with definitions of research misconduct and procedures for dealing with it, regardless of whether they will ever be party to allegations.

How frequently does research misconduct occur? There are some indications that questionable research practices may be common (e.g., Kalichman and Friedman, 1992; Martinson et al., 2006), but that research misconduct occurs only rarely. In 20 years, the federal government found an average of about 10 cases of research misconduct per year; that is, about 1 case per year for every 100,000 researchers. However, there are many barriers to accurately quantifying the extent of research misconduct; cases may go unreported and institutions may be biased against finding misconduct. The actual rate of research misconduct could be as low as 1 in 100,000 or as high as 1 in 100 (Steneck, 2000; Steneck, 2006). Yet, in the past 25 years, many serious allegations of misconduct have been widely publicized, and some of those were borne out by subsequent investigation.

Regulations and Guidelines

A government-wide definition of Research Misconduct was proposed by the Office of Science and Technology Policy (OSTP, 2000) and is now covered in the Code of Federal Regulations for both the Public Health Service (PHS, 2006), the National Science Foundation (NSF, 2006), and other agencies as well. In all cases, research misconduct is essentially defined as: "fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results."

Minimally, for something to count as research misconduct it must be committed intentionally, knowingly, or recklessly, and there must be a significant departure from accepted practices of the relevant research community. Not all instances of misbehavior or questionable conduct are covered under these policies, but for those practices that are covered, there are explicit steps that must be taken in the event of an allegation of misconduct.

Discussion

Case Study 1ⁱ

A graduate student, working on a project that involves extensive DNA sequencing, provides his mentor with a computer generated sequence of a gene. The student tells his mentor that the sequence determination has involved complete analysis of both strands of the DNA molecule. Over the next several months, it is determined that not all of the sequence data reflects analysis of both DNA strands. Indeed, follow-up work by a postdoctoral in the laboratory reveals several mistakes in the sequence. The student in question admits to misleading his mentor and, following appropriate investigation, is convicted of scientific misconduct and dismissed from the graduate program. The mentor realizes that the student presented some of the erroneous data at a regional scientific meeting. Proceedings of the meeting were not published but abstracts of all of the works presented were distributed to approximately 100 meeting participants. In addition the student, with the mentor's permission, sent the sequence by electronic mail to three other laboratories. What, if any, responsibility does the faculty mentor have

with regard to disclosing the above developments? What, if anything should the mentor do about the prematurely released data? Under these circumstances, what is the potential for harm coming from this incident of scientific fraud? Who might be harmed?

Case Study 2ⁱⁱ

You are an editor for the Journal of Novel Diagnostics. You were recently handled a manuscript that compared two new diagnostic tests for detection of a genetic defect. Test 1 is marketed by Genetix, Inc. and test 2 is marketed by Probes Unlimited. The manuscript concludes that test 1 is superior in terms of reliability and accuracy. Following peer review and minor revision, you accept the paper and it appears in print. Shortly after publication, you receive a letter from the Vice President for Research at Probes Unlimited. She claims that examination of the methods section of the paper reveals that the authors used test 2 in a manner that significantly deviates from the instructions provided by Probes Unlimited. Moreover, she claims that the senior author on the paper has previously received research grants from Genetix, Inc. Is this "sloppy science" or scientific fraud? What course of action do you take?

Case Study 3ⁱⁱⁱ

Dr. Hickory submits a grant application to a federal funding agency. When he receives the summary statement review of the grant application, he finds that it has been criticized on several grounds and that it has received a score which will prevent the application from being funded. He decides to do more experiments to generate preliminary information and indefinitely postpones resubmitting the grant application. Approximately 18 months later, Dr Hickory is asked to serve as an ad hoc reviewer for a research grant submitted to a private foundation. The topical area of the grant is closely aligned with Dr. Hickory's area of expertise. It turns out that the principal investigator of this application, Dr. Poplar, was a member of the panel that previously reviewed Hickory's above-referenced grant. In reading the introductory section of the grant application, Dr. Hickory realizes that the structure and content of this section is strikingly similar to his previously submitted unfunded grant application. In fact there are several areas of the introduction where wording is virtually identical to his initial grant application. Moreover, several of the experiments proposed in the application to the private foundation are quite similar (but not identical) to the ones he had previously proposed. Dr. Hickory wonders what he can and should do about this situation. He comes to you for advice. What advice do you give him?

Discussion Questions

1. Define fabrication, falsification, and plagiarism.
2. Give at least three examples of misconduct by researchers that would not meet the existing or proposed definitions of research misconduct. In your institution, what can be done about these types of misconduct?
3. In your institution, what formal procedures or mechanisms (e.g., ombudsman, conflict resolution, arbitration, mediation) are available to help resolve disputes or questions about the responsible practice of science?

4. Outline the basic steps to be followed in your institution for responding to an allegation of research misconduct.
5. If you have direct evidence that someone in your institution has committed research misconduct, then to whom and how should such an allegation be made?
6. If you were accused of having fabricated data that you had produced, how could you demonstrate that you have actually obtained the results you reported?

Additional Considerations

Obligation to act

Most people will find it difficult to be silent about wrongdoing, particularly if a failure to speak up is likely to result in harm to patients or subjects, a waste of scarce resources, or publication of misleading findings. Others may be inclined to report misconduct because they would not want to risk that an independent discovery of the misconduct could implicate them for complicity or could at least lead to questions about why nothing had been said earlier. Finally, the public and other funders of research have the right to expect that recipients of the funding will address serious deviations from good research practice.

Rules and procedures

Although institutions receiving federal funds need to meet a common set of minimal requirements, individual institutions are granted substantial leeway in the rules and procedures for handling of allegations of misconduct. Especially if you become involved in an allegation of misconduct, it is in your best interest to familiarize yourself with all relevant institutional procedures.

Documentation

An allegation of research misconduct is one of the most serious charges that can be made against a scientist. As such, it is essential that a charge be sustained only if justified by documentation and other relevant evidence. Whether one is making the allegation or accused of misconduct, clear documentation provides the best chance for a fair and timely resolution. As with good research, an allegation of misconduct should be sustained or rejected based on adequate documentation.

Public allegations

The pace of the process for dealing with alleged misconduct may be frustrating. In such circumstances, it can be tempting to discuss the case publicly. However, placing a complex, unresolved issue into the public arena can produce unpredictable results, which can be harmful to those directly involved and to the scientific community as a whole. Publicity may also compromise the integrity of an ongoing inquiry and the privacy of parties to the investigation. Moreover, an attempt to circumvent the institutional process may prejudice those charged with reviewing the allegation.

Not necessarily research misconduct

Even when a strong argument can be made for action, making an allegation of research misconduct should not be a first step to remedy questions or concerns. Some aspects of conduct are too new or poorly defined to allow for a simple answer about what is appropriate. Other behaviors may stem from bad manners, honest error, or differences

of opinion, which may be questionable without being research misconduct. Impressions should be validated before making serious charges, and many apparent problems can be resolved by other means.

Dispute resolution

Many concerns are best addressed by means other than alleging research misconduct. Some institutions have formal mechanisms in place for conflict resolution, mediation, or arbitration; absent such mechanisms, finding a solution to a dispute may require some creativity.

- Conflict resolution: Often, good conflict resolution skills may be helpful or even sufficient. Deal with the problem as early as possible. Begin by defining points of agreement and then work on areas of disagreement. Emphasize the problem rather than the person. Give and ask for clear communication about what is most important to each of the interested parties.
- Mediation: A respected third party can sometimes help with mediating a dispute. The goal is to clarify issues in a way that permits the best possible agreement or compromise.
- Arbitration: When other avenues of communication have failed, then parties to a dispute might be convinced to put their cases before a mutually agreeable arbitrator for review and a binding decision.

Resources

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Endnotes

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