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International Standards for Research Integrity: An Idea Whose Time has Come?

By David Resnik

Abstract

A movement to promulgate international ethics standards covering areas of conduct other than research with human subjects has now begun to gain momentum. This commentary explains why it is important to develop international research integrity standards and some of the problems that must be overcome to bring them to fruition.

Introduction

Research integrity encompasses a wide range of topics relating to the ethical conduct of research, including research involving human and animal subjects, research design, data management, data analysis, data fabrication/falsification, publication, authorship, plagiarism, peer review, mentoring, science-industry relationships, conflict of interest, intellectual property, and social responsibility (Steneck, 2007, Shamoo and Resnik, 2009). Scientific research is truly global in scope, with international collaborations, conferences, journals, databases and so on. Although science transcends national boundaries, with the exception of research involving human subjects, there are no definitive international standards for research integrity.

International standards for the ethical conduct of research with human subjects have been in place since the adoption of the Nuremberg Code after the end of World War II (Nuremberg Code, 1949). The Code was adopted by the Nuremberg Military Tribunal to judge Nazi physicians and scientists accused of war crimes committed against concentration camp prisoners used in human experiments. Before this time, some investigators, such as William Osler and Claude Bernard, had written about the ethics of clinical research; some countries, such as the region of Prussia, had adopted rules for research with human subjects, and some professional organizations, such as the American Medical Association, were in the process of developing guidelines, but it took the horrific acts committed by the Nazis to convince the world community of the need for international standards for research with human subjects (Shamoo and Resnik, 2009). Other guidelines have been adopted in the years following the development of the Nuremberg Code. In 1964, the World Medical Association (WMA) adopted its Helsinki Declaration, and in 1982 the Council for the International Organization of Medical Sciences (CIOMS) developed its guidelines (WMA,

1964; CIOMS, 2002). Both documents have been revised many times since they were first adopted.

A movement to promulgate international ethics standards covering areas of conduct other than research with human subjects has only now begun to gain momentum. From September 16 to 19, 2007, in Lisbon, Portugal, the Office of Research Integrity (ORI) and European Science Foundation (ESF) convened the first global forum on research integrity. The goal of the conference was to assemble researchers, administrators, sponsors, editors, policymakers and other people from around the globe to discuss ways of harmonizing misconduct policies and fostering ethical research (Mayer and Steneck, 2007). The Co-Chairs of the conference, Tony Mayer and Nicholas Steneck, recommended that ORI and ESF work with the Global Science Forum (GSF) and the Organization for Economic Cooperation and Development (OECD) in promoting international research cooperation on research integrity. They recommended that these organizations should work together to "clarify, harmonize, and publicize standards for best practices and procedures for reporting improper conduct in research" (Mayer and Steneck, 2007).

Long before the ORI and ESF organized this conference, journal editors from around the world had collaborated on some ethical standards dealing with research integrity. For example, the International Committee of Medical Journal Editors (ICMJE) has ethical standards dealing with authorship, conflict of interest, and protection of human and animal subjects. Seven hundred journals follow the ICMJE standards (ICMJE, 2008). The Committee on Publication Ethics (COPE), an organization that promotes integrity in peer-reviewed scientific publications, has ethical standards pertaining to research misconduct, peer review, authorship, redundant publication, conflict of interest, data analysis, and protecting human and animal subjects. Over 3,800 journals belong to COPE (COPE, 2009).

A recent, high-profile case involving research misconduct has brought the need for international research integrity standards into sharp relief. In 2004 and 2005, Seoul University researcher Woo-Suk Hwang and colleagues published two articles in the journal Science reporting the derivation of HES cell lines by therapeutic cloning. Hwang received international recognition for his work and became a national hero. In November 2005, University of Pittsburgh scientist Gerald Schatten, who collaborated with Hwang on the 2005 article, accused Hwang of misleading members of the research team about the sources of human oocytes used in the research. Hwang admitted that some of the oocytes came from women working in his lab, which was not illegal in South Korea, but was ethically questionable. The women were paid $1400 for their eggs. In December 2005, the editors of Science received an anonymous tip that two of the photo cell lines in the 2005 article were duplications. Later, one of Hwang's co-authors, Sung Roh, told the media that Hwang had fabricated 9 of the 11 cell lines presented in the article. Hwang asked for the article to be withdrawn from Science, and a committee from Seoul University began investigating the 2005 article and Hwang's other publications.

Hwang resigned his position at Seoul University at the end of December 2005. In May 2006, Hwang and five collaborators were indicted on charges of fraud, embezzlement ($3 million), and breach of bioethics laws. Schatten was never accused of fabricating data, but a committee at his university found that he had shirked his authorship responsibilities and accepted excessive consulting fees ($40,000) for collaborating with Hwang over an 18-month period (Resnik, et al. 2006, Saunders and Savulescu, 2008).

International standards for research integrity are important for several reasons. First, because research is often international in scope, it is necessary to have ethical standards that transcend national boundaries to resolve disputes that may arise when the parties come from different countries. For example, suppose that a reviewer from country A suspects that an article submitted by authors from country B plagiarizes a previously

published article from country A. Suppose, also, that government organizations from country A and country B have different definitions of plagiarism. The authors could argue that their behavior does not qualify as plagiarism according to their country's rules. It may be difficult to resolve this issue without appealing to a common definition.

Second, scientists can appeal to international integrity standards in the absence of local standards. For example, if a developing nation has no regulations pertaining to data fabrication or falsification, then international standards could be used to evaluate scientific conduct. The Helsinki Declaration has functioned as a standard of conduct for research with human subjects in the absence of local laws (Brody, 1998).

Third, well-recognized, clear and coherent international integrity standards can encourage the development of local standards. Countries that lack local standards for the conduct of research can use international standards as a model for the development of their own rules and policies. Some countries have used the Helsinki Declaration as a guide to developing their own policies, for example (Brody, 1998).

Fourth, international standards for research integrity can foster trust among scientists working in different countries. Investigators who are planning an international collaboration appeal to international standards as a benchmark for authorship, publication, data sharing, and other important concerns. If an ethical dispute arises during the collaboration, the investigators can appeal to a common benchmark.

Though there is clearly an urgent need for international research integrity standards, several difficulties must be overcome to bring them to fruition. The first difficulty is to ensure that the organization(s) sponsoring the standards have sufficient influence to gain the attention of a large percentage of scientists around the world. The organizations that developed the Nuremberg Code and the Helsinki Declaration had considerable clout. The Nuremberg Military Tribunal, convened by the Allied Powers at the end of World War II, commanded the attention of the entire world as it passed judgment on Nazi war crimes. The WMA, which was founded in 1947, includes representatives from national medical associations from 85 countries. The WMA has held annual meetings since its inception in countries from Europe, Asia, North America, South America, and Australia (WMA, 2009).

Although the ORI, ESF and OECD have some influence and standing, it is not clear whether these organizations have enough sway to get the attention of a large percentage of scientists around the world. To succeed in developing research integrity standards with global impact, the ORI, ESF and OECD may need to partner with some other organizations that have some influence on scientific ethics, such as the WMA, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and professional associations, such as the American Association for the Advancement of Science, German Association for the Advancement of Science and Medicine, the Japanese Society for the Promotion of Science, and so on. Scientists from all parts of the globe should be involved in developing the standards.

The formation of an international society for ethics in research could be instrumental in promoting international standards of research ethics. Currently, there is no such organization. There are some international organizations, such as the ICMJE, COPE, WMA, the International Conference on Harmonization (ICH, 2009), and the International Association of Bioethics (IAB, 2009), that promote ethics in publication and human subjects research, but there is no organization whose main focus is ethics in all aspects of research.

Another difficulty to overcome is that there are bound to be controversies concerning the content of the international standards. Consider, for example, the definition of research misconduct. Different countries have different definitions of research misconduct. The U.S. federal government defines research misconduct as fabrication, falsification or plagiarism

(FFP) (OSTP, 2000). Other countries, however, have definitions of misconduct that include categories of behavior other than FFP. Norway defines misconduct as FFP as well as other serious breaches of good scientific practice (Norwegian National Committee for Research Ethics in Science and Technology, 2006). Finland distinguishes between fraud, which is defined as FFP, and research misconduct, which is defined as gross negligence and irresponsibility in the conduct of research (Finland, National Advisory Board on Research Ethics, 2002). China's Ministry of Science and Technology has adopted a definition of research misconduct that includes FFP as well as submitting false résumés and serious violations of rules protecting human or animal research subjects (Chong, 2006). Australia's definition of research misconduct includes FFP as well as failure to declare a serious conflict of interest, serious violations of rules pertaining to research with human or animal research subjects, and concealment of others' misconduct (Australian Research Council, 2007).

The most vexing issue in drafting an international definition of research misconduct may be deciding whether the definition should include behaviors other than FFP (often referred to as "fraud"), such as serious violations of rules protecting human or animal research subjects, or serious departures from good scientific practice. For over a decade, policymakers in the U.S. debated about the federal definition of research misconduct. In 1987, the Public Health Service (PHS) and the National Science Foundation (NSF) defined misconduct as FFP as well as other practices that deviate seriously from those commonly accepted in the scientific community. The "other practices" category proved to be very controversial because it was too general and vague. Two separate committees tried to resolve this controversy. Finally, the Office of Science and Technology Policy (OSTP) proposed a narrower definition (i.e., misconduct = FFP), which has been adopted by various federal agencies, including the PHS and NSF (Resnik, 2003). A debate similar to one that took place within the U.S. federal government could be repeated at the international level if there is substantial support for including behaviors other than FFP in the definition of misconduct.

Controversies may also arise concerning financial conflict of interest (COI) standards. Although most researchers and policymakers agree on the importance of disclosing financial interests, there is less agreement concerning whether to require anything beyond disclosure, such as conflict management or prohibition, in some situations. In the U.S., funding agencies only require grant recipients to disclose financial interests; they do not prohibit any types of financial interests. U.S. funding agencies also do not have any policies concerning institutional COIs (Shamoo and Resnik, 2009). There is considerable variation among university COI policies in the U.S. Though most universities require disclosure of financial interests, few actually prohibit any types of financial relationships (McCrary et al., 2000). Most medical schools have COI policies that pertain to institutional officials, but few have policies that address financial interests held by the institution (Eringhaus et al., 2008). In the U.S., the National Institutes of Health (NIH) intramural program has some of strongest COI rules of any research organization. The NIH prohibits intramural investigators from consulting with pharmaceutical and biotechnology companies and places limits on stock ownership (NIH, 2008).

There is also likely to be some disagreement about whether international research integrity standards should address the topic of social responsibility, i.e., promoting good consequences for society and avoiding harmful ones. Some of the most important ethical questions in scientific research, such as becoming involved in research related to national defense or advocating for political causes, have to do with social responsibility (Shamoo and Resnik, 2009). Many professional organizations, such as the American Anthropological Association (1998), American Chemical Society (2007), American Physical Society (2002), and American Society of Microbiology (2005), have codes of ethics that discuss the social responsibilities of researchers. Several prominent books on research ethics also discuss the social responsibilities of scientists (Shrader-Frechette, 1994; Resnik, 1998; Whitbeck,

1998). However, the ethics standards promulgated by U.S. funding agencies do not mention social responsibilities (Shamoo and Resnik, 2009). The guidelines developed by COPE (2009) and ICMJE (2008) also do not mention social responsibility. The Office of Research Integrity (ORI), which is responsible for promoting ethical standards in NIH-supported research, has designated nine core areas for research ethics education, none of which include social responsibility (ORI, 2006). ORI's Introduction to the Responsible Conduct of Research, written by Nicholas Steneck, covers ORI's nine core areas but has no discussion of social responsibility (Steneck, 2007).

One reason there may be some controversy about including social responsibility in international research integrity standards is that honoring this ethical obligation often requires researchers to reach beyond the familiar territory of the laboratory or research group and apply their expertise to contentious social or political issues, such as environmental protection, global warming, overpopulation, nuclear weapons, food and drug safety, gun control, and so on. Some famous scientists who have taken their responsibilities seriously have become embroiled in social and political controversy. For example, Rachel Carson (1962) alerted the world to the dangers of pesticides, especially DDT, and helped to launch the modern environmental movement when she published *Silent Spring* in 1962. Although many people now regard Carson as the paragon of a socially responsible scientist, at the time her book was published she was attacked by the chemical industry and the U.S. Department of Agriculture and derided as a hysterical kook (Lear, 2009). Representatives from diverse nations may decide to not articulate ethical standards related to social responsibility, to prevent their deliberations from becoming bogged down in controversies unrelated to the everyday conduct of science.

Once the sponsoring organizations reach some agreement on international research integrity standards, the remaining problem is how to publicize and promote them. There is little point in having an international research integrity code in name only: a code should be a living document that influences the practice of science. The Nuremberg Code and Helsinki Declaration, for example, have had considerable influence over the conduct of research with human subjects. These two codes figure prominently in educational materials and scholarly works on research with human subjects, government reports, journal policies, and even legal opinions (Shamoo and Resnik, 2009; Brody, 1998; National Bioethics Advisory Commission, 2001; Resnik, 2004; ICMJE, 2008). To ensure that an international code of research integrity standards has significant influence, the groups promulgating the code should consider partnering with scientific and professional organizations in various countries, government agencies, journals, universities and others with an interest in research integrity. Ideally, a partnership with organizations in different countries should be formed before the ethical standards are adopted, so that instruments necessary for publicizing and promoting the standard would already be in place.

The development of international standards of research integrity is clearly an idea whose time has come. In fact, international standards of research integrity are long overdue. Hopefully, some of the practical difficulties with advancing these standards will be overcome soon, so that scientists will have guidelines for international research.

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Author

Address correspondence to Robin Pierce, J.D., Ph.D., Novel Tech Ethics, Dalhousie University, 1234 LeMerchant Street, Halifax, Nova Scotia, B3H 3P7, Canada. E-mail: pierce7@post.harvard.edu

