Summary of NSF and NIH RCR Instruction Requirements

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National Science Foundation (NSF)

In 2007, the U.S. Congress passed the “America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act,” or the America COMPETES Act (H.R. 2272). One short paragraph in this 147-page law orders NSF to promote RCR training. Quoted in full:²

SEC. 7009. RESPONSIBLE CONDUCT OF RESEARCH.

The Director shall require that each institution that applies for financial assistance from the Foundation for science and engineering research or education describe in Its grant proposal a plan to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduate students, graduate students, and postdoctoral researchers participating in the proposed research project. [page 109]

NSF’s one-paragraph implementation plan³ for section 7009, effective January 4, 2010, requires institutions to certify in proposal submissions “that the institution has a plan to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students, and postdoctoral researchers who will be supported by NSF to conduct research.” These plans need not be included in proposals, but the plans are “subject review upon request.” Institutions are “responsible for verifying” that the required groups “have received RCR training.”

The last two sentences of the implementation plan concern NSF’s support for the “development of an on-line RCR resource containing research findings, pedagogical materials, and promising practices regarding RCR in science and engineering.” This on-line resource can be found at http://www.nationalethicscenter.org/.

NSF has also provided a 17-point FAQ sheet,⁴ updated August 16, 2010, to clarify the implementation plan. Items of interest include:

3. … NSF anticipates that institutions will develop their RCR training programs in a manner that helps prepare the next generation of researchers, including the consideration

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of risks or other factors associated with student and postdoctoral researcher participation in research.

4. … it is the responsibility of each institution to determine both the content and the delivery method for the training that will meet the institution’s specific needs for RCR training in all areas at that institution for which NSF provides support. …

6. … The RCR training requirement does flow down to all subawardees, at any tier. …

**National Institutes of Health (NIH)**

**Sources**

The National Institutes of Health announced the first “Requirement for Programs on the Responsible Conduct of Research” in 1989. The requirement has been updated and elaborated several times. This summary comes from “Update on the Requirement for Instruction in the Responsible Conduct of Research,” NOT-OD-10-019, November 24, 2009. Please note that the 2011 NIH Grants Policy Statement includes three substantially similar sections to cover three different kinds of grants, as follows:

- 11.2.3.4 – Ruth L. Kirschstein National Research Service Awards for **individual fellowships**
- 11.3.3.5 – Ruth L. Kirschstein National Research Service Awards for **institutional research training grants**
- 12.4.1.4 – Research Career Development ("K") Awards

Anyone responsible for RCR education should refer to the specific portion of the Grants Policy Statement and should not rely on this summary.

**Summary**

The latest NIH requirements for RCR instruction are based on “some of the consensus best practices that have evolved in the research training community over the past two decades.”

**Definition**

The responsible conduct of research is “the practice of scientific investigation with integrity. It involves the awareness and application of established professional norms and ethical principles in the performance of all activities related to scientific research.”

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**Basic Principles**

Six principles “based on key concepts about responsible conduct of research and best practices” emphasize that

1. RCR and RCR instruction are “essential” and “integral” to research training and programs;
2. RCR is a career-spanning endeavor and RCR instruction should “be appropriate to the career stage” of trainees;
3. individuals “supported by individual funding opportunities” (in contrast to institutional grants) “are encouraged to assume individual and personal responsibility” for their own RCR instruction;
4. research faculty should be involved in RCR instruction and serve as “effective role models;”
5. RCR instruction should include “face-to-face discussions by course participants and faculty” (online training is inadequate); and
6. RCR instruction “must be carefully evaluated” in NIH grant applications.

**Instructional Components**

RCR instruction “occurs formally and informally.” Formal instruction should include the following five instructional components that “have been incorporated into many of the best regarded programs of instruction in responsible conduct of research.”

1. The **format** should emphasize “substantial face-to-face discussions among the participating trainees/fellows/scholars/participants; a combination of didactic and small-group discussions (e.g. case studies); and participation of research training faculty members in instruction in responsible conduct of research.” Online instruction can be used, but it is not sufficient.

2. “Most acceptable plans” have included the following **subject matter** (quoted verbatim):
   a. conflict of interest – personal, professional, and financial
   b. policies regarding human subjects, live vertebrate animal subjects in research, and safe laboratory practices
   c. mentor/mentee responsibilities and relationships
   d. collaborative research including collaborations with industry
   e. peer review
   f. data acquisition and laboratory tools; management, sharing and ownership
   g. research misconduct and policies for handling misconduct
   h. responsible authorship and publication
   i. the scientist as a responsible member of society, contemporary ethical issues in biomedical research, and the environmental and societal impacts of scientific research

Courses related to “professional ethics, ethical issues in clinical research,” and the like are usually “not sufficient to cover all of the above topics.”
3. There should be substantial **faculty participation**: “Training faculty and sponsors/mentors are highly encouraged to contribute both to formal and informal instruction in responsible conduct of research.”

4. The **duration of instruction** “should involve substantive contact hours between the trainees/fellows/scholars/participants and the participating faculty. Acceptable programs generally involve **at least eight contact hours**” (my emphasis). A series of short seminars, workshops, etc., over time are preferred to a single one-day event.

5. The **frequency of instruction** should span the stages of “a scientist’s career: at the undergraduate, post-baccalaureate, predoctoral, postdoctoral, and faculty levels. … Instruction must be undertaken at least once during each career stage, and at a frequency of no less than **once every four years**” (my emphasis). Predoctoral training should occur “as early as possible in graduate school.”