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### Expanding the Scope of Responsible Conduct of Research Instruction

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# Expanding the Scope of Responsible Conduct of Research Instruction

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We argue that responsible conduct research (RCR) instruction should be extended beyond students and trainees funded by the National Institutes of Health (NIH) or National Science Foundation (NSF) to include all students, trainees, faculty, and research staff involved in research. Extending the scope of RCR instruction can help institutions develop and maintain an environment that promotes ethical research conduct. Universities and scientific organizations have objected to expanding the scope of RCR instruction on the grounds that it would be a major undertaking that would require the expenditure of additional institutional resources. We argue, however, that expanding the scope of RCR instruction can be done efficiently without placing undue burdens on institutions.

**Keywords:** education, ethics, faculty, instruction, integrity, responsible conduct of research, staff, students, trainees

Most of the educational efforts to promote responsible conduct of research (RCR) have focused on students and trainees. The National Institutes of Health (NIH)'s RCR instructional requirements for extramural research apply to graduate students, trainees, post-doctoral fellows, and scholars supported by Public Health Service (PHS) training grants, career development awards, research education grants, or dissertation research grants (National Institutes of Health, 2013). The National Science Foundation (NSF)'s RCR instructional requirements for extramural research apply to undergraduate, graduate, and post-doctoral students supported by NSF funds (National Science Foundation, 2009). Though some U.S. institutions have gone beyond these federal requirements and extend mandatory RCR instruction to all graduate

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students or faculty supported by external funds or involved in human subjects research, most U.S. research institutions, with the notable exception of NIH's intramural program, do not require faculty to receive any RCR education (Resnik and Dinse, 2012).

While the federal RCR instructional requirements have played an important role in promoting research integrity at U.S. universities and colleges, one could argue that the scope of these requirements should be expanded to include all students, trainees, faculty, and staff involved in research. The reasons for including more students and trainees in RCR training than currently required by federal policies is that students and trainees who are not supported by NIH or NSF grants may still be involved in research. If an important goal of RCR instruction is to promote research integrity throughout the institution, it makes little sense to exclude entire classes of students or trainees from instructional requirements, since they will also need RCR education. Students and trainees who are not funded by NIH or NSF still need to know about misconduct, data management, authorship, publication practices, peer review, and other key topic of RCR instruction (Mastroianni and Kahn, 1998).

Moreover, excluding classes of students or trainees who are not funded by NIH or NSF from RCR instructional requirements sends a mixed a message. Two students working in the same department on similar projects could be subject to different educational requirements. A student funded by NIH would need to meet RCR educational requirements, while one funded by a grant from a private foundation would not. Students and trainees may question whether RCR instruction is important if it is not applied consistently throughout the institution. If they doubt the importance of RCR education, they may also have second thoughts about the importance of research integrity.

While few people would question the wisdom of educating more students and trainees in RCR, the argument for extending RCR instructional requirements to faculty and staff involved in research may be more controversial. The main reason for extending these requirements to faculty and staff involved in research is that they play a key role in promoting research integrity at academic institutions. First, faculty and research staff are directly involved in the conduct of research. Faculty members are the leaders of laboratories and primary drivers of research. They typically set the direction and practice of how research is conducted. Faculty members participate in all different areas of research, from conception and design, to data analysis and interpretation, to publication, whereas research staff usually collect data and provide technical support. Research staff, such as technicians and research associates, are usually the most knowledgeable people in the laboratory about procedures, materials, and methods.

Second, faculty mentor students, trainees, and staff in good research practices, including RCR. Indeed, some studies have indicated that mentoring

is perhaps the most important aspect of RCR education (Wright et al., 2008; Fisher et al., 2009; Ripley et al., 2012). To be an effective RCR mentor, one must already have a sound grasp of what it means to conduct research ethically, which implies that one already has some education or training in RCR.

Third, faculty who are involved in research administration—lab directors, department heads, deans, vice presidents, and others—can promote RCR by providing an example for others to follow and setting a positive tone for the entire institution. They can ensure that ethical standards are upheld and that reports of unethical or illegal conduct are investigated properly (Institute of Medicine, 2002). Since institutional administrators typically are also faculty members with home departments, it makes sense that they also should be trained in RCR.

Unethical conduct by faculty members who are institutional leaders can poison the research environment in obvious and insidious ways. First, unethical leadership can encourage others to behave unethically and generate institutional corruption (Institute of Medicine, 2002; Shamoo and Resnik, 2009). If faculty, students, and staff know that a lab director is fabricating or falsifying data, they may be tempted to do the same or to bend or break the rules in other ways. Even worse, a research administrator may instruct others to engage in unethical behavior, such as faking data or flouting rules for research with human or animal subjects. Faculty and staff do not have to break the rules to facilitate bad behavior of their trainees. Setting up a hypercompetitive environment and encouraging cutting corners, overtly or passively, sends a message to the lab that winning is more important than research integrity.

Second, if research administrators fail to properly investigate (or cover up) allegations of misconduct, noncompliance, or other transgressions, then these problems will continue to fester and grow worse. Moreover, faculty, students, and staff may decide to ignore suspected unethical or illegal behavior, since they may conclude that their reports will be ignored, or will place the reporter in a tenuous situation.

Third, if faculty, students, and staff regard decisions made by institutional leaders as unfair, arbitrary, biased, or wasteful, they may have less respect for the institution and its aims and policies, and may therefore violate institutional rules, misuse resources, or put less effort into their work performance (Martinson et al., 2006, 2010).

Fourth, decisions made by institutional leaders can have wide-ranging impacts and can lead to ethically problematic situations. For example, if a vice president approves a contract with a private company that creates egregious financial conflicts of interest, this decision can affect many different individuals who conduct research under the terms of the contract, since they may engage in unethical behaviors to promote their own or the company's financial interests (Resnik, 2007). Transparency of practice, codes of conduct, and RCR should be initiated and led by university, college, and departmental leaders.

In July 2000, the Office of Research Integrity, which oversees PHS research, proposed a policy to extend mandated RCR instruction to all individuals supported by PHS funds, including faculty and research staff. The policy was finalized in December 2000 in response to public comments (Steneck and Bulger, 2007). However, this policy was suspended indefinitely in January 2001 to allow for additional review of the substance of the policy and the process under which it was adopted. The policy has not been revived (Department of Health and Human Services, 2001).

Universities and scientific organizations objected to the PHS policy on the grounds that it would be a major undertaking that would require the expenditure of additional institutional resources. It would be another unfunded mandate from Washington (Steneck and Bulger, 2007). They also argued that it was not necessary to extend RCR instructional requirements to faculty and staff, because they probably already had adequate education and training in RCR. They argued that instructional efforts should focus on students and trainees (Steneck and Bulger, 2007).

Both of these objections to extending the scope of RCR instruction lack merit. First, institutions can employ several strategies to minimize their costs, such as including RCR training in indirect costs calculations. Many institutions already use online modules to supplement their in-person RCR educational programs for students and trainees. Some have developed their own modules, while others use the Collaborative Institutional Training Initiative (CITI), organized by the University of Miami (Resnik and Dinse, 2012). Faculty and staff could do some form of online training in addition to in-person training. Indeed, some research organizations, such as national laboratories, already mandate online periodic ethics training as part of their staff's continued employment.

Enrollments in in-person sessions for students and trainees could be expanded to accommodate faculty and staff. Faculty could make a valuable contribution to instruction by offering their own perspectives on RCR drawn from their research experience. Faculty perspectives would be especially useful to students and trainees because they would provide real-life illustrations of abstract ideas and principles. Indeed, these team-taught courses can be enjoyable (Stewart and Edwards, 2008). At the University of Tennessee, four faculty members and several postdocs have taught research ethics to small class-sizes, an easily implemented model (Stewart, 2011).

Second, there is little evidence to support the claim that faculty and staff instruction in RCR is not necessary. While certainly some faculty and staff have already received some systematic RCR education, many—perhaps most—have not. Mandated instruction in RCR for NIH-funded trainees did not begin until 1989, and NSF's expanded training requirements did not begin until 2009. Thus, it is likely that NIH-funded investigators whose careers began before 1989 and NSF-funded investigators whose careers began before

2009 have received no formal instruction. Additionally, many faculty and staff have conducted research without NIH or NSF support. Other agencies that fund non-biomedical science and engineering, such as the U.S. Department of Agriculture, U.S. Department of Energy, National Aeronautics and Space Administration (NASA), and Department of Defense research agencies require no RCR training. There are numerous faculty in the United States that run their entire laboratories using funds with no RCR training mandates. Moreover, periodic updates or refresher courses in RCR can be valuable for those who have received some initial education, since accepted practices and institutional policies can change over time.

Indeed, there is some evidence that senior faculty behave more unethically—and thus have a greater need for RCR training—than younger scientists. A survey sent to NIH grant recipients asked for anonymous self-reporting of research misconduct and questionable research practices by yes/no responses to several questions (Martinson et al., 2005). The survey was sent to NIH-supported young scientists (average age of 35 years) and mid-career scientists (average age, 44 years). In a subset of the survey items (6 out of 16 items) the older researchers self-reported higher incidences of misconduct and questionable research practices. In no items did they report lower frequency (Martinson et al., 2005). One interpretation is that older scientists learn to be successful by skirting the rules. Another interpretation is that the younger scientists (recipients of NIH postdoctoral fellowships) would have been RCR-trained whereas the older scientists (recipients of R01 grants) would not necessarily have been RCR-trained. Either tack argues for universal RCR training of faculty.

If RCR education is extended to faculty, the curriculum should address topics relevant to faculty, which are not covered in traditional RCR courses, such as the following ones: stewardship of resources; fairness and accountability in administrative decision-making; supervision of subordinates and management of personnel; mentoring (from a faculty perspective); oversight of research to ensure compliance with laws and institutional policies; laboratory safety; workplace diversity and antidiscrimination laws and policies; leadership; and effective resolution of conflicts among members of one's department, laboratory, or research group. Providing faculty with education in these and other topics that go beyond the traditional RCR curriculum can help them conduct research responsibly and deal with difficult issues that arise in academic science. Arguably, training in any of these aspects would lead to stronger institutions and research endeavors.

Many commentators who have studied scientific integrity or are involved in research oversight or RCR education have stressed the importance developing and maintaining an environment that fosters ethical conduct (Institute of Medicine, 2002; Vagird, 2007; Shamoo and Resnik, 2009; Geller et al., 2010; Kornfield, 2012). In such an environment, members of the academic community



not only are familiar with the institution's RCR policies and oversight mechanisms, but also recognize the importance of integrity for the conduct of research, mentoring, formal education, social interactions, and university administration. Institutional leaders stress the importance of integrity through their words and deeds and support those who report misconduct or illegal activities or require advice on ethical issues. Ethics is not an afterthought but is woven throughout the fabric of the institutional culture (Institute of Medicine, 2002). Extending RCR instruction to all students, trainees, faculty, and staff involved in research can help institutions to develop and maintain this type of environment.

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