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Foreword

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Scientists today need to have a broad perspective on what it means to conduct research that is consistent with current and evolving standards on responsible conduct of research (RCR). Educated scientists who are well versed in RCR will be able to provide stronger peer review, help to identify possible misconduct or questionable research practices before publication, know how to assure integrity in data when working with other disciplines or working internationally, openly discuss research misconduct with others, provide stronger RCR-focused training opportunities, and set standards, act as role models, and review data with their trainees as well as their colleagues. Being an informed scientist further requires the development of an in depth and broad ethical perspective gained through a professional commitment to examine responsible research practice issues. How many scientists can you identify who demonstrate on a daily basis this type of RCR role modeling behavior?

In the past twenty years, scientists have been exposed to many forms of communications about the importance of research integrity and the need to prevent research misconduct (DHHS, 2001; IOM, 2002: NAS, 1989a, 1997; NIH, 2009; Macrina, 2014; Shamoo and Resnik, 2015). How well has such information been incorporated? Research on scientists' behaviors indicates that research faculty members often lack relevant knowledge on standards, practices, and guidelines they need to know and apply (Anderson et al., 2007; Antes et al., 2009; House and Seeman, 2010; Kalichman, 2007; Titus, 2014); they are often not involved with educating their trainees on responsible research

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behaviors (Bird, 2001; Feldman, 2009; Kornfeld, 2012; Nettles and Millett, 2006; Ripley, 2012; Titus, 2012; Wright, Titus, and Cornelison, 2008) and have not had appropriate or sufficient opportunities to receive training on being a better mentor (Kalichman, 2014: Ripley., 2012; Titus, 2012). This will impact on the development of scientists' skills to handle research and mentoring in cross-cutting fields and/or in conducting it on the global scale (Feldman, 2009; Cordova, 2015). In addition, the evolving changes in science also depend on involvement of scientists in discussion about responsible practices and ethical ramifications, yet scientists are often uncomfortable and try to avoid discussions on values (Devereaux, 2014; Kalichman, 2014; McCormick, 2012; Resnik, 2011, 2014; Wolpe, 2006). While RCR, as a term, has been identified in the lexicon of most researchers' vocabulary, it is demonstrably clear that it has not been fully acculturated by all faculty and trainees.

We are fortunate in this collection of articles to see how scientist-leaders have addressed this issue of applying ethical principles and responsible research practices. These authors have described how they have grappled with complex and difficult concerns encountered in promoting research integrity.

While this collection of articles was written by four chemical scientists, one anthropologist, and one chemical journalist, I can attest to the fact that they have written their articles so they are readable regardless of one's discipline. I am a social scientist, and I must admit that I was intimidated when I started to read the articles; I feared they would discuss chemistry from a perspective that only chemists could understand. However, these five articles are all very enjoyable to read and applicable to all research scientists.

Most importantly, these articles have authenticity and credibility because the scientists are writing about themselves and letting us see how they choose, under new conditions, to be responsive to the ethical issues on responsible research practices. They should be proud of their joint effort to openly explore complex subjects. They may be unlikely to think of themselves as role models—yet they are.

QUESTIONS AND PERSPECTIVES RAISED

What Is Responsible Citizenship?

In the parlance of the NIH directions on RCR, the authors each demonstrate how to be a "responsible member of society, (and deal) with contemporary ethical issues in biomedical research, and the environmental and societal impacts of scientific research" (NIH, 2009). Professor Jeffrey Kovac explores the myriad of ways that being a good citizen applies to all scientists and not just chemists:

Chemists face the same ethical challenges that all other scientists, and indeed all human beings must confront. Our future depends on our willingness to ask and answer these crucial ethical questions.

Can Conflicts Be Good for RCR?

Professor Roald Hoffmann describes how he believes that responsible research is enhanced when there are conflicts. Hoffmann posits that conflicts lead to "greater knowledge and better practices, which are important in honing ethical judgment." He writes from the heart of having lived through many conflicts, and his article should not be missed. By the way, Hoffmann is a Nobel Laureate in chemistry, and so you get to see how his special creative mind works.

Is Blogging Peer Review?

On a total contemporary issue, Dr. Ashutosh Jogalekar discusses his role as a blogger and why he believes that "online forums have emerged as a striking alternative—and some may say, second—tier of literature peer review." One has the opportunity to observe how an active blogger thinks about both a responsive process as well as at a responsible discussion on allegations of possible research misconduct.

How Does Science Reporting Apply RCR Principles?

On another contemporary level, we learn from Mr. William Schulz, the news editor for *Chemical & Engineering News*, how he focuses his efforts to gather reliable news based on facts. He describes struggles to report stories based on confirmed sources and verification, and he urges scientists to be willing to work with responsible reporters who are trying to report on relevant research issues and shine a light on research practices.

Why Do Difficulties in Honest Authorship Attribution Persist?

Scientists' behavior towards authorship attribution in scientific publications is examined by Drs. Jeffrey I. Seeman and Mark C. House. While RCR emphasizes honest reporting of data, including the determination and reporting of authorship, they find that application of this principle of integrity in publishing and effective resolution of disputes are lacking. Dr. Seeman and Dr. House explore why misattribution—or the perception of misattribution—exists, and they suggest ways to minimize this critical component in responsible research.

CONCLUSION: PROFESSIONAL COMMITMENT

This collection has moved research integrity education and discussion into the hands of scientists who demonstrate to us ways they consciously think about RCR and the ethical choices that confront them in their lives and in their mentoring roles with other scientists and students. These scientists also illustrate how they have acculturated RCR educational concepts and have a professional commitment to champion integrity. The articles in this special issue of *Accountability in Research* provide me with hope that more scientists will emerge who also will invest in and make a difference by actively recognizing their responsibility to promote discussion on responsible research practices and the related ethical issues.

DISCLAIMER

Sandra Titus is a Health Science Administrator in the Office of Research Integrity. However, this article was written in her personal capacity and the views expressed do not represent those of the Department of Health and Human Services or the Federal Government.

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